

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
SITE INVESTIGATION AND RESTORATION BRANCH

FINAL PLAN OF REMEDIAL ACTION



March 2007

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**Rodney Village Shopping Center
Dover, Delaware**

DNREC Project No. DE-1288

This Final Plan of Remedial Action (Final Plan) presents the Department of Natural Resources and Environmental Control's (DNREC's) preferred cleanup alternative for the remediation at the Rodney Village Shopping Center (Site) in Dover, Delaware. For Site-related reports and more information, please see the public participation section of this document.

The purpose of the Final Plan is to provide: 1) specific information about the contamination present at the Site and 2) the presumptive remedy DNREC has considered as the remedial action for the Site. A presumptive remedy is the preferred and established remedial alternative for common categories of releases or facilities and the remedy being proposed falls into this category. In addition, as described in Section 12 of the Delaware Hazardous Substance Cleanup Act (HSCA), DNREC provided notice to the public and an opportunity for the public to comment on the proposed plan. During the comment period from February 28 to March 20, 2007, DNREC did not receive any comment on the proposed plan; therefore, the proposed plan has been adopted as the Final Plan.

This Final Plan summarizes the Remedial Investigation dated November 12, 2004 and the Supplemental Remedial Investigation Report dated April 17, 2006. These reports are included in the administrative record file upon which this Final Plan is based. Copies of these documents can be obtained or viewed at DNREC offices in New Castle, Delaware.

INTRODUCTION

The Site is located at 1724 South Governors Avenue, in Kent County, Dover, Delaware (Figure 1). The coordinates of the approximate center of the Site are: Latitude 39° 07' 36.72'' (North), Longitude 75° 31' 55.08'' (West).

Rodney Village, LLC entered into the Voluntary Cleanup Program (VCP) under the provisions of the Hazardous Substance Cleanup Act (HSCA), 7 Del. C. Chapter 91. Through the VCP Agreement, Rodney Village, LLC agreed to perform an investigation to identify whether any risks to public health, welfare and the environment are present at the Site and to perform the remedy, if necessary. Rodney Village, LLC contracted Environmental Alliance, Inc. (Alliance), a HSCA-approved environmental consulting company, to perform the investigation.

SITE DESCRIPTION AND HISTORY

The Site is a portion of a 15.5-acre tax parcel (2-00.08516-04-65.00-00), located at 1724 South Governors Avenue, Dover, Delaware (Figure 2). The Site is bordered by Route 13 to the east, Charles Polk Road to the south, and Rodney Village Development to the north and west. The property consists of a shopping center with over 200,000 square feet of buildings and an associated parking lot. The multi-tenant commercial/retail shopping center contains a grocery store, a Goodwill thrift store, and several other retail stores. A dry cleaning facility was located on the property. The current tenant of the former dry cleaning facility is a hair styling salon. Properties in the general vicinity of the Site include residential and commercial land uses. The Site is supplied by water from offsite sources through a public water system.

The location of the former dry cleaners is known, but details of the operating history are unclear. Information obtained during the RI indicated that the dry cleaners operated in the 1970s and 1980s. Prior to the building of a shopping center in 1959, the property was reported to be farmland.

Surrounding property uses include commercial businesses along Route 13, with residences adjacent to the property on the west, and more residential properties east of Route 13. The nearest body of water is a stream - Isaac Branch – that is located within a few hundred feet of the property to the south.

INVESTIGATION RESULTS

Alliance completed a Remedial Investigation (RI) dated November 12, 2004 and the Supplemental Remedial Investigation Report (SRI) dated April 17, 2006. These investigations included the collection of samples from the soil, groundwater and soil gas beneath the Site. Based on the operational history of the Site, only compounds which were related to dry cleaning operation (ie. Volatile organic compounds or VOCs) were analyzed. Several contaminants were detected in soil gas and groundwater above DNREC's screening criteria.

A detailed discussion of the sampling results is included in the RI and SRI report. The following is a summary of the investigation results.

SOIL

Soil samples were analyzed for VOCs. No VOCs were detected above the DNREC's Uniform Risk Based Standard (URS) for unrestricted use in the soils.

GROUNDWATER

Groundwater at the Site occurs at depths ranging from approximately 7 to 17 feet below ground surface (bgs). The groundwater zone consists of medium grained sand, underlain by a silt layer found at depths ranging from 22 to 30 feet bgs. Groundwater flow is generally toward the southeast.

During the RI, groundwater samples were collected from seven (7) monitoring wells during several groundwater sampling events. Sampling results indicated that only chloromethane and tetrachloroethene (PCE) exceeded DNREC's groundwater URS in select wells. However, down gradient wells installed at the property boundary did not detect any similar contaminants. Methyl-tert-butyl-ether (MTBE) was detected above the DNREC criteria in one geoprobe well during a Phase II environmental investigation. However, this chemical was not associated with any site operations and has not been detected during any of the subsequent groundwater sampling events. For this reason, it is not considered a site contaminant of concern. DNREC's Tank Management Branch is addressing the source of MTBE in the area. Table 1 lists the maximum concentrations of contaminants of concern (COCs) identified in groundwater.

Table 1 Groundwater Results

<u>Contaminant</u>	<u>Maximum Concentration*</u> (ug/L)	<u>Groundwater URS</u> (ug/L)
<i>Organics (VOCs)</i>		
Tetrachloroethene (PCE)	17	5/1
Chloromethane	6	3/2

* Maximum Concentration detected in groundwater during the Phase II and RI.

ug/L – micrograms per liter (parts per billion or ppb)

Note: The URS provides two criteria for the substances indicated. The lowest of these is used for screening purposes.

SOIL GAS

During the SRI, three (3) soil vapor probes were installed through the former dry cleaning building concrete floor. Using these probes, air from under the concrete floor (sub-slab samples) was collected to test for VOCs that could potentially migrate from under the building into the occupied building. Table 2 lists the maximum contaminant concentrations detected for each soil gas sample.

Table 2 Sub-Slab Soil Vapor Sampling Results

<u>Contaminant</u>	<u>Maximum Concentration*</u> (ppbV)	<u>J&E Derived RBCs**</u> (ppbV)
<i>Organics (VOCs)</i>		
Acetonitrile	16	14,020
Benzene	1	38.93
Chloroform	4 J	8.57
Cis-1,2-Dichloroethene	2,600	3555
Methylene Chloride	330	462.6
Tetrachloroethene	4,000	48.22
Trans-1,2-Dichloroethene	22 J	7127
Trichloroethene (TCE)	1,200	1.65
Total Xylenes	35 J	1,940,000

* Maximum Concentration detected in sub-slab soil gas.

** Backward calculation of the Risk-Based Concentration using the Johnson and Ettinger Model for a 1×10^{-6} risk and a hazard index of 0.1

ppbV – parts per billion by volume

J Estimated concentration

SITE RISK EVALUATION

A risk assessment was performed to identify the potential effects to human health and the environment posed by contaminants of concern at the Site.

Soil

No contaminants of concern were identified in the soil and therefore no risk calculation for soil was necessary.

Groundwater

The total carcinogenic risk for groundwater was calculated at 1.64×10^{-4} , which exceeds DNREC's acceptable risk level of 1×10^{-5} . Currently groundwater from the site is not being utilized for human consumption. Therefore groundwater migration to the property boundary was evaluated. A conservative fate and transport analytical model was used and demonstrated the COCs would be below URS criteria at the property boundary. The fate and transport model was confirmed by the RI results that showed no detections of COCs in groundwater at the down gradient property boundary during two monitoring events.

Soil Vapor Intrusion Risk Assessment

Based on the sub-slab air sampling results, a quantitative risk assessment was performed to identify the risks from the potential exposure to vapor that may migrate into the building from the subsurface through cracks in the floor.

An EPA approved vapor intrusion to indoor air model was used to determine the potential risk to occupants through the inhalation pathway. Using the maximum sub-slab concentrations (Table 2) as inputs to the model, the cumulative carcinogenic risk was 1.33×10^{-3} , which is greater than

the HSCA target level of 1×10^{-5} . The compounds contributing to the elevated risks were PCE and TCE. The calculated non-carcinogenic risk (Hazard Index) was 2.15, which is greater than the HSCA target level of 1.0.

REMEDIAL ACTION OBJECTIVES

According to Section 8.4(1) of the HSCA Regulations, Site-specific remedial action objectives (RAOs) must be established for all plans of remedial action. The Regulations provide that DNREC will set objectives for land use, resource use, and cleanup levels that are protective of human health and the environment. The following qualitative RAOs are appropriate for the Site:

- Prevent potential human exposure to VOC vapors from sub-slab soil gas into the former dry cleaner building that would result in potentially unacceptable human exposure.
- Prevent the use of groundwater without DNREC's prior written approval at the Site as long as groundwater is contaminated with hazardous substances at unacceptable concentrations.

These objectives are consistent with the current and future development plans of the Site, City of Dover zoning policies, and applicable state and local regulations.

Quantitative objectives define specific levels of remedial action to achieve protection of human health and the environment. Based on the qualitative RAOs, the following quantitative RAOs based on an unrestricted Site use are appropriate:

- Prevent potential human exposure to VOC vapors from sub-slab soil gas in the former dry cleaner building that would result in a cumulative carcinogenic risk factor greater than 1×10^{-5} and a non-carcinogenic risk greater than a Hazard Index of 1.0.
- Prevent the use of the groundwater contaminated with PCE and chloromethane that would result in a cumulative risk factor greater than 1×10^{-5} and a non-carcinogenic risk factor greater than a Hazard Index of 1.0.

EVALUATION OF REMEDIAL ALTERNATIVE

A presumptive remedy approach is the preferred and established remedial alternative for common categories of releases or facilities. The presumptive remedy considered for the Site was installation of a sub-slab vapor extraction system to act as an engineering control to minimize the potential for vapor migration into the building and to mitigate presence of these VOCs in the sub-slab space.

According to Subsection 8.5(3) of the HSCA Regulations, "The Department may consider and approve any presumptive remedy that is determined to satisfy the requirements contained in Subsection 8.6". Installation of the sub-slab vapor extraction system was determined to be protective of human health, welfare and the environment and meet the remaining requirements of Subsection 8.6.

This technology (sub-slab vapor extraction system) has been widely used and accepted in the remediation of radon beneath buildings. DNREC has accepted installation of the sub-slab soil vapor extraction system as the preferred remedial action for the Site since the remedy meets the criteria presented above. The remedy removes the potential for human exposure to the VOC vapors and it can be implemented in a short time frame. The detailed design of the system, along with the Operation and Maintenance (O&M) details of the system will be presented to DNREC in a Remedial Action Implementation Work Plan upon approval of the Final Plan. The estimated cost to implement the sub-slab vapor extraction system remedy as well as O&M requirements is \$25,000. The estimated time of operation for the sub-slab vapor extraction system is approximately 2 years.

FINAL PLAN OF REMEDIAL ACTION

Based on DNREC's evaluation of the Site information, which includes current and past environmental investigations, historical information, the above remedial action objectives, and the evaluation of the presumptive remedy, DNREC requires that the following remedial actions be taken at the Site:

- 1) A sub-slab vapor extraction system will be installed in the former dry cleaners building. The sub-slab vapor extraction system will consist of a vacuum pump connected to piping to draw vapors out from beneath the building. The system will also provide a conduit for future vapor testing, and integrity of the vapor elimination system. The sub-slab vapor extraction system design would need to be reviewed and approved by DNREC-SIRB prior to its installation. The vented air will be required to be treated prior to discharge to the outside atmosphere. The system will be operated continuously and monitored until the vapor concentrations in the sub-slab reach acceptable levels as determined by DNREC.
- 2) A DNREC-approved Operations and Monitoring (O&M) Plan will be established and implemented within 90 days following DNREC's adoption of the Final Plan. Current and future owners of the property will be responsible for implementation of all aspects and costs of the approved remedy, including all requirements of the final plan, the approved O&M Plan, and adherence to the requirements and conditions established in the Uniform Environmental Covenant for the site. The O&M Plan will include operation and monitoring of the sub-slab vapor extraction system and groundwater monitoring at the property boundary wells.
- 3) An environmental covenant, consistent with Delaware's Uniform Environmental Covenants Act, UECA (Title 7, Del. Code Chapter 79, Subtitle II), will be required at the Site, within 90-days following DNREC's adoption of the Final Plan of Remedial Action. The environmental covenant will describe the restrictions regarding the use of groundwater at the Site in accordance with the Groundwater Management Zone (GMZ) described below.
- 4) DNREC will place a Groundwater Management Zone (GMZ) on the Site that will stipulate that DNREC's review and approval will be required before placement of any water supply well or usage of groundwater at the Site. The GMZ will prohibit the installation of any water supply well in the shallow aquifer. Water supply wells may be installed in the deeper aquifer only upon DNREC's written approval. DNREC may consider removal of the GMZ and the environmental covenant as applicable based on future information.

PUBLIC PARTICIPATION

The Department actively solicited written public comments and suggestions on the Proposed Plan of Remedial Action. The comment period began on February 28, 2007 and ended on March 20, 2007. No comments were received. If you have any questions or concerns regarding the Rodney Village Shopping Center site, or if you would like to view reports or other information regarding the site, please contact the project manager, Rick Galloway at 391 Lukens Drive, New Castle, Delaware 19720, or at 302.395.2600.

DECLARATION

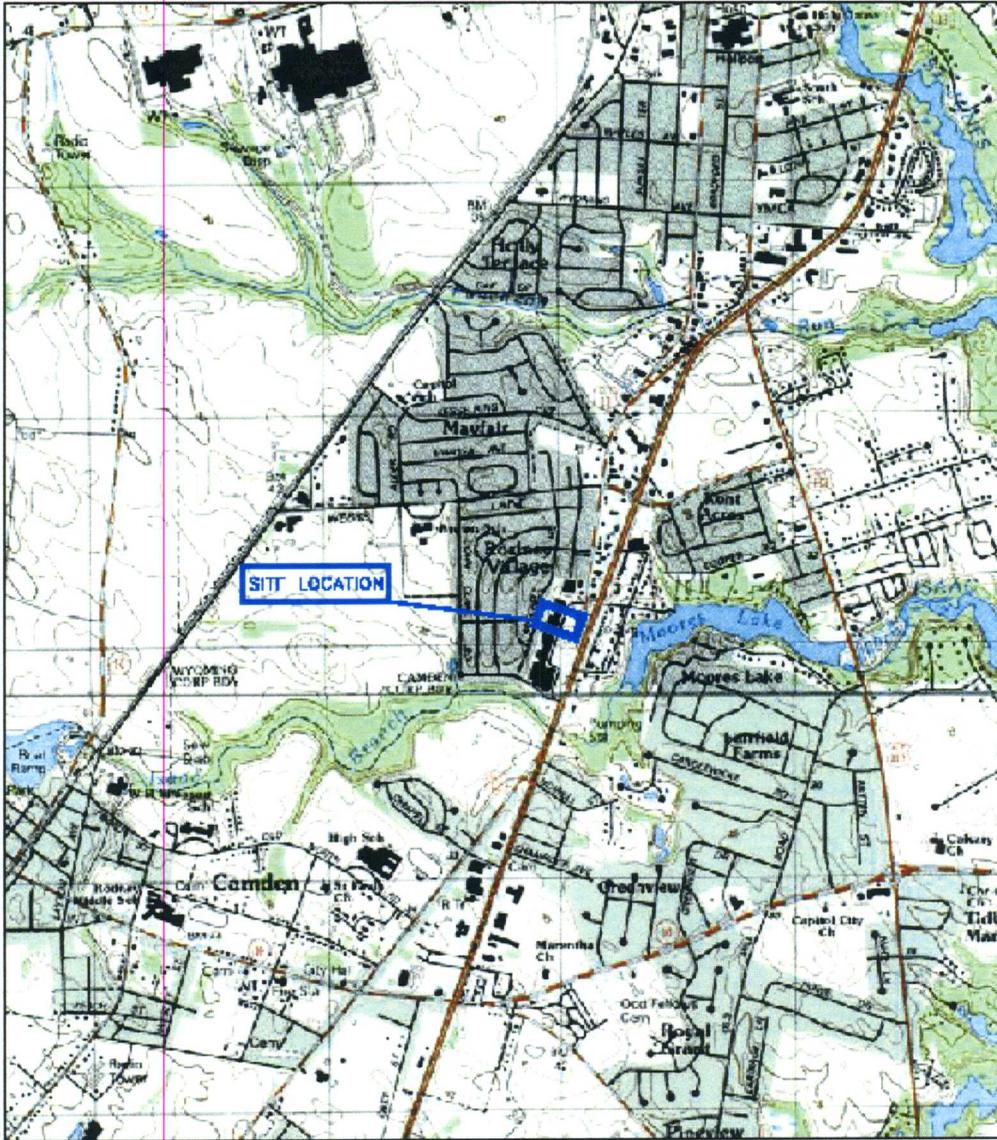
The Final Plan of Remedial Action for the Rodney Village Shopping Center site is protective of human health, welfare and the environment, and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.


James D. Werner, Director,
Division of Air and Waste Management

3/29/07
Date

RMG:ebg
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FIGURES



0 300 FT
 APPROPRIATE SCALE



DATE: 7/14/06

BY:

AGG

BY:

FIGURE 1
 SITG TOPOGRAPHIC MAP
 RODNEY VILLAGE SHOPPING CENTER
 DOWR, DELAWARE

Source: USGS Dover & Wyoming, DFL Quadrangles



Legend

-  Monitoring Well
-  15.5 Acre Tax Parcel
-  Subject Site

**Rodney Village Shopping Center
Dover, Delaware**

SITE PLAN

DRAWN BY: MAN	FILE NAME: 1828m04.mxd	SCALE: SEE DRAWING	FIGURE NO: 2
APPROVED BY:	PROJECT NO: 1828	DATE: 10/23/08	