Department of Environmental Conservation

Division of Environmental Remediation

Environmental Restoration
Record of Decision
Chestnut Ridge Village Park
Chestnut Ridge (V) Rockland County
Site Number B-00037-3

February 2001

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

DECLARATION STATEMENT
ENVIRONMENTAL RESTORATION RECORD OF DECISION

"Chestnut Ridge Village Park" Environmental Restoration Site
Chestnut Ridge, Rockland County, New York
Site No. B-00037-3

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Chestnut Ridge Village Park environmental restoration site which was chosen in accordance with the New York State Environmental Conservation Law.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Chestnut Ridge Village Park environmental restoration site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous substances and/or petroleum products from this site, if not addressed by implementing the remedy selected in this ROD, presents a potential threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Site Investigation/Remedial Alternatives Report (SI/RAR) for the Chestnut Ridge Village Park and the criteria identified for evaluation of alternatives, the NYSDEC has selected soil excavation with extraction of groundwater. The components of the remedy are as follows:

- the source areas of contaminated soil will be excavated and disposed off-site in an appropriate manner,
- contaminated groundwater will be pumped out during the excavation of the contaminated soil,
- if groundwater contamination remains above groundwater standards after a period of six months following soil excavation, a contingency groundwater remedy involving oxygen release compound (ORC) bioremediation will be implemented,
- groundwater monitoring will be conducted until results indicate that no further threat to groundwater exists, and

- the building on-site will be demolished.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective.

3/9/01

Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health, has selected this remedy to address the threat the environment created by the presence of hazardous substances at the Chestnut Ridge Village Park.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Under the Environmental Restoration (Brownfields) Program, the State may provide a grant to the village to reimburse up to 75 percent of the eligible costs for site remediation activities. Once remediated, the property can then be reused.

The Chestnut Ridge Village Park site is an abandoned gasoline service station and garage located on the corner of Red Schoolhouse Road and Chestnut Ridge Road in the Village of Chestnut Ridge in Rockland County. As more fully described in Sections 3 and 4 of this document, leaking underground storage tanks and piping have resulted in the release of a number of hazardous substances, including lead and toluene, at the site. These disposal activities have resulted in the following threats to the environment:

- an environmental threat associated with the impacts of contaminants to the on-site soil and groundwater.

Although there is currently no public exposure to contaminated soil or groundwater, the potential exists for future public contact with site soils and migration of contaminants into drinking water wells. In order to eliminate or mitigate the threats to the public health and/or the environment that the hazardous substances disposed at the Chestnut Ridge Village Park brownfield site have caused, the following remedy was selected to allow for recreational use of the site:

- the source areas of contaminated soil will be excavated and disposed off-site in an appropriate manner,

- contaminated groundwater will be pumped out during the excavation of the contaminated soil,

- if groundwater contamination remains above ambient quality standards for six months after soil excavation, a contingency groundwater remedy involving oxygen release compound (ORC) bioremediation will be implemented,

- groundwater monitoring will be conducted until results indicate that no further threat to groundwater exists, and

- the building onesite will be demolished.

The selected remedy, discussed in detail in Section 8 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD) in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The site is an abandoned gasoline service station and garage and is approximately one half acre in size. The gas station is located on the corner of Red Schoolhouse Road and Chestnut Ridge Road in the Village of Chestnut Ridge. The garage on the site is set back 105 feet from the road. The site is mostly paved with a small woodland area behind the building. The site setting is suburban with residences and businesses nearby. Public drinking water is supplied to the residences and businesses in the area. An adjacent property to the west of the site is also an abandoned gasoline service station. Other surrounding properties include two small shopping plazas and a bank. An intermittent stream, Pine Brook, is located to the northwest of the site. See Figures 1 and 2 for the general location of the site and the layout of the site. The Village is planning to use the site as a recreational park once the remediation is complete.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Leaking underground storage tanks (USTs), associated piping, and the dispenser islands contributed to the soil and groundwater petroleum contamination. Spills may have occurred from filling of the USTs or filling vehicle gasoline tanks at the dispenser islands. The gasoline filling station was in operation from 1963 to 1992.

A drywell also contributed to the soil contamination on-site. The contamination likely occurred from the disposal of products associated with the service station, such as transmission fluids or waste solvents in the drywell via floor drains in the garage.

Used oil was stored in an underground waste oil tank located at the rear of the service station garage. Stained soil was observed in the area of the waste oil tank and may have occurred when the tank was filled with oil.

Three 35egallon drums were located in the service station garage and contained waste oil or spent solvent. A Safety Kleen parts washer sink was also located in the garage. The drums were removed, but the sink is still present in the building.

3.2: Environmental Restoration History

A Phase I Environmental Assessment was completed in April 1997 by the Village of Chestnut Ridge to address the disposal of hazardous substances. The Phase I Environmental Assessment identified areas of concern at the waste oil tank, the petroleum underground storage tanks, the septic system, the hydraulic lift in the garage, the dispenser islands, and the drywell. The report recommended further investigation of the site.

In September 1998, the Village submitted a work plan to perform a Site Investigation (SI) and evaluate remedial alternatives (RA) for the site and the NYSDEC approved the SI/RA work plan. The site investigation began in October 1998 and continued through March 2000.

SECTION 4: SITE CONTAMINATION

To determine the nature and extent of any contamination by hazardous substances of this environmental restoration site, the Village of Chestnut Ridge has recently completed a Site Investigation/Remedial Alternatives Report (SI/RAR).

4.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site.

The SI was conducted in three phases. The first phase was conducted between October 1998 and March 1999, the second phase between August 1999 and September 1999, and the third phase between April 2000 and May 2000. A report entitled, "Site Investigation Report, March 28, 2000" has been prepared, which describes the field activities and findings of the SI in detail. An addendum letter was submitted with additional groundwater sampling analytical results on May 5, 2000.

The SI included the following activities:

- a geophysical survey to determine the location of any potential underground storage tanks or associated piping, known storage tanks, and filling stations;
- a soil gas survey to determine possible source areas of contamination;
- the installation of soil borings and monitoring wells for sampling and testing of soils and groundwater as well as physical properties of soil and hydrogeologic conditions; and
- the excavation and removal of the septic tank, waste oil tank, underground gasoline and fuel oil storage tanks, associated piping, and waste oil/spent solvent drums.

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the SI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Chestnut Ridge Village Park site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions and health-based exposure scenarios. In addition, for soils, background concentration levels can be considered for certain categories of contaminants.

Based on the site investigation results in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the SI Report.

Chemical concentrations are reported in parts per billion (ppb) or parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The geology consists of a shallow layer of gravelly silt loam above a layer of gravelly fine sandy loam. Loam is a rich, easily crumbled soil made up of silt, sand, clay, and organic matter in evenly mixed variously sized particles. The bedrock consists of sandstone and is located at approximately 20 feet below ground surface (bgs). Groundwater is located at approximately12 feet bgs and flows in an easterly direction.

There are no impermeable barriers to prevent the migration of the contamination. However, the groundwater does not appear to move quickly, and the groundwater contamination plume is localized around monitoring well MW-3 and remains on-site. This is most likely due to the fraction of organic matter, combination of soil types, and low permeability of the soil.

4.1.2: Nature of Contamination

As described in the SI report, many soil, groundwater, soil gas, and sediment samples were collected at and near the site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs are volatile organic compounds (VOCs), such as toluene and benzene, semi-volatile organic compounds (SVOCs), and metals, such as arsenic and cadmium.

VOCs are components of many different products, including petroleum. Benzene and toluene are commonly associated with gasoline spills. The particular VOCs at this site, when they are liquids, tend to be lighter than water which allows them to float. Volatile organic compounds, such as toluene, ethylbenzene, and xylene, were found in the drywell liquid. Benzene, toluene, ethylbenzene, and xylene (BTEX) were also found in the on-site groundwater.

Semi-volatile organic compounds (SVOCs) are similar to VOCs, but they volatilize less readily than VOCs. SVOCs can be found in petroleum products. SVOCs, consisting primarily of polynuclear aromatic hydrocarbons (PAHs), were found in the on-site soil.

Metals also occur naturally at low levels in soil. Some metals are soluble in water. Other metals are not very soluble in water, and they tend to persist in the environment. Metals, such as cadmium, chromium, and arsenic were found in the soil surrounding the drywell and in the liquid within the drywell. These metals are most likely due to oils and other products that were used at the service station and garage.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in groundwater and soil and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

The soil located at the underground gasoline storage tanks was contaminated with BTEX compounds and was excavated during the Interim Remedial Measure (IRM), as described in Section 4.2. Stained soil in the area of the waste oil tank was excavated with the waste oil tank during the IRM. Contaminated soil remains at the former northern dispenser island and on-site drywell. Figure 3 shows the locations of the soil borings and soil samples taken from the IRM excavations.

The former northern dispenser island is contaminated with VOCs, particularly BTEX compounds. Subsurface soils in this area have contaminant levels of 3 ppm benzene, 2.9 ppm toluene, 9.7 ppm of ethylbenzene, and 12 ppm of xylenes. The SCGs for these compounds in soil are 0.06 ppm, 1.5 ppm, 5.5 ppm, and 1.2 ppm, respectively.

The soil surrounding the drywell is contaminated with VOCs, SVOCs, and metals. The drywell soil contains higher concentrations of BTEX contamination than the former dispenser island, with 21 ppm benzene, 95 ppm toluene, 120 ppm ethylbenzene, and 100 ppm xylene. VOCs used as solvents, such as tetrachloroethylene, were detected below groundwater standards. Metals such as arsenic, cadmium, chromium, lead, and mercury were found at levels exceeding their SCGs. The levels (and their corresponding SCGs) are arsenic 93.3 parts per million (7.5 ppm), cadmium 38.6 ppm (10 ppm), chromium 98.5 ppm (50 ppm), lead 4,050 ppm (400 ppm), and mercury 0.88 ppm (0.1 ppm).

Groundwater

Three monitoring wells were installed on-site. Monitoring well MW-1 is located near the drywell on the southern portion of the site. Monitoring well MW-2 is located on the northwestern portion of the site. Monitoring wells MW-1 and MW-2 show no contamination exceeding groundwater quality standards. The monitoring wells are screened from 10 to 20 feet below ground surface and the wells straddle the water table. Since there was no contamination above groundwater standards in MW-1 or MW-2, the adjacent service station is not considered to be contributing to the on-site contamination.

Groundwater contamination is centralized around monitoring well MW-3, which has been sampled on three occasions. Contamination at MW-3 is most likely related to releases from the former northern dispenser island. During the first round of sampling in February 1999, the groundwater at MW-3 contained VOCs at levels of 8,700 ppb benzene, 740 ppb toluene, 1,700 ppb ethylbenzene, and 2,250 ppb xylene. The second round of sampling in October 1999, revealed concentrations of 420 ppb methyl tertiary butyl ether (MTBE), 3,800 ppb benzene, 180 ppb toluene, 1,700 ppb ethylbenzene, and 1,940 ppb xylene. The third round of sampling in March 2000, revealed concentrations of 83 ppb MTBE, 832 ppb benzene, 2,290 ppb toluene, 2,980 ppb ethylbenzene, and 12,100 ppb xylene. The SCGs for MTBE and benzene are 10 ppb and 1 ppb, respectively. The SCGs for toluene, ethylbenzene, and xylene are each 5 ppb.

Off-site temporary well samples, TW-4, TW-5, TW-6, and TW-7, showed no contamination exceeding ambient quality guidance values or standards. The temporary well samples were taken at a depth of approximately fifteen feet below ground surface. See Figure 2 for the location of the monitoring wells and the temporary well samples.

The drywell located on the southern side of the site is used for storm water drainage on the site and was possibly used as a means of disposing wastewater during operation of the service station, especially from the garage bay sink and drain. The drywell typically contains standing water. Water samples were taken from the drywell for analysis. Figure 3 shows the location of the drywell and the samples taken surrounding the drywell.

The contaminants of concern (COCs) in the standing water in the drywell were VOCs, SVOCs, and metals. VOCs, such as acetone, toluene, ethylbenzene, and xylene, were found in the drywell at levels of 190 ppb, 110 ppb, 59 ppb, and 410 ppb, respectively. The SCGs for these VOCs are 50 ppb for acetone, 1 ppb for benzene, and 5 ppb for toluene, ethylbenzene, and xylene. Metals, such as arsenic and lead were found in the samples at levels of 256 ppb and 21,000 ppb, respectively. The SCGs for arsenic and lead are both 50 ppb.

Waste Materials

Eleven 55-gallon drums were found on-site prior to the investigation. Some of the drums contained water and some were empty. The drums were generally used to prevent traffic from entering onto the site. The drums were disposed properly and none of them contained hazardous waste or materials. Three 35-gallon drums were found inside the garage. They contained either waste oil or spent solvent. The drums were disposed properly during the IRM. These containers were intact, and there was no evidence of leakage from them.

Soil Gas Survey

Five soil gas points were sampled at a depth between 9 and 12 feet. Polyethylene tubing was inserted into a steel rod on the Geoprobe. Tedlar bags were filled with a vacuum pump. The bag was sealed and submitted to a laboratory for analysis. Results showed a range of 83 parts per billion by volume (ppbv) to 621 ppbv of methyl tertiary butyl ether (MTBE). The results were deemed to be tentative in nature and of borderline usability due to laboratory error.

4.2: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or an exposure pathway can be effectively addressed before completion of the SI/RAR.

An IRM was performed at the site in November 1998 to remove three underground storage tanks, associated piping, a waste oil tank, a fuel oil tank, and a septic tank to prevent any further contamination of the groundwater. Approximately 475 tons of contaminated soil was also excavated and properly disposed of at an off-site facility. Confirmatory soil sampling was conducted to ensure that the IRM excavated all soil contaminated above SCGs.

4.3: Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section XII of the SI report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- ingestion of contaminated groundwater - This pathway could potentially occur in the future if private or public drinking water supply wells existed at or near the site. However, a potable well search was completed in March 2000 and did not identify any drinking water supply wells within a quarter mile of the site. Residences and businesses in the area are served by public water. Furthermore, the areal extent of groundwater contamination is limited to a defined area on-site; and

- inhalation of VOC vapors from contaminated soil gas - This pathway could potentially occur if contaminated soil gas was present and migrated away from the site and entered the living space of nearby homes and businesses. Since a large portion of the contamination source has been removed from the site and the areal extent of existing groundwater contamination is limited to a small area on-site, it is unlikely that contaminated soil gas, if present, would be present in sufficient quantity to present an off-site exposure concern.

4.4: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site.

Since the site is in a suburban area, there are few ecological risks identified with the site. An intermittent stream, Pine Brook, is located approximately 1/8 mile to the northwest of the site and is not a concern due to its distance from the site and the lack of off-site contaminant migration. Also, no wetland areas are indicated on the National Wetlands Inventory Map in the vicinity of the site. Storm water drainage is discharged to the drywell located at the southern end of the property.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the State to recover State response costs should PRPs be identified. The Village of Chestnut Ridge will assist the State in its efforts by providing all information to the State which identifies PRPs. The Village will also not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND THE PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria, and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous substance disposed at the site through the proper application of scientific and engineering principles.

The proposed future use for the Chestnut Ridge Village Park would be a public park for recreational use. The goals selected for this site are:

- reduce, control, or eliminate, to the extent practicable, the contamination present in the soils on-site;
- eliminate the potential for direct human or animal contact with the contaminated soils on-site;
- mitigate the impacts of contaminated groundwater to the environment;
- prevent, to the extent possible, migration of contaminants to groundwater; and
- achieve groundwater quality standards to the extent practicable.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective and comply with other statutory requirements. Potential remedial alternatives for the Chestnut Ridge Village Park Site were identified, screened and evaluated in a Remedial Alternatives Report. This evaluation is presented in the report entitled, "Revised Remedial Alternatives Report, June 29, 2000" and the addendum to the report, "Groundwater Sampling Analytical Results - May 5, 2000."

Although the site is being addressed as a single operable unit, alternatives were developed and evaluated separately for the contaminated media delineated in the Site Investigation. The following section describes the alternatives considered in the detailed analysis. A more complete description of the alternatives and discussion of the detailed evaluation can be found in the Remedial Alternatives Report.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy or procure contracts for design and construction.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site. A key component of the redevelopment of this parcel is the removal of the abandoned service station. The building demolition is a baseline cost regardless of the alternative proposed to address hazardous substances. The building demolition is estimated to cost approximately $15,000.

SOIL ALTERNATIVES

Alternative S1 - No Further Action

This alternative recognizes remediation of the site by a previously completed IRM that removed underground storage tanks and contaminated soils. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. There would be no additional costs for this soil alternative.

Alternative S2 - Capping On-site

All hazardous and nonhazardous soils would remain on-site. Capping would consist of the placement of a geosynthetic membrane cap and a soil cover. Institutional controls, such as a deed restriction, would be necessary to prevent exposure to contaminated soils in the future. The drywell would be properly closed. Operations and maintenance costs for this alternative are due to maintenance of the cap.

Present Worth:	$ 77,797
Capital Cost:	$ 62,425
Annual O&M:	$ 1,000
Time to Implement:	2 weeks - 1 month

Alternative S3 - Soil Removal and Replacement

Approximately 180 cubic yards (cy) of soil would be removed in the area of the northern dispenser island until groundwater is reached. The drywell and contaminated soil surrounding the drywell would be excavated. The drywell and contaminated soil would be removed in accordance with conventional excavation techniques, such as the use of backhoes. The excavations would be backfilled with clean fill. To minimize the potential for settling of the fill material, the fill would be placed and mechanically compacted in layers.

Excavated soils would be stockpiled on-site pending waste characterization and covered with plastic sheeting to prevent any erosion or releases to air. Samples would be collected from the stockpile and submitted to a certified laboratory for waste characterization analysis. In addition, post excavation samples would be collected and analyzed to confirm that all contaminated soils exceeding State cleanup objectives in TAGM 4046 were removed. Following the receipt of the waste characterization laboratory results, contaminated stockpiled soil would be transported and properly disposed at a soil treatment or disposal recycling facility. The excavations would be backfilled with clean soil.

Present Worth:	$ 78,065
Capital Cost:	$ 78,065
Annual O&M:	$0
Time to Implement:	1 week - 2 weeks

Alternative S4 - Soil Vapor Extraction (SVE)

This technology would employ a soil vapor extraction system, wherein air would be pumped from a vapor extraction well that is set in the unsaturated zone of soil. As the air is withdrawn, VOCs would be removed from the soil and pulled to the surface where they would be treated with activated carbon prior to the air being released to the environment. This technology would not address the SVOC or metal contaminants in soil.

A series of SVE wells would be installed at the area of the former northern dispenser island to remediate the VOC contamination in the soil. The use of SVE wells in the area of the drywell would not be appropriate as the contaminants found in this area also include SVOCs and metals. Instead, contaminated soil in a diameter approximately eight feet from the drywell would be excavated and disposed off-site. The drywell would be backfilled and properly closed.

Operations and maintenance for this alternative consists of monitoring the equipment, replacing the carbon, and removing and disposing of the condensed water vapor. Samples would be collected and analyzed to ensure that the remedy is working efficiently.

Present Worth:	$ 124,755
Capital Cost:	$ 111,370
Annual O&M:	$ 7,200
Time to Implement:	6 weeks - 8 weeks

GROUNDWATER ALTERNATIVES

Alternative GW1 - No Further Action

This alternative recognizes remediation of the site conducted under a previously completed IRM to remove underground storage tanks and contaminated soils as the sources of groundwater contamination. Groundwater monitoring would be continued to evaluate the effectiveness of the remediation completed under the IRM. No further action would be necessary.

Present Worth:	$15,021
Capital Cost:	$ 0
Annual O&M:	$8,080
Time to Implement:	1 week

Alternative GW2 - Groundwater Extraction and Treatment

A groundwater extraction and treatment system would employ a pumping system to bring contaminated groundwater to the ground surface where the water would be treated and discharged.

The contaminated groundwater would be treated with an air stripper or liquid phase granular activated carbon.

Air stripping would involve the transfer of VOCs from water to air. This technology would utilize a tower that has a spray nozzle that would spray the extracted groundwater over a series of baffles or screens. As the extracted groundwater flows through the baffles, air would be forced into the tower to remove the volatile compounds from the water. The decontaminated groundwater would be collected into a sump located at the bottom of the tower. The contaminated air that would be stripped from the groundwater would be treated by carbon and released into the environment.

If liquid phase granular activated carbon was to be used, the extracted groundwater would pass through tanks containing the activated carbon. As the water passes through the tanks, the contaminants would attach to the activated carbon. The carbon tanks would be periodically replaced and the spent tanks would be regenerated or disposed at a proper facility.

Present Worth:	$ 98,243
Capital Cost:	$ 86,345
Annual O&M:	$ 8,080
Time to Implement:	10 weeks - 12 weeks

Alternative GW3 - Oxygen Release Compound (ORC)

Oxygen Release Compound is a patented formulation of magnesium peroxide which, when moist, releases oxygen slowly into the groundwater. Groundwater would be oxygenated and bioremediation would be allowed to occur. VOCs, particularly petroleum products, undergo aerobic bioremediation naturally. The aerobic bioremediation is enhanced by ORC due to the release of oxygen into the aquifer.

Approximately 25 one-inch PVC pipes would be placed in the area of MW-3, the source area of the groundwater contamination, perpendicular to groundwater flow. The ORC, consisting of magnesium peroxide powder that is packaged in filter socks, would be placed into the source area wells where it would release oxygen into the groundwater. The ORC filter socks would last as long as one year.

A groundwater monitoring well would be installed downgradient of the source area to determine if the ORC injections are facilitating degradation of the contaminants. The dissolved oxygen levels and the contaminant levels in the source areas would be periodically monitored to ensure the effectiveness of the technology.

Present Worth:	$ 108,394
Capital Cost:	$ 93,150
Annual O&M:	$ 8,200
Time to Implement:	4 weeks - 6 weeks

Alternative GW4 - Air Sparging / Soil Vapor Extraction

For this alternative, an air sparging/soil vapor extraction system would be placed in the vicinity of the northern dispenser island to treat the source area and the contaminated groundwater.

Air would be forced into an injection well which is set below the groundwater table. The forced air would form bubbles in the groundwater which would trap contaminants and carry them into the unsaturated zone. Once the contaminants reach the unsaturated zone, a soil vapor extraction system would pull the contaminated vapors into a treatment system before the air would be released into the environment.

Groundwater would be monitored to ensure that the remedy is successful at removing the contaminants.

Present Worth:	$ 112,175
Capital Cost:	$ 95,295
Annual O&M:	$ 9,080
Time to Implement:	6 weeks - 8 weeks

Alternative GW-5 - Groundwater Extraction and Disposal

This alternative is in conjunction with Alternative S3, excavation and disposal, as a remedial alternative for soil. In this alternative, the soil would be excavated into the groundwater table and the contaminated groundwater would be pumped out and properly disposed. Additional soil may be excavated to remove all of the contaminated groundwater around MW-3.

Approximately 1500 gallons of groundwater would be pumped and disposed during the soil excavation. The excavation would be backfilled with clean soil that was removed during the excavation or with clean fill, from the site.

Groundwater monitoring would be continued to evaluate the effectiveness of the remediation completed under this alternative. Only the additional soil excavation necessary to complete the groundwater extraction around MW-3 is included in the cost estimate for this alternative. The majority of the soil cost estimate is included under Alternative S3.

Present Worth:	$ 30,915
Capital Cost:	$ 15,895
Annual O&M:	$ 8,080
Time to Implement:	1 week - 2 weeks

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that governs the remediation of environmental restoration project sites in New York State (6 NYCCR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Remedial Alternatives Report.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. <u>Compliance with New York State Standards, Criteria, and Guidance (SCGs).</u> Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. The most significant SCGs for this site are the groundwater drinking water standards set by the NYSDOH State Sanitary Code and soil cleanup guidelines set by the NYSDEC's Technical and Guidance Memorandum (TAGM) 4046.

Both of the No Further Action alternatives, Alternatives S1 and GW1, would not comply with SCGs for either soil or groundwater.

Alternative S2 would leave the contaminated soils in place and install a cap over the site. The placement of the cap would prevent water from infiltrating the soil and prevent further leaching into the groundwater. This alternative would not meet the SCGs for soil or groundwater unless the contamination undergoes attenuation in the soil via natural processes.

Alternative S3 would meet soil SCGs by the complete removal of contaminated soil and would bring the soils into compliance with the SCGs for the site, eliminating the sources of groundwater contamination.

Alternative S4 would excavate the soils surrounding the drywell and place soil vapor extraction wells in the area of the northern dispenser island. The contaminated soils surrounding the drywell would be excavated since the nature of the contaminants is not amenable to soil vapor extraction. This alternative would meet the SCGs for soils.

Alternative GW2 would extract and treat groundwater in the area of monitoring well MW-3. The SCGs for groundwater would be met with this alternative.

Alternative GW3 would treat the groundwater with ORC to facilitate bioremediation. The SCGs would be met in a reasonable time frame for the groundwater through assisted natural attenuation.

Alternative GW4 would meet the SCGs for both soil and groundwater for VOCs, but not for metals. This alternative would not be appropriate for the drywell area since there is metal contamination in that area.

Alternative GW-5, groundwater extraction and disposal, would meet the SCGs for both groundwater and soil.

2. <u>Protection of Human Health and the Environment.</u> This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The No Further Action Alternatives, S1 and GW1, would not be protective of human health or the environment because contamination would be left on-site. Future exposure may occur to workers from the soil contamination if it is left on-site during redevelopment of the site into a park. Groundwater contamination could migrate off-site and affect off-site receptors.

Alternative S2 would meet the criterion of protecting human health and the environment. The capping of the remaining contaminated soils would prevent dermal contact of the soil from humans, and the cap would reduce the rate of contaminants leaching into the groundwater. The drywell would be excavated and abandoned properly, removing the source of SVOC and metal contaminatione

Alternative S3, soil excavation and removal, would meet the protection of human health and the environment. Dermal contact with contaminated soils would be prevented and the source would be removed to prevent future exposure.

Alternative S4, the SVE system, would meet protection of human health and the environment. The source of soil and groundwater contamination would be removed.

Alternatives GW2 and GW3 would meet the criterion because contaminated groundwater would be treated and would prevent future exposure to humans and the environment.

Alternative GW4 would meet the criterion of protecting human health and the environment since both contaminated groundwater and soil would be treated.

Alternative GW-5 would meet the criterion for protecting human health and the environment since the contaminated groundwater would be removed from the site.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

The No Further Action Alternatives would meet the criterion of short term effectiveness because no work would be done and there would be no impact on workers or the community.

In Alternatives S2 and S3, the potential short term impact would be the release of any airborne dust, ingestion, or direct contact with contaminated soil during the excavation and removal of contaminated soils. These short term impacts could be effectively managed with proper monitoring and construction. Alternative S2 would take longer to complete than Alternative S3 due to construction and installation of a geosynthetic liner and a cap.

The primary route of potential short term impact in Alternatives S4, GW2, GW3, GW4, and GW5 would be the release of any airborne dust, ingestion, or direct contact with contaminated soil during the construction of the remedy. These short term impacts could be effectively managed with proper monitoring and construction. Alternative GW3 would be implemented within 4-6 weeks, Alternatives S4 and GW4 would both be implemented in 6-8 weeks, and Alternative GW2 would be implemented in 10-12 weeks. Alternative GW-5 could be implemented in 1-2 weeks.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of

the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

The No Further Action Alternatives, S1 and GW1, would not meet the criterion of long term effectiveness because long-term groundwater monitoring would be required and some contamination would remain on-site, which would continue to leach into the groundwater.

Alternative S2 is not considered to be permanent. Operation and maintenance, environmental controls, and long-term groundwater monitoring would be required for this alternative.

Alternative S3 would be effective in the long term because all contaminated soil would be removed. The groundwater quality at the site would be expected to improve once the source of the contamination is removed. Environmental controls and monitoring of groundwater would be required.

Alternative S4 would be effective in the long term because contaminated soils at the former northern dispenser island would be treated and the soils at the drywell would be removed. Environmental controls and monitoring of groundwater would be required.

Alternative GW2 would be effective in the long term because it would eliminate the threats associated with the groundwater contamination. Environmental controls and monitoring of groundwater would still be required.

Alternative GW3, using ORC, would permanently eliminate the contamination since the groundwater would be treated using the ORC to facilitate bioremediation.

Alternative GW4 would permanently eliminate the contaminated groundwater at MW-3. Environmental controls and long-term monitoring would be required for this alternative.

Alternative GW-5 would permanently eliminate the contaminated groundwater in the vicinity of the former northern dispenser island and MW-3. Groundwater monitoring would be required to ensure that the SCGs have been met.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the substances at the site.

The No Further Action Alternatives would eventually meet this criterion because the toxicity of some of the contaminants would be reduced during natural attenuation of the VOCs. However, neither the mobility nor the volume of the contamination would be reduced because no active treatment would be taken to remediate the contamination.

Alternatives S2 and S3 would reduce the mobility of the contaminants by reducing the potential for soil particles to migrate and by reducing the infiltration of rainwater through the contaminated zone. The volume and mobility of contamination would be reduced in Alternative S3 due to the removal of highly contaminated soils and the source of groundwater contamination being removed from the site.

Alternative S4 would reduce the mobility of contaminants by removing them from the soil and adsorbing them onto carbon. The volume of the contaminants would also be reduced, as the carbon is regenerated and the VOCs are destroyed.

In Alternative GW2, the volume and mobility of the contaminants would be reduced, as the contaminated groundwater at MW-3 would be extracted and treated.

Alternative GW3, using ORC, would reduce the volume of the contaminants by treating the contamination at MW-3 by aerobic bioremediation.

The SVE/air sparge system for Alternative GW4 would reduce the volume and mobility of the contaminants in the soil and groundwater. The toxicity of the contaminants would not be reduced, but the potential threat to human health and the environment would be reduced.

Alternative GW-5 would effectively reduce the volume of the contamination. The toxicity of the contaminants would not be reduced, but the potential threat to human health and the environment would be reduced.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

The No Further Action alternatives could be readily implemented since no further remediation would have to be done at the site.

Capping the soil could be readily implemented for Alternative S2 using conventional mechanical equipment suitable for such operations. Technologies for constructing a cap are commercially available from various contractors and implementation could occur without delay. However, a cap on the site may inhibit future plans for redevelopment of the site as a village park.

Removal of contaminated soil, as in Alternative S3, could be readily implemented using conventional mechanized equipment. Technologies for soil excavation are commercially available from various contractors and implementation could occur without delay. Excavation of contaminated soil would be somewhat difficult to perform due to the need to protect workers and to control air emissions. Staging of the soil on the site would be readily implementable. Off-site disposal capacity is readily available.

For Alternative S4, treatment of the contaminated media could be readily implemented using conventional equipment. Soil vapor extraction would require the installation of extraction wells and a treatment system. This technology is commercially available from various contractors and implementation could occur without delay. However, the high silt content in the soil on-site would prevent effective remediation via soil vapor extraction. Also, this alternative may hamper redevelopment of the site into a park during the remediation because of the aboveground treatment equipment. Alternative S4 would be expected to operate for two years.

For Alternative GW2, treatment of the contaminated groundwater could be readily implemented using conventional equipment. Groundwater extraction and treatment would require the installation of extraction wells and a treatment system. This technology is commercially available from various contractors and implementation could occur without delay. However, this alternative may hamper future redevelopment of the site into a park during the remediation because of the aboveground treatment equipment. The system would be expected to operate for two years.

The ORC technology in Alternative GW3 is a patented process that is available from only one vendor. However, it is readily available. Implementation of these alternatives could occur without delay. This alternative would be easily implemented on-site and would not hinder redevelopment of the site as a parke

In Alternative GW4, the groundwater remedy could be readily implemented using conventional equipment to install the wells necessary for the remedy. However, the high silt content in the loamy soil on site yields an insufficient porosity for effective remediation via soil vapor extraction and air sparging. This alternative may also hamper future redevelopment of the site into a park because of housing the treatment system and equipment aboveground.

Alternative GW-5 would be easily implementable because the excavation and groundwater pumping equipment is readily available. Disposal capacity is readily available for extracted groundwater. This alternative would also not hinder redevelopment on the site.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decisione Each cost estimate mentioned in this comparison does not include the baseline cost of $15,000 for the demolition of the onsite building. The cost estimates for each alternative and the baseline cost are presented in Table 2.

The costs for Alternative S2 (capping) would be dependent on the quantity of landscaped versus paved areas at the site that are planned for the future park. The cost estimate is based on the assumption that approximately 10,000 square feet of the site would be paved in the future. The total estimated cost would to be $77,797.

In Alternative S3, approximately 180 cy of contaminated soil would be removed from the former northern dispenser island and 40 cy of soil would be removed from the drywell. Clean fill would be needed to backfill the excavatione The cost for this alternative would be $78,065.

The costs for Alternative S4 would include excavation of the drywell and drywell soils, the installation of four SVE wells and extraction equipment, and closure of the drywell with excavation of contaminated soils. For purposes of the cost estimate, operation of the SVE system is estimated to last two years. The total cost for this alternative would be $124,775.

Alternative GW2 costs would include three groundwater extraction wells, an air stripping tower, and air and water samples. For purposes of the cost estimate, operation of the pump and treat system is estimated to last two years. Additional soil excavations are not included in the cost estimate for this groundwater alternative, since they are in the cost estimate for the soil alternatives. The total cost for this alternative would be $98,243.

Alternative GW3 costs would include the installation of approximately 25 monitoring wells, the ORC filter socks with 4,200 pounds of ORC slurry, groundwater sampling and analysis, and equipment rentals. The total cost for this alternative would be $108,394.

Alternative GW4 costs would include the installation of SVE wells, air sparging wells, air compressors, vacuum blowers, a shed, and associated meters and equipment. For purposes of the cost estimate, the operation period for the SVE/air sparge system is two years. Additional soil excavations are not included in the cost estimate. The total cost for this alternative would be $1¢2,175.

Alternative GW-5 costs would include excavation of the soil into the groundwater table and any additional soils that would need to be excavated to reach the contaminated groundwater at MW-3. A pump would extract the groundwater from the excavation and transfer the water to a tanker truck for proper off-site disposal. Staging of the soil, waste characterization, and disposal of the groundwater and soil are also included in the costs, as well as backfilling the excavation with clean fill. The total cost for this alternative would be $30,915.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the SI/RAR reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised.

In general the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to the implementation of the remedy, the maintenance of the remedy during the construction of the Village Park, and the schedule of events after the Record of Decision is finalized. These comments can be addressed during the design phase of the project.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the results of the SI/RAR, and the evaluation presented in Section 7, the NYSDEC is selecting Alternatives S3 and GW5 as the remedy for this site, in addition to the baseline action of demolition of the building. Alternative GW-3 is considered as a contingency if residual groundwater contamination persists.

This selection is based upon the evaluation of the eight alternatives for the site. With the exception of the No Further Action alternative, each of the alternatives would comply with the threshold criteria.

With respect to the balancing criteria, the soil alternatives are distinguished primarily by permanence and cost. Alternatives S2 (capping on-site) and S3 (soil excavation and removal) were the lowest cost soil alternatives. Alternative S2 would not remove contaminated soil from the ground to treat the compounds of concern (COCs) which are contributing to groundwater contamination. Furthermore, this alternative would not provide a permanent remedy and long-term maintenance would be required.

Alternative S3 would provide for the complete removal of contaminated soil, allowing a visual and analytical inspection to ensure that all of the soils containing COCs in excess of the remedial goals would be removed and disposed off-site. Alternative S3 would also provide a permanent remedy for the contamination and remove the source of groundwater contamination.

The groundwater alternatives are similar with respect to the majority of the balancing criteria. The major differences between the alternatives are implementability and cost.

Alternative GW4 is less readily implementable since the system would require a period of operation, monitoring, and maintenance and it could interfere with the future development and use of the site. Alternatives GW3 and GW5 would be readily implementable and they would not interfere with the future use of the site. In Alternative GW3, ORC injection wells would be flush mounted and easily hidden. There would be no additional equipment remaining at the site in Alternative GW5. Alternative GW5 would provide for the removal of contaminated groundwater, allowing analytical inspection to ensure that the groundwater containing COCs in excess of the proposed remedial goals would be removed and disposed off-site. Alternative GW5 would also provide a permanent remedy for the groundwater contamination.

However, there is a large difference in estimated costs between the Alternatives, GW3 and GW5. GW5 is more cost effective than GW3. The total cost for GW3 is $108,394 and the cost for GW5 is $30,915. Because Alternative GW-5 is readily implementable, cost-effective, and permanent, the DEC has selected GW-5 as the groundwater component of the site remedy. In the event that GW-5 is not fully effective, the DEC will use ORC (GW-3) as a contingency for residual contamination. The contingency would include the design and installation of the oxygen release compound. The estimate for the number of ORC introduction wells and amount of slurry would be determined during a design phase before implementation of the contingency. However, the number of wells is expected to be reduced if the area of groundwater contamination has decreased due to the implementation of Alternative GW5.

A key component of the redevelopment of this parcel is the removal of the on-site building. The building demolition is estimated to cost approximately $15,000 which is added to the total cost of the combination of Alternatives S3 and GW5.

The estimated present worth cost to implement the proposed remedy is $123,980, including demolition of the onsite building. The cost to construct the recommended remedy is estimated to be $108,960. The estimated average annual operation and maintenance cost for the recommended Alternatives, S3 and GW5, for 2 years is $8,080.

If Alternative GW-5 is not completely successful in removing the contaminated groundwater and it is not feasible to continue with additional rounds of groundwater extraction and disposal, Alternative GW3, ORC, will be implemented to remediate the remainder of the contamination. With the contingency of GW-3, the total cost of the recommended alternatives, including building demolition, will be $221,004, assuming that the number of ORC introduction wells will be reduced to 20 wells for a decreased area of groundwater contamination. The construction cost for the total project would be $205,760 and the annual cost for two years will be $8,200.

Implementation of the combination of the soil and groundwater remedies at the same time will effectively reduce the cost than if the alternatives were constructed separately. Since the area of groundwater contamination is small, the contaminated groundwater can be pumped out and disposed and the number of ORC introduction wells can be reduced, if determined to be necessarye

The elements of the remedy are as followse

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the SI/RAR will be resolved.

2. Contaminated soils in the areas of the drywell and the former northern dispenser island will be excavated to TAGM 4046 cleanup objectives. The excavation will continue until contaminated groundwater can be effectively removed, or it is not feasible to continue. Water encountered in the excavation will be pumped out and transported for off-site disposal. Confirmatory groundwater and soil sampling will be required.

3. Contaminated soils and groundwater will be properly disposed at an appropriate off-site facilities.

4. Clean fill will be used to backfill the excavation.

5. If groundwater contamination remains above groundwater standards after a period of six months following soil excavation, the contingency groundwater remedy involving oxygen release compound (ORC) bioremediation would be implemented. The implementation would include a design phase and installation of the ORC.

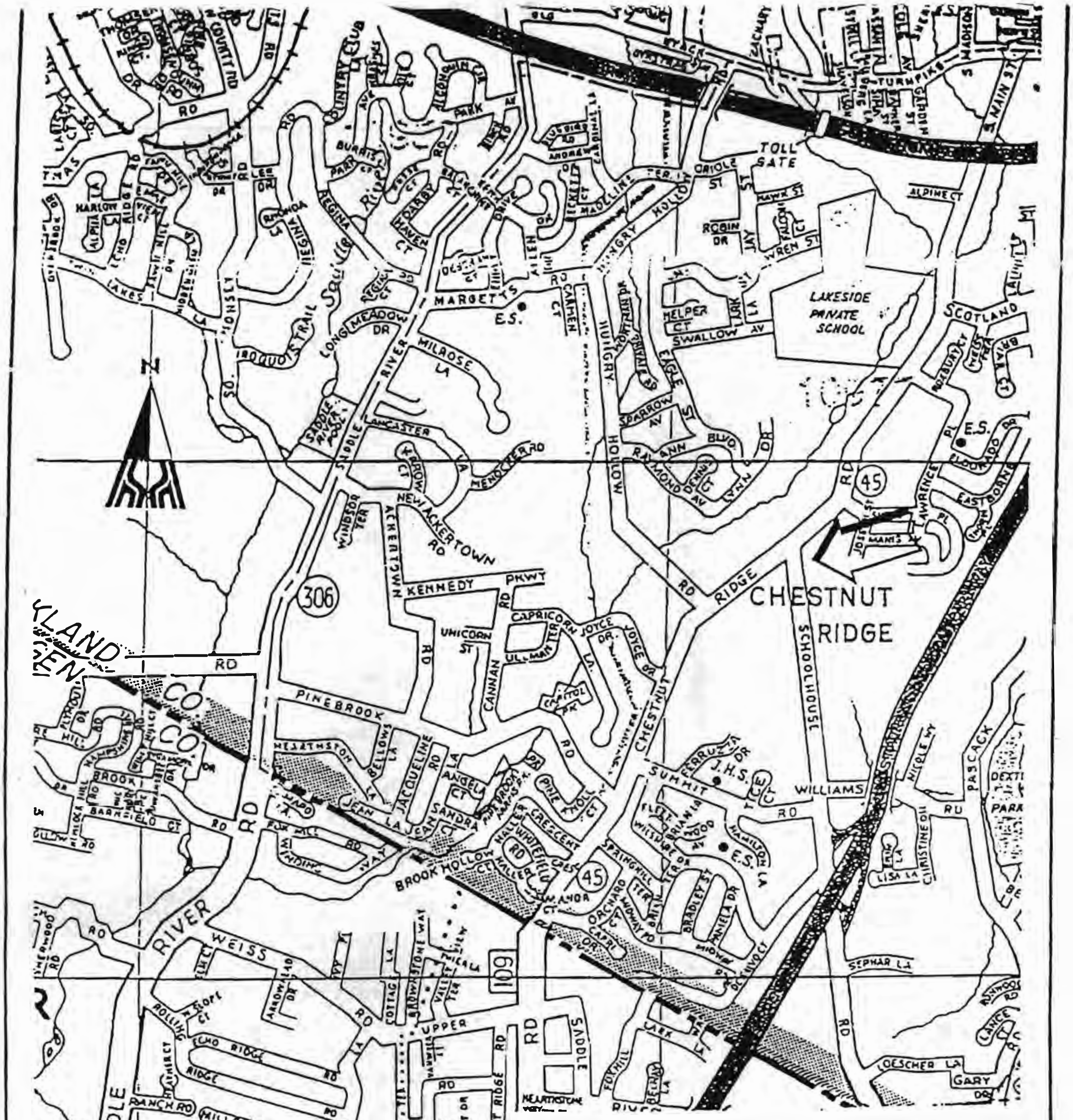
6. A series of ORC introduction wells may be installed in the area of the contaminated groundwater in the vicinity of MW-3. ORC would be placed in the wells in the form of a slurry or in permeable socks. The ORC may be replaced after a period of a year to ensure proper application of the ORC in the groundwater.

7. A groundwater monitoring well will be installed downgradient of MW-3 as a part of a groundwater monitoring program. The groundwater monitoring program would allow the effectiveness of the selected remedy to be monitored and would be a component of the operation and maintenance for the site.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the Chestnut Ridge Village Park environmental restoration process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternativese The following public participation activities were conducted for the sitee

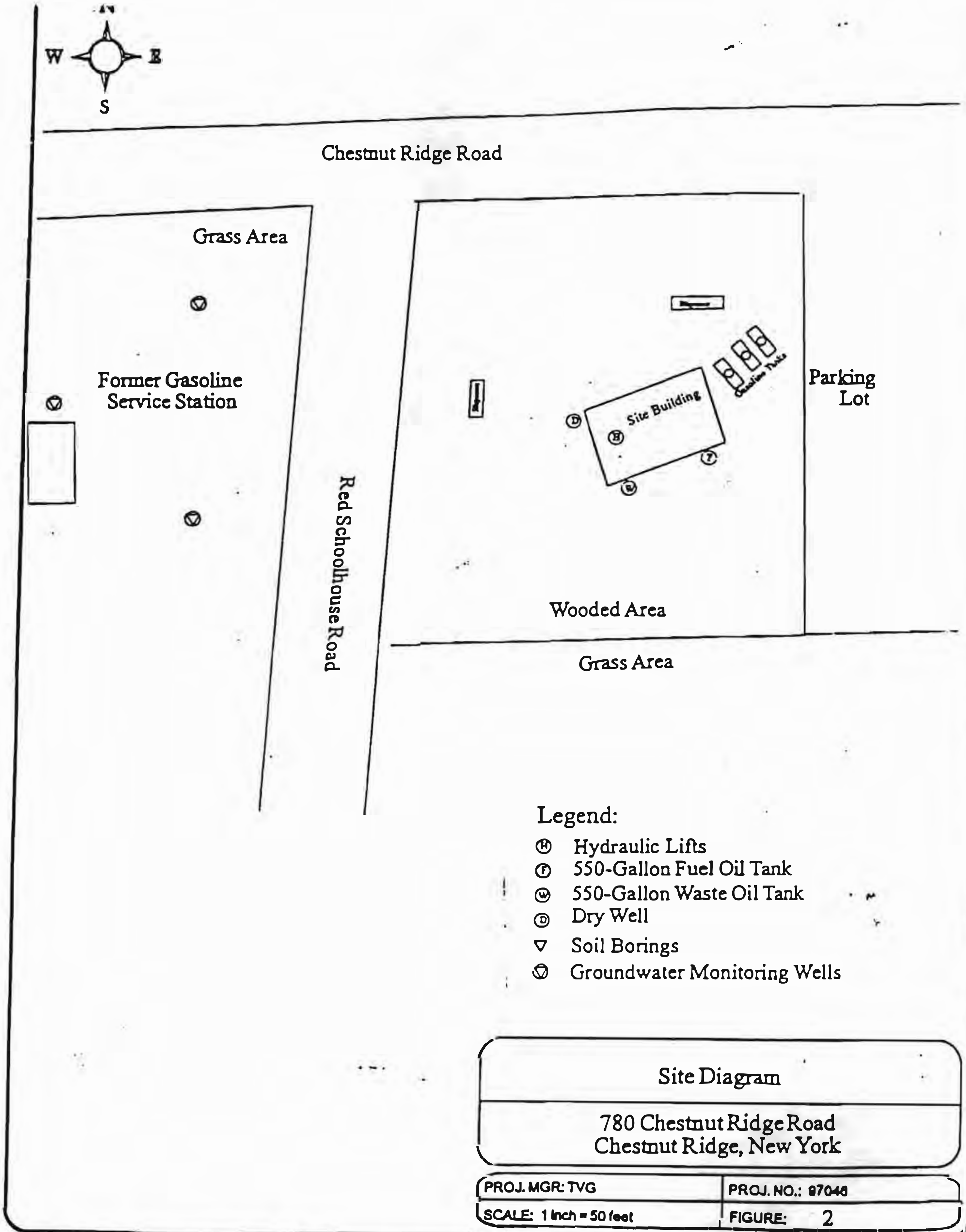
- A repository for documents pertaining to the site was established.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- A fact sheet was sent and a public information meeting was held to discuss the investigation work plan.
- The Village of Chestnut Ridge regularly posted signs at the site regarding the status of the project.
- The Village regularly posted information regarding the status of the project in the village newsletter.
- A fact sheet was mailed and a public meeting was held on December 5, 2000 to discuss the proposed remedial action plan (PRAP).
- In February 2001, a Responsiveness Summary was prepared and made available to the public, to address the comments received during the public comment period for the PRAP.

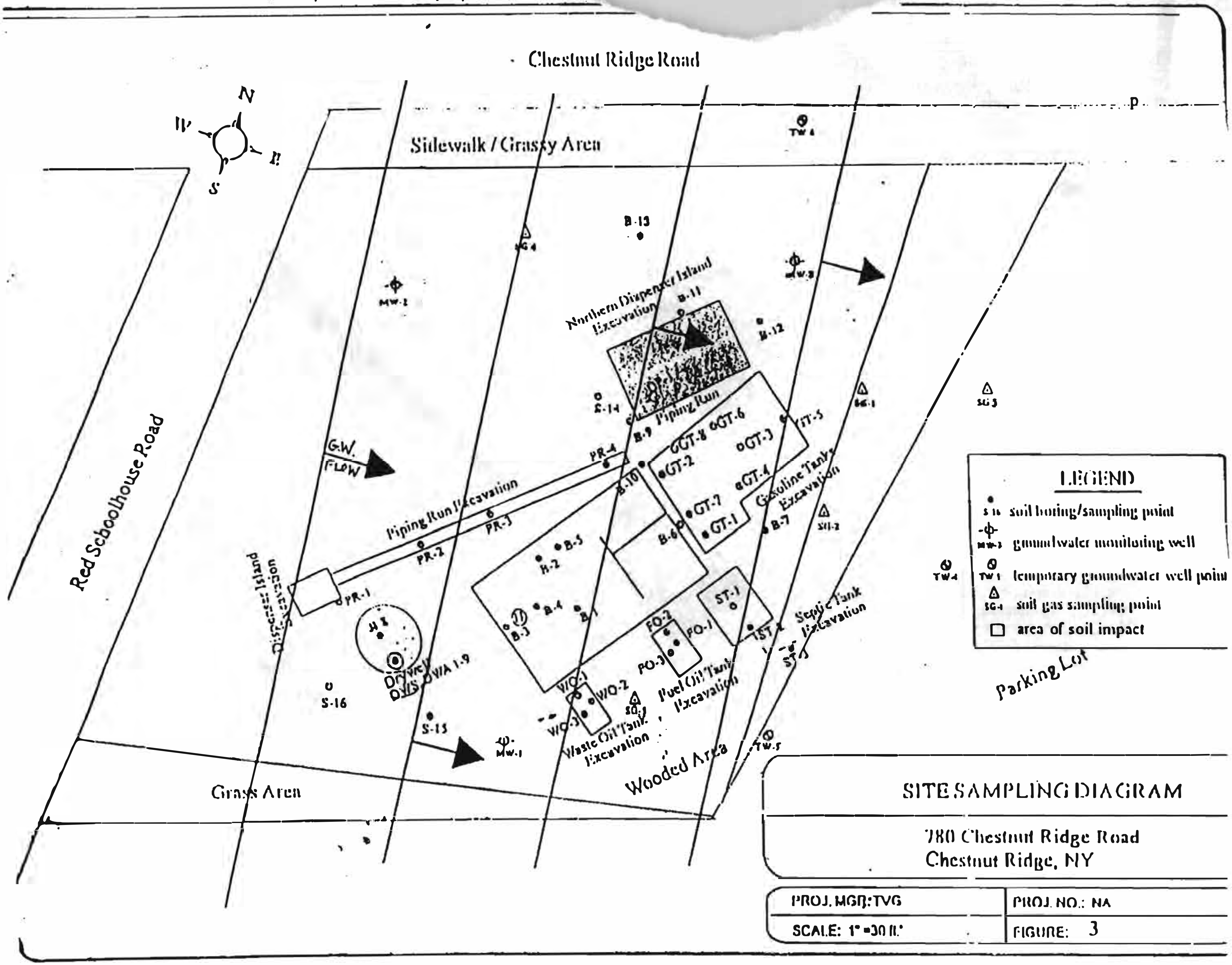


GENERAL LOCATION MAP

780 Chestnut Ridge Road
Chestnut Ridge, New York

PROJ. MGR: TVG	PROJ. NO.: N/A
SCALE: N/A	FIGURE: 1


W
E
S
Chestnut Ridge Road
Grass Area
Former Gasoline
Service Station
Red Schoolhouse Road
Site Building
Parking
Lot
Wooded Area
Grass Area
Legend:
Hydraulic Lifts
550-Gallon Fuel Oil Tank
550-Gallon Waste Oil Tank
Dry Well
Soil Borings
Groundwater Monitoring Wells
Site Diagram
780 Chestnut Ridge Road
Chestnut Ridge, New York
PROJ. MGR: TVG
PROJ. NO.: 97046
SCALE: 1 Inch = 50 feet
FIGURE: 2


Chestnut Ridge Road
Sidewalk / Grassy Area
N
W
E
S
Red Schoolhouse Road
G.W. FLOW
Northern Dispenser Island Excavation
Piping Run
Piping Run Excavation
Dispenser Island Excavation
Gasoline Tanks Excavation
Septic Tank Excavation
Fuel Oil Tank Excavation
Waste Oil Tank Excavation
Drywell
Grass Area
Wooded Area
Parking Lot
B-13
B-11
B-12
B-9
B-10
B-6
B-7
B-5
B-2
B-4
B-1
B-3
S-14
S-15
S-16
MW-1
MW-2
MW-3
SG-1
SG-2
SG-3
SG-4
TW-4
TW-5
PR-1
PR-2
PR-3
PR-4
GT-1
GT-2
GT-3
GT-4
GT-5
GT-6
GT-7
GT-8
ST-1
ST-2
ST-3
FO-1
FO-2
FO-3
WO-1
WO-2
WO-3
LEGEND
soil boring/sampling point
groundwater monitoring well
temporary groundwater well point
soil gas sampling point
area of soil impact
SITE SAMPLING DIAGRAM
780 Chestnut Ridge Road
Chestnut Ridge, NY
PROJ. MGR: TVG
PROJ. NO.: NA
SCALE: 1" = 30 ft.
FIGURE: 3

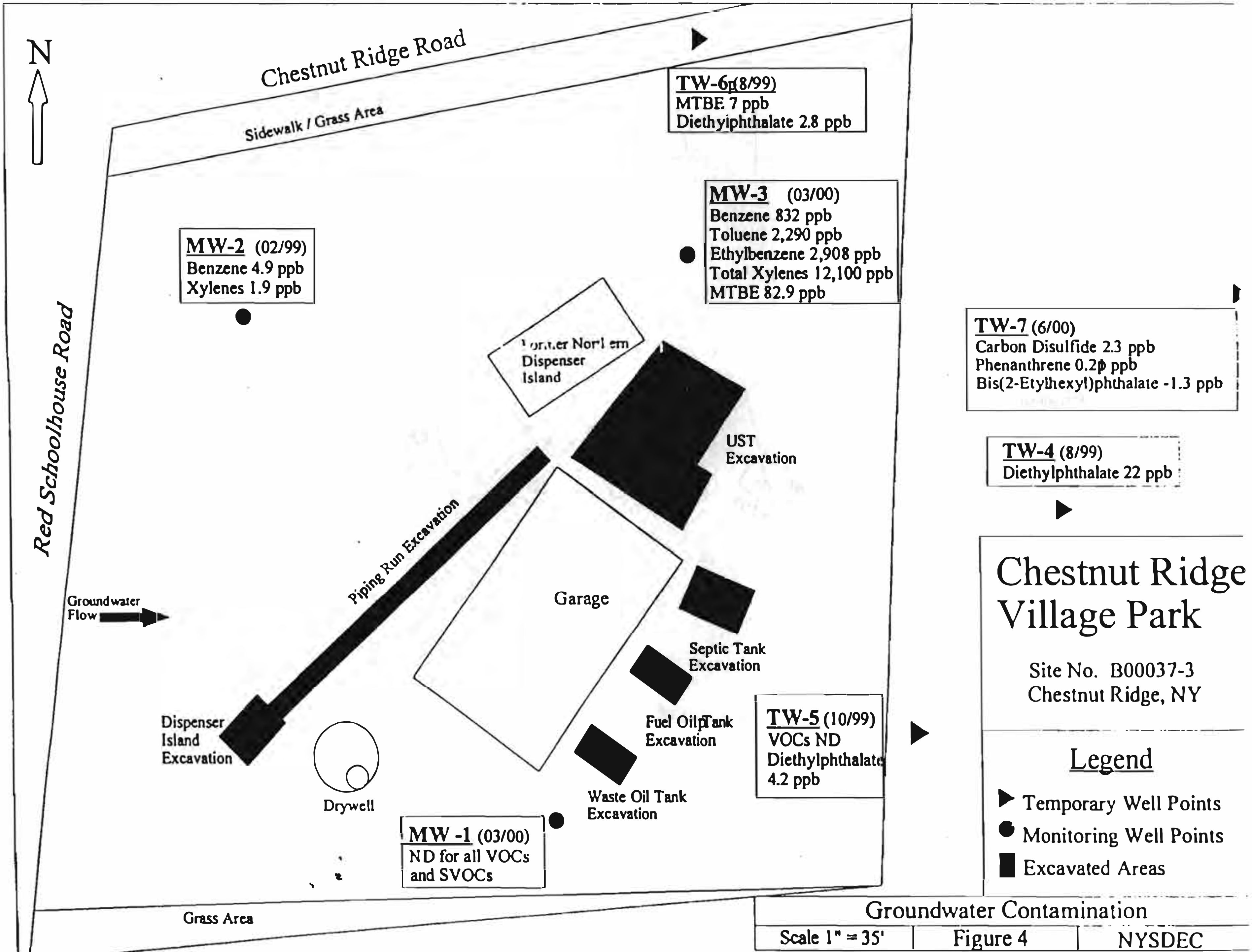

N
Chestnut Ridge Road
Sidewalk / Grass Area
Red Schoolhouse Road
TW-6 (8/99)
MTBE 7 ppb
Diethyiphthalate 2.8 ppb
MW-3 (03/00)
Benzene 832 ppb
Toluene 2,290 ppb
Ethylbenzene 2,908 ppb
Total Xylenes 12,100 ppb
MTBE 82.9 ppb
MW-2 (02/99)
Benzene 4.9 ppb
Xylenes 1.9 ppb
Dispenser
Island
UST
Excavation
TW-7 (6/00)
Carbon Disulfide 2.3 ppb
Phenanthrene 0.2 ppb
Bis(2-Etylhexyl)phthalate -1.3 ppb
TW-4 (8/99)
Diethylphthalate 22 ppb
Piping Run Excavation
Groundwater
Flow
Garage
Septic Tank
Excavation
Fuel Oil Tank
Excavation
Dispenser
Island
Excavation
Drywell
Waste Oil Tank
Excavation
TW-5 (10/99)
VOCs ND
Diethylphthalate
4.2 ppb
MW -1 (03/00)
ND for all VOCs
and SVOCs
Grass Area
Chestnut Ridge
Village Park
Site No. B00037-3
Chestnut Ridge, NY
Legend
Temporary Well Points
Monitoring Well Points
Excavated Areas
Groundwater Contamination
Scale 1" = 35'
Figure 4
NYSDEC

Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE	FREQUENCY of Exceeding SCGs or Background	SCG/ Bkgd.
Groundwater (ppb)	Volatile Organic Compounds (VOCs)	Toluene	ND (1) to 2290	4 of 13*	5
		Benzene	ND (1) to 8700	3 of 13*	1
		Ethylbenzene	ND (1) to 2980	4 of 13*	5
		Xylene	ND (1) to 12,100	4 of 13*	5
		Acetone	ND (5) to 190	1 of 13	50
		2-Butanone (MEK)	ND (5) to 60	1 of 13	50
		n-Propylbenzene	ND (1) to 230	1 of 13	5
		1,3,5 Trimethylbenzene	ND (1) to 180	1 of 13	5
		1,2,4 Trimethylbenzene	ND (1) to 1200	1 of 13	5
		Naphthalene	ND (5) to 320	1 of 13	10
		MTBE	ND (5) to 420	2 of 13*	10
	Semivolatile Organic Compounds (SVOCs)	Naphthalene	ND (5) to 250	2 of 13	10
		2-Methylnaphthalene	ND (5) to 68.7	1 of 13	4.7
	Metals	Arsenic	ND (0.5) to 256	1 of 13	50
		Barium	ND (20) to 3,270	1 of 13	1,000
		Cadmium	ND (1) to 323	1 of 13	5
		Chromium	ND (10) to 586	1 of 13	50
		Lead	ND (2) to 21,000	1 of 13	50
Soil (ppm)	VOCs	Acetone	ND (0.1) to 62	2 of 62	0.11
		2-Butanone	ND (0.1) to 48	2 of 62	0.3
		Benzene	ND (0.1) to 21	2 of 62	0.06
		Chlorobenzene	ND (0.1) to 2.7	1 of 62	1.7
		Ethylbenzene	ND (0.1) to 120	2 of 62	5.5
		Methylene Chloride	ND (0.1) to 6.4	1 of 62	0.1

		Toluene	ND (0.1) to 95	4 of 62	1.5
		Trichloroethylene	ND (0.1) to 9.4	1 of 62	0.7
		Tetrachloroethylene	ND (0.1) to 2.5	1 of 62	1.4
		Xylene	ND (0.1) to 100	11 of 62	1.2
	SVOCs	Benzo(a)anthracene	ND (0.33) to 29	1 of 62	3
		Benzo(b)fluoranthene	ND (0.33) to 35	1 of 62	1.1
		Benzo(k)fluoranthene	ND (0.33) to 36	1 of 62	1.1
		Benzo(a)pyrene	ND (0.33) to 36	1of 62	11
		Chrysene	ND (0.33) to 41	1 of 62	0.4
		Di-n-butyl phthlate	ND (0.33) to 45	2 of 62	8.1
		Indeno(123cd)pyrene	ND (0.33) to 24	1 of 62	3.2
		Naphthalene	ND (0.33) to 94	1 of 62	13
	Metals	Arsenic	ND (1) to 93.3	1 of 62	7.5
		Cadmium	ND (0.5) to 38.6	1 of 62	10
		Chromium	ND (1) to 98.5	1 of 62	50
		Lead	ND (0.5) to 4,050	1 of 62	400
		Mercury	ND (0.02) to 0.88	1 of 62	0.1

* - Groundwater samples were taken on three separate occasions, but only one monitoring well and the drywell exhibited contaminants above SCGs.

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
Baseline Cost for Recommended Alternative: Building Demolition	$15,000	$0	$15,000
S1) No Further Action	$0	$0	$0
S2) Clay Capping On-site	$62,425	$1,000	$77,797
S3) Soil Removal and Replacement	$78,065	$0	$78,065
S4) Soil Vapor Extraction	$111,370	$7,200	$124,755
GW1) No Further Action	$0	$8,080	$15,021
GW2) Groundwater Pump and Treat	$86,345	$6,400	$98,243
GW3) Oxygen Release Compound	$93,150	$8,200	$108,394
GW4) Air Sparging / Soil Vapor Extraction	$95,295	$6,000	$106,449
GW5) Groundwater Extraction and Disposal	$15,895	$8,080	$30,915
Combination of Recommended Alternatives S3 and GW5	$93,960	$8,080	$108,980
Selected Remedial Alternative: Combination of Recommended Alternatives S3 and GW5 with Contingency Plan, Alternative GW3	$190,760	$8,200	$206,004

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Chestnut Ridge Village Park
Environmental Restoration Proposed Remedial Action Plan
Chestnut Ridge, Rockland County
Site No. B-00037-3

The Proposed Remedial Action Plan (PRAP) for the Chestnut Ridge Village Park was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on November 13, 2000. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil and groundwater at the Chestnut Ridge Village Park. The preferred remedy was excavation and removal of the contaminated soil, extraction and disposal of the contaminated groundwater, and groundwater monitoring.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on December 5, 2000 which included a presentation of the Site Investigation (SI) and Remedial Alternatives Report (RAR) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on January 2, 2001.

This Responsiveness Summary responds to all questions and comments raised at the December 5, 2000 public meeting.

The following are the comments received at the public meeting, with the NYSDEC's responses:

COMMENT 1:

If the contingency plan is implemented with the oxygen release compound (ORC), will we be able to use the site as a park during the remediation process?

RESPONSE 1:

The site will be able to be used as a park during the remediation process. The remediation would take place underground because the oxygen release compound would be installed by placing socks containing the ORC or by placing an ORC slurry into flush mounted wells. There would be no additional aboveground equipment that would interfere with the use of the park. Access to the ORC wells and monitoring wells would be required, but this could be easily accommodated in the park design.

COMMENT 2:

Why will you need to pump out the groundwater after the source of the contamination, i.e. the tanks and soil, have been removed?

RESPONSE 2:

Even though the source of the soil and groundwater contamination will be removed, some residual groundwater contamination will still be present. The extraction of the contaminated groundwater will prevent future migration of the groundwater contamination.

COMMENT 3:

After the Record of Decision is issued, what happens next?

RESPONSE 3:

After the Record of Decision is issued, the Village would then apply for a Brownfield remediation grant. Once the application is complete and accepted by the NYSDEC, the design of the selected remedy can begin. Once the design is finalized and the bidding process has been completed, the construction of the remedy will take place.

APPENDIX B

Administrative Record

Administrative Record Index File
Chestnut Ridge Village Park
Site #B-00037-3
Site Investigation

1. Index: Chestnut Ridge Village Park, Site #B-00037-3

2. Phase I Environmental Assessment, Dorson Environmental Management, April 1997

3. Site Investigatione/ Remedial Alternative Work Plan, September 1998

4. Site Investigation Report, Dorson Environmental Management, March 2000

5. Groundwater Sampling Analytical Results, Dorson Environmental Management, May 2000

6. Revised Remedial Alternatives Report, Dorson Environmental Management, June 2000

7. Proposed Remedial Action Plan, November 2000

8. Meeting Invitation and Fact Sheet, November 2000

9. Chestnut Ridge Village Park, Record of Decision, February 2001

10. QA/QC Data 1997-2000

11. Correspondence File that consists of correspondence from November 1995 to January 2001

Cassette tape of the Proposed Remedial Action Plan public meeting is stored separately at the State Records Center.