MOHONK ROAD INDUSTRIAL PLANT SITE

Hamlet of High Falls, Ulster County, New York
Site No. 3-56-023

PROPOSED REMEDIAL ACTION PLAN

November 1999

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

This Proposed Remedial Action Plan (PRAP) was developed by the New York State Department of Environmental Conservation (NYSDEC), as lead agency, with support from the U.S. Environmental Protection Agency (EPA), the New York State Department of Health (NYSDOH) and the Ulster County Health Department (UCHD). In January 1999, the Mohonk Road Industrial Plant (MRIP) site (the Site) was listed on EPA's National Priorities List (NPL). The EPA will be the lead agency for the remedial design and remedial construction phases of the project.

The NYSDEC, in consultation with the EPA, NYSDOH and UCHD, is proposing a remedy to address the significant threat to human health and the environment created by the presence of hazardous wastes at the Site. (The Federal Superfund law or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended (42 U.S.C. §§ 9601-9675) authorizes EPA to respond to releases or threatened releases into the environment of hazardous substances, pollutants, or contaminants. Hazardous substances include hazardous waste.)

The NYSDEC has issued this PRAP as a component of the citizen participation plan, developed pursuant to the New York State Environmental Conservation Law (ECL) and 6 NYCRR Part 375. EPA has similar public participation responsibilities under Section 117(a) of CERCLA and the National Contingency Plan (NCP), 40 C.F.R. § 300.430(f).

Written comments on the PRAP can be submitted until January 15 2000 to Patrick Hamblin, Project Manager, EPA at the following address:

EPA
Emergency & Remedial Response Division
290 Broadway, 20th Floor
NY, NY 10007-1866
Phone: (212) 637-3314
Fax: (212) 637-3966

This document is a summary of the information that can be found in greater detail in the Remedial Investigation/Feasibility Study (RI/FS) and other relevant reports and documents, which are available at the NYSDEC and EPA document repositories referenced below. A summary of the preferred remedy is given in Section 8 of this document.

As described in Sections 3 and 4 of this document, improper handling and disposal of waste solvents resulted in the release of hazardous wastes (primarily 1,1,1-trichloroethane, also known as 1,1,1-TCA, and trichloroethene, also known as TCE) at the MRIP property. Some of this material has migrated from the MRIP property to surrounding areas, including to the underlying bedrock aquifer. These disposal activities have resulted in the following significant threats (actual or potential) to human health:

- a significant threat to human health associated with the ingestion, inhalation and direct contact with volatile organic compound (VOC) contaminated bedrock groundwater, on and off the MRIP property, above New York State and/or Federal drinking water standards; and

- a significant threat to human health associated with the ingestion, inhalation and direct contact with contaminated subsurface soils by workers on the MRIP property.

In order to restore the Site to pre-disposal conditions to the extent feasible and authorized by law and, at a minimum, to eliminate or mitigate the significant threats to the public health that the hazardous waste disposed at the MRIP property has caused, the following remedy is proposed:

- The construction of a new public water supply system to provide clean and safe potable water to the residences in the Hamlet of High Falls and the Towns of Rosendale and Marbletown with impacted or threatened private supply wells.

- The continuation of the NYSDEC Interim Remedial Measure (IRM) to monitor and maintain the individual granular activated carbon (GAC) filtration systems in use until the new public water supply system is fully operational.

- Continued operation of EPA's Non-time Critical Removal Action (NTCRA) which includes the extraction and treatment of contaminated bedrock groundwater on the MRIP property.

- The excavation and off-Site disposal of approximately 200 cubic yards of contaminated subsurface soils remaining at the MRIP property. Additional soil sampling will be conducted during the Remedial Design (RD) to further refine this estimate and determine if additional soils need to be excavated. A paint waste area, approximately 300 cubic yards in volume, that was recently identified by EPA's Removal Program would also be excavated, treated (if necessary), and disposed of off-Site if the area is not addressed by EPA's Removal Program.

- Capture and treatment of VOCs in the groundwater plume off the MRIP property.

- Long-term groundwater monitoring.

The proposed remedy, discussed in detail in Section 7 of this document, is intended to attain the remedial action objectives selected for the Site, in conformity with New York State applicable standards, criteria and guidance (SCGs), as identified in Section 6. Under Section 121(d) of CERCLA, 42 U.S.C. Section 9621(d), EPA is required to attain legally applicable or relevant and appropriate Federal and State requirements, standards, and criteria when implementing remedial actions at CERCLA sites, unless such ARARs are waived under CERCLA section 121(d)(4). These requirements are collectively referred to as Applicable or Relevant and Appropriate Requirements (ARARs). EPA also uses "to be considered" (TBCs), that include nonbinding criteria, advisories, guidance, and proposed standards. SCGs include all applicable Federal ARARs and TBCs.

This PRAP identifies the preferred remedy, summarizes the other alternatives considered and discusses the reasons for this preference. **NYSDEC and EPA will select a final remedy for the Site only after careful consideration of all comments received during the public comment period.** Any remedy selected will include both performance and environmental monitoring along with periodic reevaluation of the effectiveness of the selected remedy and the need for further action, if any.

To better understand the Site and the investigations conducted, the public is encouraged to review the project documents at the following repositories:

NYSDEC Central Office
Attention: Michael Komoroske
50 Wolf Road, Albany, NY 12233-7010
Phone (518) 457-3395
Hours Mon. through Fri., 8:00 to 4:45

NYSDEC Region 3 Office
Attention: Michael Knipfing
21 South Putt Corners Road
New Paltz, NY 12561
Phone (914) 256-3154
Hours Mon. through Fri., 8:30 to 4:45

EPA Region 2 Office
Attention: Patrick Hamblin
Emergency & Remedial Response Division
290 Broadway, 20th Floor
NY, NY 10007-1866
Phone: (212) 637-3314

NYSDEC and EPA Information Repositories:
Stone Ridge Library
Stone Ridge, New York 12484
Phone: (914) 687-7023
Hours: Mon & Wed, 1:30-8:00; Tue, Thu & Sat, 10:00-5:30; Fri, 1:30-5:30; Sun, closed

Rosendale Library
264 Main Street, Rosendale NY 12472
Phone: (914) 658-9013
Hours: Mon, Tue & Thur, 11-7:30; Wed & Fri, 11-5, Sat, 10-3; Sun, Closed

DATES TO REMEMBER:

November 15, 1999 to January 15, 2000 - Public comment period on the RI/FS Report, PRAP and preferred alternative. Since a extension request has already been received, the normal 30 day comment period has been extended to 60 days.

Thursday December 2, 1999, 7:00 pm - Public meeting at the High Falls Firehouse, High Falls, New York

A public meeting will be held to present the findings of the FS along with a summary of the proposed remedy. After the presentation, a question and answer period will be held, during which verbal or written comments can be submitted on the preferred remedy. Written comments can be submitted at any time during the public comment period.

Based on new information or public comments, the preferred alternative may be modified or another of the alternatives presented in this PRAP may be selected. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and responses provided in the Responsiveness Summary section of the Record of Decision (ROD), which will be issued by EPA and will represent NYSDEC and EPA's final decision regarding the selected remedy after careful consideration of all public comments.

SECTION 2: SITE LOCATION AND DESCRIPTION

The MRIP property is located on Mohonk Road in High Falls, Ulster County (see Figure 1). The MRIP property is approximately 14.5 acres, most of which is undeveloped. The MRIP property is bounded on the southeast by Mohonk Road and to the northeast, northwest, and southwest by residential properties on large wooded lots. The MRIP property (see Figure 2) is mostly undeveloped except for the southern corner of the property, which is occupied by an approximately 43,000 ft^2 building. A 6,000-gallon fuel oil underground storage tank (UST) and a 1,000-gallon underground disposal tank were located to the north of the building. The 6,000-gallon fuel oil UST was removed in 1992 by a previous owner. The NYSDEC removed the 1,000 gallon underground disposal tank as an IRM in August 1997. See Figure 2.

The surrounding area is rural in nature and relies exclusively on groundwater as a source of potable water. The Rondout Creek, a Class B water body, flows approximately 3,000 feet to the north and west of the MRIP property. The best usages of Class B surface waters are primary and secondary contact recreation and fishing and are suitable for fish propagation and survival. The Coxing Kill, a Class C(T) water body, flows approximately 2,000 feet to the east of the MRIP property. The best usage of Class C waters are fishing and these waters are suitable for fish propagation and survival.

SECTION 3: SITE HISTORY

3.1 Operational/Disposal History

The structure on the MRIP property has been used as a manufacturing facility since at least the early 1960s when a metal finishing company, Varifab, Inc. moved into the building. Varifab reportedly used TCE in the finishing and assembly of metal parts for computer card punch machines and computer frames. Consolidated Diesel purchased Varifab and the property in about 1969 and continued and expanded metal fabrications operations there until approximately 1972. The facility was purchased by the R.C.

Ballard Corporation in 1972 which conducted a wet spray operation there. This type of painting operation would require large quantities of solvents in order to clean surfaces prior to painting. The property was again sold in 1975 to a Richard C. Wilson who conducted unknown operations there for approximately six months. In 1976, the property was purchased by Gelles Associates, which manufactured metal and wood store display fixtures. In 1992, the Banco Popular of Puerto Rico repossessed the property. In 1993, the property was purchased by the Kithkin Corporation and is currently leased to a company that makes sets for the movie and TV industry.

In 1994, a resident on Mohonk Road contacted the UCHD concerning the quality of her drinking water. The well was sampled and found to contain VOCs above the NYSDOH drinking water standards. These VOCs included: 1,1,1-TCA at 290 parts per billion (ppb); TCE at 26 ppb; 1,1-dichloroethylene (1,1-DCE) at 76 ppb; and 1,1-dichloroethane (1,1-DCA) at 22 ppb. Concentrations of total VOCs exceeding 1,000 ppb have been detected in other residential wells. The NYSDOH drinking water standard is 5 ppb for each of these compounds. Other wells in the area were sampled and many were also found to be contaminated with VOCs. Beginning in April 1994, at the request of the health departments, the NYSDEC installed GAC filtration systems on residential, municipal and commercial property water supply wells whose water contains VOCs above the NYSDOH drinking water standard. The NYSDEC is currently monitoring and maintaining 70 GAC filtration systems as an IRM.

The NYSDEC identified the MRIP property as the source of the contamination, and in August 1994, the MRIP property was designated a Class 2 site on the New York State Registry of Inactive Hazardous Waste Disposal Sites. The Class 2 designation indicates that the site poses a significant threat to public health and/or the environment. The Site was listed on the Federal National Priorities List (NPL, also known as Superfund) of hazardous waste sites on January 19, 1999.

3.2 Remedial History/Previous Investigations

After repeated, unsuccessful attempts to have a responsible party fund a full remedial program at the Site, the NYSDEC in 1996 elected to use the State Superfund program to conduct the work. In the Fall of 1996, the NYSDEC and their consultant conducted an Immediate Investigation Work Assignment (IIWA). A sample from the 1,000-gallon underground disposal tank on the MRIP property indicated an estimated concentration of 1,1,1-TCA at 26% and 1,1-DCE at 1.8% in the sludge at the bottom of the tank. Since the 1,000-gallon tank was determined to be the primary source of the VOC contamination in the groundwater, the NYSDEC elected to remove the tank as an IRM in August 1997 (see Figure 2). The tank was removed along with about 25 tons of contaminated soil from beneath the tank and properly disposed of off-Site to prevent additional contamination from entering the groundwater. No residual contamination was detected in the location of the former 6,000-gallon fuel oil storage tank. As part of the IIWA, five shallow soil/bedrock interface monitoring wells were installed on the MRIP property. Analysis of groundwater sampled from monitoring well MRMW-4 located near the 1,000-gallon underground disposal tank detected the presence of 1,1-DCE at 10,000 ppb; 1,1-DCA at 6,700 ppb; TCE at 3,300 ppb; and 1,1,1-TCA at 82,000 ppb. Four bedrock monitoring wells were installed and sampled on the MRIP property under a second IIWA in April 1997.

The NYSDEC requested that EPA's Removal Program construct a groundwater extraction and treatment system on the MRIP property, in order to minimize the migration of the most highly contaminated portion of the groundwater plume. This Removal Action will extract the contaminated groundwater and treat it on the MRIP property using an air stripper. The clean, treated water will be discharged to a nearby surface water stream in accordance with effluent criteria issued by the NYSDEC. EPA has classified this work as a NTCRA. The EPA issued and solicited comment on an Engineering Evaluation/Cost Analysis (EE/CA) that described the rationale for the NTCRA. EPA's responses to the comments received were summarized in a Responsiveness Summary. The Responsiveness Summary was included in an Action Memorandum, the decision document that substantiated the need for a removal action at the Site, which was finalized in June 1999. The design for the NTCRA is nearing completion and preliminary mobilization at the MRIP property occurred in July 1999; construction of the treatment system is anticipated to be completed in the late Fall of 1999.

3.3 Scope and Role

Cleanup at the Site is currently being addressed with 3 actions:

- New York State's interim remedial measures,
- EPA's NTCRA,
- and the long-term remediation plan.

This proposed plan describes the alternatives for the long-term remediation of the Site. New York State's interim actions addressed immediate health threats through the installation of GAC filters on impacted homes and businesses, and removal of the suspected source of contamination. EPA's NTCRA is designed to minimize the further migration in the bedrock aquifer of the most highly contaminated portion of the groundwater plume.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the Site and to evaluate alternatives to address the significant threat to human health posed by the presence of hazardous waste, the NYSDEC has recently completed a RI/FS.

4.1 Summary of the Remedial Investigation (RI)

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the MRIP property. The initial RI work was conducted between March 1997 and December 1997. A draft RI Report was issued in March 1998. Additional RI field activities occurred between April 1998 and June 1998. A final RI Report was issued in September 1998.

The RI included the following activities:

- private water well survey;
- soil probe borings and soil sampling;
- test pit excavation and subsurface soil sampling;

- tracing drain lines from the building to determine additional contamination source areas on the MRIP property;
- surface water sampling;
- groundwater monitoring well network installation and sampling off the MRIP property;
- groundwater elevation and flow data;
- groundwater pumping tests;
- human health exposure assessment;
- habitat assessment; and
- completion of a RI Report

To determine which media (soil, groundwater, air, etc.) contain contamination at levels of concern, the RI analytical data were compared to the SCGs and ARARs. Groundwater, drinking water and surface water standards identified for the Site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of NYS Sanitary Code, as well as Federal Safe Drinking Water Act 40 CFR Part 141 et.seq., maximum contaminant levels (MCLs) for drinking water. For soils, NYSDEC TAGM 4046 provides soil cleanup objectives for the protection of groundwater, background conditions and health-based exposure scenarios.

Chemical concentrations for water and soil are reported in parts per billion (ppb) and/or parts per million (ppm). For comparison purposes, SCGs are defined for each media.

4.1.1 Nature and Extent of Contamination

Based upon the results of the RI, soils and groundwater at the Site require remediation. These results are summarized below. More complete information can be found in the RI Report which is available at the information repositories.

4.1.1.1 *Surface Soils* - Historical sampling did not detect any contaminants of concern (COCs) in the surface soils on the MRIP property. Recently, EPA's Removal Program discovered a potential waste disposal area which is near the surface, which is discussed in the following section.

4.1.1.2 *Subsurface Soils* - Samples were collected by using a direct push soil sampler and through the excavation of test pits and trenches. The excavations uncovered drain lines originating from inside the north and west sides of the building. Subsurface soils samples were also collected from three locations inside the building. The subsurface soil data indicate that contaminated soils remain in the vicinity of the former 1,000-gallon underground disposal tank north of the building, in an area just west of the building, and in a small area under the building. Contaminants that were found above SCGs include 1,1,1-TCA at 4.6 ppm with a cleanup objective of 0.800 ppm, TCE at 0.730 ppm with a cleanup objective of 0.700 ppm, DCA at 1.3 ppm with a cleanup objective of 0.200 ppm, perchloroethylene (PCE) at 25 ppm with a cleanup objective of 1.4 ppm, ethyl benzene at 61 ppm with a cleanup objective of 5.5 ppm and xylene at 570 ppm with a cleanup objective of 1.2 ppm. Although the subsurface soils pose no risk to children or adult residents since they are not accessible, they do pose a risk to construction workers or workers on the MRIP property who may come in contact with them during future excavations. In addition, these soils have the potential to impact groundwater through the leaching of the VOCs into the groundwater. In total, there are approximately 200 cubic yards of contaminated subsurface soils that would need to be addressed, as shown in Figure 3. Additional soil sampling would be conducted during the RD to refine this estimate.

In addition to the subsurface soil contamination found during the RI, EPA and NYSDEC recently discovered an additional disposal area at the Site. In May 1999, the EPA Removal Program performed a geophysical survey followed by development of test pits which identified a potential disposal area, approximately 300 cubic yards in volume, about 75 feet north of the northwest corner of the building on the MRIP property. This area was found to contain paint wastes, and samples from the area were found to contain elevated levels of paint-related compounds including toluene, ethylbenzene, xylenes, isopropylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, lead and naphthalene. This work is detailed in an EPA Trip Report titled Exploratory Trenching at the Mohonk Road Industrial Site, dated June 28, 1999. EPA is currently assessing whether this disposal area can be addressed using its removal authorities. If it is not addressed as a removal action, it will be addressed as part of the soil remediation program discussed in this PRAP. This report is available at EPA's information repositories.

4.1.1.3 *Surface Water* - Samples were collected from various ponds and other water bodies downgradient of the MRIP property. With the exception of the cistern located just north and downgradient of the MRIP property, none of the samples were contaminated with Site-related contaminants. The cistern was 10-12 feet in depth and contained approximately a foot of water at the bottom. This water was more reflective of the shallow soil/bedrock interface groundwater than surface water. The sample contained 1,1,1-TCA at 43 ppb and DCE at 4 ppb, which is consistent with nearby soil/bedrock interface monitoring well MRMW-5 on the MRIP property.

4.1.1.4 *Groundwater* - Monitoring wells were installed off the MRIP property to provide subsurface geologic data and to allow monitoring of groundwater elevations and quality. This information was necessary to evaluate the direction of groundwater flow and to characterize the extent of the groundwater contaminant plume. In addition to the wells installed on the MRIP property in the Fall of 1996 and Spring of 1997, eleven monitoring wells have been installed off the MRIP property and sampled as part of the RI. The most recent complete monitoring well sampling event was in October 1998. Another complete groundwater sampling event occurred in October 1999. See Table 1 for the groundwater sampling results.

In the Hamlet of High Falls, the Shawangunk fractured bedrock aquifer is the principal source of drinking water. Water movement through this formation is characterized by a series of distinct, structurally controlled, locally interconnected fracture systems. This aquifer is recharged directly by precipitation on exposed bedrock areas and by infiltration through the overburden material. The soil or overburden groundwater is limited and is not widely used as a source of potable water. The MRIP property is found near a topographical high and serves as a recharge area for the bedrock aquifer. Vertical flow gradients at the MRIP property are clearly downward. Groundwater flow direction in the bedrock aquifer is predominantly to the north toward the Rondout Creek, but also showed components of flow to the northeast toward the Coxing Kill and northwest toward the Rondout Creek. There are a number of springs in the area which are used as sources of water by some residents. Sampling indicates that these springs are not contaminated by site related COCs. Artesian or upward groundwater flow has been observed in monitoring well MRMW-13B and has also been reported in residential wells along Berme Road near the Rondout Creek (see Figure 4.)

The shallow soil/bedrock interface monitoring well MRMW-4 on the MRIP property is located next to the location of the former 1,000-gallon underground disposal tank. As discussed earlier, this well is significantly impacted by VOCs. Soil/bedrock interface monitoring well MRMW-5 is located less than 100 feet downgradient of MRMW-4 and is significantly less impacted, with 1,1,1-TCA at 51 ppb in the December 1997 sampling round. No VOCs above the 5 ppb groundwater standard have been detected in soil/bedrock interface well MRMW-11 located further downgradient. This indicates that the contamination is moving vertically downward on the MRIP property directly into the underlying bedrock aquifer. VOCs have not been detected in samples collected from springs in the area.

The extent and concentration levels of the bedrock groundwater contamination are depicted in Figure 5. The Site-related COCs found in the bedrock aquifer include 1,1,1-TCA, TCE, DCE and DCA. 1,1,1-TCA was detected at 4,100 ppb in monitoring well MRMW-5B on the MRIP property in the October 1998 sampling round. In this same round of sampling, 1,1,1-TCA was detected at 150 ppb in monitoring well MRMW-12B and at 210 ppb in monitoring well MRMW-15B, which are both located off the MRIP property approximately 1,600 feet downgradient from the location of the 1,000-gallon underground tank which has been removed and is considered a former source of contamination. The groundwater standard for 1,1,1-TCA is 5 ppb. A residential supply well approximately 1,000 feet from the source area has consistently had concentrations of total VOCs at greater than 1,000 ppb. The VOC contamination is found throughout the vertical extent of the bedrock aquifer due to the interconnection of the bedrock fractures. Monitoring well MRMW-11B was drilled to a depth of 181 feet and 1,1,1-TCA was detected at 540 ppb in the May 1998 sampling round. The "nearfield plume" has been defined as having concentrations of total VOCs at greater than 1,000 ppb. The "farfield plume" is defined as having concentrations of total VOCs less than 1,000 ppb. Based on the May 1998 sampling data, the nearfield plume is estimated to have an area of approximately 6.3 acres and the total plume an area of 170 acres. The Site-related groundwater plume extends over 4,000 feet from the MRIP property and has impacted 70 residential, commercial and municipal water supply wells.

4.1.1.5 *Aquifer Testing* - A 45-hour pump test was conducted on a production well PW-2 located on the MRIP property to determine if sufficient drawdown and hence capture of the plume could be achieved through pumping of the aquifer. The pump test indicated that the well could achieve a high rate of pumping, although significant localized drawdown of the water table occurred. A second pump test was conducted on MRMW-11B and the results were similar to the first test. Based on the pump test results and water level measurements, the average linear groundwater velocity in the bedrock aquifer was calculated to be approximately 0.26 feet/day (95 feet/year). Assuming that the waste disposal began approximately 35 years ago, the groundwater velocity or flow accounts for a large portion of the noted movement of the plume. The data from the two pump tests has been used to develop and calibrate a groundwater model of the plume.

4.1.1.6 *Groundwater Flow Model* - In order to better evaluate alternatives for alternate water supplies (AWS) and/or plume control systems, a groundwater flow model was developed as part of the FS. The modeling study was used to predict the effect the groundwater pump and treat systems would have on the continued use of private individual wells as a water source; to evaluate plume migration; and the response of the bedrock aquifer to any of the potential alternative water supply scenarios. The modeling study included the development of a conceptual model of the hydrogeologic system, selection of the appropriate computer codes, model design and calibration, predictive simulation, and presentations of modeling design and results. Two groundwater model simulations were conducted involving the NTCRA extraction wells on the MRIP property; these models are described below. Important conclusions drawn from the model simulations include the following:

- Under steady-state conditions (continued use of the community private wells and no groundwater extraction and treatment system operating), the model suggests that the VOC contaminants in the groundwater will travel outside of the current plume boundary and possibly impact the Rondout Creek and the Coxing Kill. See Figure 13.

- If a public water system is installed to service only properties with wells currently impacted and no active remedial actions (i.e., groundwater extraction and treatment) are taken at the Site, the groundwater model simulations suggests that a section of residences north of Route 213 will be impacted by the contaminant plume as well as a group of residences south of Route 213 near Rondout Creek.

In the first groundwater model scenario, the wells installed as part of the NTCRA were modeled as pumping at a total of 40 gallons per minute (gpm) and all residential wells within the model domain were also pumping. For the second scenario, the NTCRA wells were again modeled as pumping at a total of 40 gpm but the residential wells were assumed turned off. As would be expected, both simulations indicate that a portion of the plume near the MRIP property would be contained by the NTCRA wells. When the NTCRA wells were assumed to be pumping and the residential wells remained on (or pumping) (scenario 1), the simulation indicates a significant portion of the northern end of the farfield plume would be drawn into residential wells, while the leading edge of the plume would reach the Rondout Creek in roughly three years. In the second scenario, which assumed the residential wells would not be pumping, the plume would continue to migrate and reach the Rondout Creek in approximately one year. In other words, if a public water system remedy was implemented and the existing impacted and threatened private wells were taken out of service, without an aquifer-wide groundwater response action, the groundwater plume would be expected to migrate further and possibly impact the Rondout Creek and the Coxing Kill.

EPA performed additional groundwater modeling to determine optimal rates of groundwater extraction for the NTCRA. This modeling is described in a June 15, 1999 Technical Memorandum, which is available at EPA's information repositories.

4.1.1.7 *Human Health Exposure Assessment* - The assessment was conducted by the NYSDEC to provide a qualitative assessment of the health risks to humans under current and future land-use scenarios. The assessment concluded that the primary routes of exposure and most significant exposure intakes under a current land use scenario are inhalation of VOCs from groundwater (via showering) by residents off the MRIP property, followed by ingestion of groundwater by workers on the MRIP property and ingestion of groundwater by local residents (primarily children) off the MRIP property. It is important to note that the use of the GAC filtration systems has eliminated these exposure pathway and ensures a safe supply of water for those wells which are currently impacted. Under a future-use scenario, the local residents have the greatest exposure to COCs from the Site, with inhalation accounting for the most significant amount of COC intake. The exposure assessment considers the amount of exposure to chemicals from the Site and does not equate to the potential risk from exposure, which is dependent on a chemical's toxicity and is discussed below.

EPA Risk Assessors quantified the estimated risk based on the Human Health Exposure Assessment. The results are discussed in Section 4.3 below, and are available for review at the EPA information repositories for the Site (EPA Memorandum, dated October 20, 1999).

4.1.1.8 *Fish and Wildlife Impact Analysis* - A Step 1 Analysis of the Site was conducted following the guidelines issued by the NYSDEC. The analysis is presented in Chapter 8 of the RI Report. Although the impact analysis concluded there was no current impact to fish and wildlife resources, without an active groundwater response the plume could migrate and potentially impact fish and wildlife resources.

A RI Report was prepared that summarizes the findings of the RI and is available for review at the project document repositories listed in Section 1.

4.2 Interim Remedial Measures

Interim Remedial Measures (IRMs) are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

In addition to the installation of the GAC filtration systems IRM, and as discussed in Sections 3.1 & 3.2 of this document, an underground tank excavation and removal IRM was performed in September 1997. The design and construction of a contaminated groundwater extraction and treatment system on the MRIP property as a NTCRA is ongoing. Preliminary mobilization at the MRIP property occurred in July 1999 and construction of the treatment system is anticipated to be completed in late fall 1999.

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 MRIP property. A baseline risk assessment was conducted by EPA based upon the results of the Human Health Exposure Assessment conducted in the RI, and an analysis of residents in the nearfield plume, in order to estimate the risks associated with current and future Site conditions. The baseline risk assessment estimates the human health risk which would result from the contamination at the Site if no remedial action were taken, and the currently operating GAC filters were not in use. A more detailed discussion of the Human Health Exposure Assessment and the baseline risk assessment can be found in Chapter 7 of the RI Report, and in an EPA Memorandum dated October 20, 1999, respectively.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification* – identifies the contaminants of concern at the Site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment* – estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water by which humans are potentially exposed.) *Toxicity Assessment* – determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization* – summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

Current Federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the range of E-04 to E-06 (e.g., a one-in-ten-thousand to a one-in-one-million excess cancer risk) and a maximum health Hazard Index (HI) (which reflects noncarcinogenic effects for a human receptor) equal to 1.0. (A HI greater than 1.0 indicates a potential of noncarcinogenic health effects).

The results of the baseline risk assessment indicate that the groundwater at the Site poses an unacceptable risk to human health. These calculations assume the currently operating GAC filters are not in use.

Under current use scenarios, the carcinogenic risk for the adult worker on the MRIP property through ingestion and inhalation (via showering) of groundwater is 4.6E-04, which is at the upper bound of EPA's acceptable level. The HI for workers on the MRIP property under current use scenarios is 1.3, which exceeds EPA's acceptable level for noncarcinogenic health effects. Estimated carcinogenic risk to adults off the MRIP property in the nearfield plume under current and future use scenarios is 6.4E-4 for adults, which exceeds EPA's acceptable level for carcinogenic risk. Estimated carcinogenic risk to children off the MRIP property in the nearfield plume is 4.4E-04 for children, which is at the upper bound of EPA's acceptable risk level. The HI for adults and children off the MRIP property in the nearfield plume under current and future use scenarios is 0.38 and 0.94, respectively.

Actual or threatened releases of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health or welfare.

4.4 Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures which may be presented by the Site. The Fish and Wildlife Impact Assessment included in the RI presents a more detailed discussion of the potential impacts from the Site to fish and wildlife resources. Although the RI impact assessment did not identify currently existing pathways for significant exposures to fish or wildlife, without an active groundwater response the plume could migrate and potentially impact fish and wildlife resources.

SECTION 5: ENFORCEMENT STATUS

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

The PRPs for the Site identified to date by NYSDEC include the current owner of the MRIP property, the Kithkin Corporation, and a number of previous owners of the MRIP property including the Banco Popular of Puerto Rico, Gelles Associates, Richard C. Wilson, the R.C. Ballard Corporation, Consolidated Diesel and Varifab, Inc.

The PRPs failed to perform the RI/FS at the Site when requested by the NYSDEC. EPA has noticed the Kithkin Corporation, Daniel Gelles, and Gelles Associates Inc. of their potential liability at the Site. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. The PRPs are subject to legal actions by the State and/or EPA for recovery of all response costs the State and/or EPA have incurred.

SECTION 6: SUMMARY OF REMEDIAL ACTION OBJECTIVES & GOALS

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as SCGs.

Goals for the remedial program have been established through the remedy selection process. The overall remedial objective is to meet all SCGs, including Federal ARARs as described above, and be protective of human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment through the proper application of scientific and engineering principles. The RAOs selected for this Site are as follows:

- Eliminate the inhalation, ingestion and dermal contact of contaminated groundwater associated with the Site that does not meet State or Federal drinking water standards.
- Restore the bedrock aquifer to its best beneficial use.
- Eliminate the potential for human exposure to subsurface contaminated soil on the MRIP property. Contaminated Site soil cleanup objectives for COCs would be based on NYSDEC's Technical and

Administrative Guidance Memorandum (TAGM).

- Eliminate further off-Property contaminated bedrock groundwater migration and impacts.

- Eliminate the potential for any further contaminant discharges on the MRIP property.

The contaminant and media-specific SCGs are presented in Table 1.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost-effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Site were identified, screened and evaluated in a FS, dated March 1999. Since contamination from the Site consists of VOCs, the FS utilized EPA's Office of Solid Waste and Emergency Response Directive 9283.1-12 - Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites to identify remedial alternatives.

A summary of the remedial alternatives follows. As used in the following text, the time to implement reflects only the time required to construct the remedy and does not include the time required to design the remedy, to procure contracts for design and construction or to negotiate with PRPs for implementation of the remedy. All of the groundwater response alternatives assume a long-term groundwater monitoring program of up to 30 years.

7.1 Description of Alternatives

The potential remedies were developed to achieve the established RAOs for the contaminated media at the Site, specifically the VOC-contaminated groundwater plume and soils. Alternatives for each medium are discussed and evaluated separately. The alternatives discussed below may vary in title and description from those identified in the FS.

Potable Water Supply Alternatives

AWS 1 No Further Action

Present Worth:	$ 0
Capital Cost:	$ 0
Annual O&M:	$ 0
Time to Implement:	0 years

The no further action alternative is evaluated as a procedural requirement and as a basis for comparison. It includes no active remedial measures and discontinuation of monitoring and maintenance of the 70 currently operational point of use (POU) GAC systems for private well owners after the current service contract for these filters expires. After the service contract expires on February 26, 2001, further maintenance of these systems would be the responsibility of the homeowner.

AWS 2 Installation and Maintenance of Additional GAC Filter Systems

Present Worth:	$5,319,000
Capital Cost:	$384,000
Annual O&M:	$321,000
Time to Implement:	3 months

Alternative AWS 2 includes installation and maintenance of a GAC system for all of the private well owners in the proposed public water service area (PWSA) that are currently not on GAC filters (approximately 73 more systems), and continued monitoring and maintenance of the 70 currently operating POU GAC systems.

The PWSA is depicted in Figure 6 and includes all properties currently impacted by Site-related groundwater contamination or considered threatened by the Site-related groundwater contamination. The PWSA was designed to be protective of human health. The RI groundwater sampling data, the historical private well sampling data and the simulations from the groundwater flow model were used to determine the boundaries. The proposed PWSA is comprised of 174 lots in the Towns of Marbletown and Rosendale. Of these 174 lots, approximately 143 of them are currently developed for residential or commercial use and contain private wells.

Alternative AWS 2 includes continued maintenance of the 70 currently operational POU GAC systems for private well owners. This alternative includes the implementation of institutional controls, such as groundwater use restrictions, which are intended to prevent development of the bedrock aquifer in the area of currently existing or potential future contamination as a potable water supply without appropriate treatment.

AWS 3 <u>Public Water Supply Using Catskill Aqueduct</u>

Present Worth:	$ 8,573,000
Capital Cost:	$ 7,589,000
Annual O&M:	$ 64,000
Time to Implement:	2 years

Alternative AWS 3 includes the use of the Catskill Aqueduct as a new water supply source (see Figure 8) and the establishment of a water distribution system in the PWSA. The PWSA for AWS 3 is the same as described in AWS 2 (see Figure 6.) Pursuant to the Surface Water Treatment Rule (40 CFR Parts 141 and 142), raw water from the aqueduct would require treatment to remove conventional contaminants, such as particulates, color, taste, odor, and microbes. A conventional treatment scheme for a surface water supply, such as the aqueduct water, includes coagulation, flocculation, sedimentation, and filtration. After filtration, a final disinfectant (e.g., chlorine) would be added to lower the microbe content in the distribution system and control algal growth (see Figure 7.) A similar treatment scheme is currently used by the Village of New Paltz to treat its water supply, a portion of which is also drawn from the Catskill Aqueduct.

Utilization of the Catskill Aqueduct would require the establishment of a community water district in the towns of Marbletown and Rosendale and a use agreement with the New York City Department of Environmental Protection (NYCDEP). A connection to the aqueduct dewatering chamber on Canal Road would need to be made and a main would be installed to transfer raw water from the dewatering chamber to the treatment plant. To develop conceptual design cost estimates, it was assumed that the treatment plant would be located on the MRIP property. The location of the plant would be finalized during the design of the system. A pump would be needed to transfer the treated water to a water storage tank. A distribution system (see Figure 9) must also be constructed to convey the treated water from the storage tank to the users in the community. Access would need to be obtained to install the distribution system. The system would be designed to provide fire protection to comply with local requirements.

For periods of time when the Catskill Aqueduct is temporarily out of service, a backup supply of water would be needed for a minimum five-day period. The sources of the backup supply to be considered during remedial design are either the Rondout Creek or a bedrock supply well(s). The raw water from both of the possible backup water supplies would require treatment. Using the Rondout Creek would involve a pumping station at the pool created by the dam in High Falls and a raw water transmission main from the Rondout Creek to the treatment plant. As a possible backup supply well, monitoring well MRMW-13B, located near the dewatering chamber, was found to have a high yield (approximately 100 to 150 gpm) and was not in the contaminated plume area. The selection of the actual backup supply would be determined during predesign activities. The costs provided for this alternative reflect the bedrock well as a backup supply.

AWS 4 <u>Public Water Supply Using Well Field</u>

Present Worth:	$ 8,973,000
Capital Cost:	$ 7,620,000
Total Annual O&M:	$ 88,000
Time to Implement:	2 years

Alternative AWS 4 includes the installation of a new well field to service the PWSA on a full-time basis. To develop conceptual design cost estimates, the proposed location for this new well field is as shown in Figure 10. The actual location would be determined during predesign and require the drilling of test wells, additional pump tests and groundwater modeling. In this alternative, it was assumed that two supply wells would be pumping simultaneously at approximately 20 to 25 gpm each to sustain the average water demand of 45 gpm in the PWSA. A third well would be drilled as a backup.

As with AWS 3, a community water district would need to be established. Raw water from these wells would be pumped to a storage tank. It is assumed that treatment of the raw water would include chlorination at the very least and probably inorganic removal via coagulation, flocculation, settling, and filtration (needed because of the high iron and manganese content of the groundwater); this is consistent with water supply well practices in Ulster County and with the New York State regulations. Dosing equipment would maintain the necessary chlorine level to maintain disinfection (see Figure 11.) From the storage tank, water would be transferred to a distribution system, which would supply the PWSA. Access would need to be obtained to install and operate the distribution system. The system would be designed to provide fire protection to comply with local requirements.

The PWSA for AWS 4 is the same as described in AWS 2 and AWS 3.

Contaminated Bedrock Aquifer Response Alternatives

Alternatives were also developed to respond to the groundwater contaminant plume emanating from the MRIP property. As noted above, EPA is implementing a NTCRA to minimize the migration of the most contaminated groundwater in the nearfield plume. The FS has evaluated alternatives to address all of the Site-related contaminated groundwater in the bedrock aquifer.

Three alternatives were established for the groundwater response (GR).

GR 1 No Further Action

Present Worth:	$ 654,000
Capital Cost:	$ 131,000
Total Annual O&M:	$ 34,000
Time to Implement:	3 months

Alternative GR 1 is a no further action option that includes a long-term monitoring and evaluation program, presumed to be 30 years. For cost estimating purposes, it was assumed that the NTCRA extraction and treatment system on the MRIP property would operate for one year. O&M for the treatment system would be funded by the removal program.

Alternative GR 1 also includes the installation of new groundwater monitoring wells and the required sampling of potable and monitoring wells as part of a long-term groundwater monitoring program. See Figure 12. The Rondout Creek and Coxing Kill would also be sampled as part of the long-term monitoring program. This program would monitor and evaluate the fate and transport of the contaminant plume on an annual basis to determine whether the groundwater RAOs are satisfied.

The groundwater monitoring program may be discontinued when contaminant levels in the plume are below remedial action objectives for two consecutive years. This alternative assumes that the groundwater monitoring program would be the same regardless of the water supply alternative that is selected. The O&M cost for this alternative includes the monitoring program. Capital costs for this alternative covers well installation.

GR 2 Continuation of Non-Time Critical Removal Action

Present Worth:	$3,482,000
Capital Cost:	$ 131,000
Total Annual O&M:	$ 218,000
Time to Implement:	3 months

Alternative GR 2 includes active treatment of the nearfield plume which includes continuation of the NTCRA extraction and treatment system as a remedial action for a presumed period of 30 years, and institutional controls to minimize human contact with contaminated groundwater. The institutional controls would consist of groundwater use restrictions for private well users downgradient of the existing plume. Groundwater use restrictions would be proposed to prevent development of the Shawangunk fractured bedrock aquifer system (Shawangunk Formation) as a potable water source on and downgradient of the MRIP property. The groundwater use restrictions would apply in and near the areas of the existing groundwater plume. A long-term groundwater and surface water monitoring program would be included in this alternative, similar to the one described under Alternative GR 1, to monitor the movement of contaminants and to assess the efficiency of the NTCRA recovery wells in removing the contaminants from the plume. The O&M cost for this alternative includes the the monitoring program and operation of the treatment plant on the MRIP property.

GR 3 Extraction and Ex-Situ Treatment

Present Worth:	$ 6,043,000
Capital Cost:	$ 1,247,000
Total Annual O&M:	$ 312,000
Time to Implement:	2 years

Alternative GR 3 involves active remediation of contaminated groundwater by extraction and treatment Site-wide (i.e., continued operation of the NTCRA system as detailed in Alternative GR 2 to address the nearfield plume, and installation of a separate extraction and treatment system off the MRIP property to address the farfield plume.) The alternative also has a long-term monitoring component. Active remediation would reduce the time frame for restoration of the bedrock groundwater. The system's design would be similar to the extraction and treatment system of the proposed NTCRA.

Selection of a particular pumping pattern (i.e., placement of wells in and around the contaminant plume) depends on the identified depth and extent of contamination. The extraction wells would be designed to operate at an optimal rate to collect contaminated groundwater, contain the contaminant plume, and prevent the plume from migrating further downgradient. Because groundwater extraction at high pumping rates may cause depressed levels of groundwater in the bedrock aquifer and many of the existing private wells, this alternative must be paired with an AWS alternative that does not rely on local groundwater as a water supply (i.e., a groundwater supply that is not under the influence of the proposed extraction system, such as in Alternatives AWS 3 or AWS 4).

The groundwater model was used to simulate this groundwater extraction and treatment option. The number of wells, pumping rates, and well locations were varied to determine which combination would effectively capture highly contaminated groundwater in the interior of the plume (within the 100 ppb contour as of the June 1998 sampling) while letting lower contamination levels on the periphery escape and remediate through natural processes. After running several different cases with pumping rates between 25 and 50 gpm, it was determined that using three wells pumping at a rate of 40 gpm each produced drawdown averaging less than 10 ft in residential wells outside of the PWSA and effectively captured the contaminants released in the interior of the plume. If this alternative is selected, optimal pumping rates and well placement would be confirmed during the remedial design phase.

Steady-state simulations of the time necessary to achieve remedial action objectives in the aquifer were also conducted. For the case with three extraction wells each pumping at 40 gpm, along with the NTCRA extraction wells pumping at a total of 40 gpm, 29 years were required for both systems to extract contaminants, achieve RAOs and attain ARARs.

Contaminated groundwater would be pumped from the extraction wells to a water treatment plant to remove VOCs. At a minimum, groundwater would be treated for VOC removal to achieve the New York State surface water discharge requirements. Pretreatment of the groundwater would be necessary to remove conventional contaminants, such as iron and manganese, that foul treatment plant equipment. For cost estimating purposes, it was assumed that treated groundwater would be discharged to the Rondout Creek via a gravity discharge line.

Long-term groundwater monitoring would be conducted during the active remediation phase to assess the effectiveness of the groundwater extraction and treatment technology on contaminant concentrations. No new monitoring wells are proposed under this alternative, but could be installed if determined to be necessary. Periodic evaluations of the groundwater monitoring data would be used to evaluate the continued operation of the pump and treat system. The monitoring program may be discontinued when contaminant levels are below remedial action objectives for two consecutive years.

Contaminated Subsurface Soils on the MRIP Property Source Control Alternatives

Contaminated soils on the MRIP property are limited to the subsurface, i.e., greater than 2 ft below grade. The COCs in these soils are 1,2-DCE, 1,1,1-TCA and PCE, but elevated levels of TCE, DCE, DCA, ethylbenzene, and xylenes are also present. Areas of the MRIP property containing contaminated soils include those labeled on Figure 3 as Areas 1A, 1B and 2B. Additional sampling for COCs would be conducted in Areas D-1 and D-2 to determine if additional soils need to be excavated. The potential disposal pit area recently identified by EPA's removal program was found to contain elevated levels of paint-related compounds including toluene, ethylbenzene, xylenes, isopropylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, lead and naphthalene. The sampling is detailed in an EPA Trip Report titled Exploratory Trenching at the Mohonk Road Industrial Site, dated June 28, 1999. The EPA is evaluating whether this area is eligible to be addressed as a removal action; if not, this area would be addressed as part of the proposed remedy described in this PRAP.

Three alternatives have been established for source control (SC Alternatives). Alternative SC 1 involves no action. Alternative SC 2 involves excavation and ex-situ treatment of the contaminated soil that can be performed on the MRIP property. Alternative SC 3 includes excavation and off-Site treatment and disposal of the contaminated soil.

SC 1 <u>No Further Action</u>

Present Worth:	$25,000
Capital Cost:	$25,000
Total Annual O&M:	$ 0
Time to Implement:	0 year

Alternative SC 1 does not include any excavation or treatment of contaminated soils on the MRIP property, but includes fencing to restrict access to the contaminated soils.

SC 2 <u>Excavation and Ex-Situ Treatment Performed on the MRIP Property</u>

Present Worth:	$ 294,000
Capital Cost:	$ 177,000
Total Annual O&M:	$ 63,000
Time to Implement:	2 years

Alternative SC 2 involves the excavation and ex-situ treatment of approximately 200 cubic yards of soil containing contaminants at levels that exceed the RAOs. Contaminated soil on the MRIP property is approximated by the areas shown in Figure 3, however, additional sampling would be performed during the RD to further define the extent of contamination at the Site. The paint disposal area identified by EPA's removal program would be excavated for treatment, if the area were not addressed as a removal action. This area is approximately 300 cubic yards in volume, and would increase the capital cost of this alternative by roughly $50,000. During the excavation, sampling would be conducted to ensure that contaminated soil is removed to satisfy the RAOs. Uncontaminated soil, particularly the surface soil, would be stockpiled on the MRIP property and used to backfill the excavation, along with uncontaminated backfill material transported to the MRIP property.

An area of the MRIP property would be designated to perform the soil remediation using enhanced biodegradation and aeration. Contaminated soil would be spread on a liner in a thin layer. Soil nutrient levels would be measured and modified as necessary to promote optimal biodegradation. The soil would be aerated periodically to enhance volatilization of VOCs, and would be backfilled at the Site after the cleanup levels are achieved. For cost-estimating purposes, it is assumed that the treatment area would not be covered and that storm water runoff would not be collected. These assumptions would be reassessed in the remedial design phase. The storm water could collect low levels of VOCs and would be sampled to determine whether collection and treatment would be necessary prior to discharge.

The most suitable place to conduct the enhanced biodegradation and aeration process would be in an easily accessible area that is void of trees and structures. This area would be sloped slightly so that storm water could be easily collected, if necessary.

SC 3 Excavation and Off-Site Disposal

Present Worth:	$ 253,000
Capital Cost:	$ 253,000
Total Annual O&M:	$ 0
Time to Implement:	1 month

Alternative SC 3 involves the excavation and off-Site treatment (if necessary) and disposal of approximately 200 cubic yards of soil containing contaminants at levels that exceed the RAOs. The paint disposal area identified by EPA's removal program would be excavated for treatment (if necessary) and disposal, if the area were not addressed as a removal action. This area is approximately 300 cubic yards in volume, and would increase the capital cost of this alternative by approximately $80,000. The excavation and sampling procedure for Alternative SC 3 would be similar to that of Alternative SC 2. Contaminated soil would be stockpiled or placed in rolloff containers on the MRIP property. Liners and/or covers may be necessary for the stockpiling of contaminated soil. Uncontaminated soil would be stockpiled and used as a portion of the backfill to the excavation.

Based on the analytical results of the RI, contaminated soil that is generated from the MRIP property would likely be classified as nonhazardous industrial waste. Additional sampling of the excavated soil would be required to characterize the soil. Once characterized for disposal, the soil would be transported off-Site to a waste treatment or disposal facility. All treatment (if necessary) and disposal would occur at a permitted facility. For costing purposes, it is assumed that the soils could be directly landfilled without treatment. Alternative methods of treatment/disposal would be reviewed in the remedial design and the most economical option selected.

7.2 Evaluation of Remedial Alternatives

The eight criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste disposal sites in New York State (6 NYCRR Part 375) and CERCLA. A brief description of the criteria is provided below, followed by evaluations of each set of alternatives against each criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study. CERCLA has an additional criteria for State acceptance, which does not apply to this PRAP as it is being issued by NYSDEC.

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

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs) Compliance with SCGs (which includes ARARs) addresses whether or not a remedy will meet environmental laws, regulations, standards and guidance. In general, the remedies selected must comply with 6 NYCRR Part 375, CERCLA and the NCP.

2. Protection of Human Health and the Environment This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

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.

4. Long-term Effectiveness and Permanence This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation.

5. Reduction of Toxicity, Mobility or Volume Through Treatment Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the Site through treatment.

6. Implementability The technical and administrative feasibility of implementing each alternative is evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy 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.

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 decision. The costs for each alternative are presented in Table 2.

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

8. Community Acceptance Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated.

7.2.1 Evaluation of Potable Water Supply Alternatives

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs) The most significant SCGs for potable groundwater are the Safe Drinking Water Act

(42 U.S.C. §§ 300F et. seq.), National Primary Drinking Water Standards (40 CFR Part 141), and 6NYCRR Part 703 Groundwater Standards. For 1,1,1-TCA the Class GA groundwater (fresh groundwaters whose best usage is a source of potable water) and drinking water standard is 5 parts per billion (ppb).

The no further action alternative for the potable water (AWS 1) would not achieve compliance with SCGs for drinking water. Potable water Alternatives AWS 2, AWS 3 and AWS 4 are similarly effective in their ability to achieve applicable drinking water standards through either GAC treatment at individual wells or the installation of a public water supply. However, selection of Alternative AWS 2 would prevent active remediation of the farfield plume (Alternative GR 3) because, in the absence of a public water supply system, groundwater extraction may depress the water table and have an adverse impact on nearby private wells. Therefore, selection of this alternative would hinder attempts to actively restore the aquifer to predisposal conditions and achieve SCGs.

Construction of either the potable water supply Alternatives AWS 3 or AWS 4 will comply with the National Historic Preservation Act (NHPA) (16 U.S.C. 470), Executive Order 11988 - Flood Plain Management, Executive Order 11990 - Protection of Wetlands and 40 CFR 6 Apx. A (Policy on Implementing Executive Order 11990), EPA's 1985 Statement of Policy on Floodplains/ Wetlands Assessments for CERCLA Actions, New York State wetlands protection under 6 NYCRR Part 662, and 6 NYCRR Part 601 for the developing a water distribution system. The pipeline installation as depicted conceptually in Figure 9 for Alternatives AWS 3 and AWS 4 would also comply with location-specific SCGs. Alternative AWS 3 would comply with NYCDEP requirements.

2. <u>Protection of Human Health and the Environment</u>

The no further action alternative, AWS 1, for the potable water would not be protective of human health in the currently impacted and threatened areas. Alternative AWS 2 would be more protective of human health than Alternative AWS 1, but the potential for human exposure remains if the GAC filters fail. The NYSDOH does not consider the use of point-of-use GAC filtration units a long-term remedy, if a cost-effective, safe and reliable alternate water supply is available. It is generally the policy of both the NYSDEC and the EPA not to fund the long-term operation, maintenance and monitoring (O,M&M) of a large number of GAC filters as a long-term remedy, such as AWS 2. Alternative AWS 3 (Catskill Aqueduct as primary supply) and Alternative AWS 4 (Well Field as primary supply) are the most protective alternate water supply alternatives. AWS 3 and AWS 4 would be protective of human health through the supply of reliable, uncontaminated potable water.

3. <u>Short-term Effectiveness</u>

Alternative AWS 1, no action, would not be effective in the short term for providing clean potable water. All of the remaining potable water supply alternatives would be effective for providing potable water in the short term to the consumers whose wells have GAC filtration systems currently installed. GAC treatment has proven to be effective to date. Periodic monitoring of private wells that could potentially be impacted by the contaminant plume (i.e., wells downgradient of the contaminant plume) has been instituted by the local health department and has proven to be effective to date. NYSDEC continues to periodically sample monitoring wells in the community. Alternatives AWS 3 and AWS 4 would be effective in the short term as they incorporate the provision for installation and maintenance of GAC filters to impacted wells until a public water supply is provided. Implementation of these alternatives would take an estimated 2 years and cause noise and traffic impacts. However, these impacts can be minimized by employing appropriate construction techniques and practices.

4. Long-term Effectiveness and Permanence

Alternative AWS 1 does not provide long-term effectiveness or permanence. Alternative AWS 2 could be effective in providing a long-term source of potable water, but the potential for contaminant breakthrough exists in GAC systems, thus GAC systems are not considered by EPA and NYSDEC to be a permanent remedy. In addition, maintaining a large number of individual POU GAC systems is less reliable, and would require more maintenance than an area-wide water treatment system, which would be used with Alternatives AWS 3 and AWS 4. Therefore, Alternatives AWS 3 and AWS 4 would be more effective than Alternatives AWS 1 or AWS 2 in providing a long-term, reliable source of potable water.

The water supply from Alternative AWS 4 is slightly less reliable than Alternative AWS 3 since the wells could run dry during drought conditions. Based on groundwater model simulations, Alternative AWS 4 water supply wells pumping in the proposed upgradient location would not draw contaminants upgradient, to any previously unaffected residential areas or into the supply wells. Also based on model results, the impact of pumping the supply wells at 22.5 gpm each and NTCRA extraction wells at a total of 40 gpm on residential wells outside of the PWSA would be minimal except for two residential wells located relatively close to both the supply wells which the model predicted would exhibit a drawdown of about 16 ft. For Alternative AWS 4, it is important to note that without a detailed survey of well depths (and the depth of pumps in these wells), drawdowns such as those simulated, coupled with seasonal water level variations, may adversely affect some residential wells.

Alternative AWS 3 would provide permanence and the best long-term effectiveness.

5. Reduction of Toxicity, Mobility or Volume Through Treatment

Alternative AWS 1 would not reduce the toxicity, mobility or volume of contaminants in the groundwater. Alternative AWS 2 would reduce toxicity by treating contaminated groundwater at the point-of-use with GAC filtration. Alternatives AWS 3 and AWS 4 would eliminate the toxicity to residents by providing clean potable water to the currently impacted area and the threatened area.

6. Implementability

The no action alternative, AWS 1, is easily implemented. The installation of an additional 75 filtration systems can be readily implemented under Alternative AWS 2 as 70 existing GAC filtration systems have been installed and maintained successfully. However, maintaining this large a number of individual systems would require significant oversight.

Alternatives AWS 3 and AWS 4 are both technically feasible. These alternatives would require the construction of a water treatment plant, storage tower and a water distribution system, state and local approval of the design of the facilities and the formation of a water district. Construction efforts would need to be coordinated with the local utility companies. In addition, a water usage agreement would need to be reached between the PWSA water district and the NYCDEP for Alternative AWS 3.

7. Cost

Alternative AWS 1, no further action, has no capital or operation, maintenance and monitoring (O,M&M) costs. The capital costs for Alternative AWS 2 includes the costs for GAC filtration units which would be added to approximately 75 additional properties whose wells are considered threatened by the groundwater plume. The costs for AWS 2 for the continued operation, maintenance and monitoring (O,M&M) of the 70 GAC filtration systems currently installed and the 75 additional systems which would be installed are based on an estimated future yearly cost of $2,215 per system. The capital costs for Alternatives AWS 3 and AWS 4 are essentially the same and are considerably higher than Alternative AWS 2. The O,M&M of Alternative AWS 4 is somewhat higher than Alternative AWS 3 due to greater electrical usage.

8. Community Acceptance

A "Responsiveness Summary" will be prepared and attached to the Record of Decision for the Site that describes public comments received during the public comment period and how the comments and concerns will be addressed. If the final remedy selected differs significantly from the proposed remedy, the Record of Decision will describe the differences and reasons for the changes.

7.2.2 Evaluation of Contaminated Bedrock Aquifer Response Alternatives

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs)

Effluent from the active groundwater response Alternatives GR 2 and GR 3 would comply with the Clean Water Act (CWA, 33 U.S.C. §§ 1251-1387) and Safe Drinking Water Act (42 U.S.C. §§ 300F et. seq.), and NYS Surface Water Standards. Air emissions would comply with the Clean Air Act (CAA, 42 U.S.C. §§ 7401 et. seq.), 6 NYCRR Part 2129 (air emissions) and NYS Air Guide - 1. The alternatives would also comply with the National Historic Preservation Act (NHPA), Executive Order 11988 - Flood Plain Management, Executive Order 11990 - Protection of Wetlands and 40 CFR 6 Apx. A (Policy on Implementing Executive Order 11990), EPA's 1985 Statement of Policy on Floodplains/Wetlands Assessments for CERCLA Actions, and New York State wetlands protection under 6 NYCRR Part 662.

The no further action alternative for groundwater, GR 1, would not achieve compliance with State or Federal drinking water standards in either the currently impacted area or the threatened area.

Groundwater Response Alternative GR 2 would achieve applicable groundwater standards in the nearfield portion of the plume through active groundwater extraction and treatment while the farfield plume cleanup would rely on natural processes to eventually achieve applicable groundwater standards. Alternative GR 3 would be more effective than Alternative GR 2 in that it would achieve applicable groundwater standards throughout the entire nearfield and farfield plume through active treatment and in a shorter time frame.

2. Protection of Human Health and the Environment

Of the three groundwater response alternatives, Alternative GR 3, which would extract and treat the contaminated groundwater Site-wide, is the most protective by preventing human contact with the nearfield and farfield plumes. Alternative GR 1 would not include any measures to prevent human contact with contaminated groundwater. Alternative GR 2 would extract and treat the nearfield portion of the groundwater and would rely on only institutional controls to prevent human contact with contaminated groundwater in the farfield portion of the plume.

3. **Short-term Effectiveness**

Groundwater Response Alternatives GR 1 and GR 2 would have minimal short-term impacts on human health and the environment as they would not require any significant construction. Alternative GR 3 would result in adverse impacts to local roads and traffic, as well as impacts to the community from noise and dust generation due to the installation of piping and the construction of a groundwater treatment facility. However, these impacts would be minimized by employing appropriate construction techniques and practices.

4. **Long-term Effectiveness and Permanence**

Groundwater response Alternative GR 1 would not be an effective or permanent remedial alternative in the long term. Also, after one year, the NTCRA extraction and treatment system would be shut down and would no longer be acting to minimize the migration of the nearfield plume. Alternative GR 2 would be more effective in reducing impacts to downgradient wells, however, contaminants in the farfield plume would not be addressed. Alternative GR 3 would be the most effective alternative to control and remediate the groundwater contaminant plume and reduce impacts to downgradient wells. The groundwater model results show that implementation of Alternative GR 3 will contain all contaminants within the potential PWSA and that any wells outside the PWSA would not be impacted.

5. **Reduction of Toxicity, Mobility or Volume Through Treatment**

Groundwater Response Alternative GR 1 would not actively result in any reduction of toxicity, mobility, or volume of contamination present in the groundwater. Both Alternatives GR 2 and GR 3 would reduce these parameters in the nearfield plume, but GR 2 would not actively reduce these parameters in the farfield plume. Alternative GR 3 would actively reduce these parameters throughout the entire groundwater contaminant plume.

6. **Implementability**

Groundwater response Alternatives GR 1 and GR 2 would be easily implemented. Institutional controls for GR 2 would be established by the EPA and the NYSDEC. The NTCRA component of Alternative GR 2 would already be in place on the MRIP property, and would continue operating and require a part-time operator. For Alternative GR 3, the technologies for the installation of the extraction wells and treatment facility off the MRIP property are readily available, although they would take about two years to construct. Because groundwater extraction at high pumping rates may cause depressed levels of groundwater in the bedrock aquifer and many of the existing private wells, this alternative must be paired with an AWS alternative that does not rely on local groundwater as a water supply (i.e., a groundwater supply that is not under the influence of the proposed extraction system such as in Alternatives AWS 3 or AWS 4). Access to private property for this construction would need to be obtained. Public perceptions concerning the placement of the facilities would also need to be addressed.

7. **Cost**

The capital costs for groundwater response Alternatives GR 1 and GR 2 are the same since both alternatives would provide the same enhanced groundwater monitoring program. The O,M&M costs for Alternative GR 2 are greater than for Alternative GR 1 due to the continued operation of the NTCRA groundwater extraction and treatment system on the MRIP property. The capital costs for Alternative GR 3 are considerably higher than for Alternatives GR 1 and GR 2, since Alternative GR3 would involve the design and construction of an additional groundwater extraction and treatment system off the MRIP property. The O,M&M costs for Alternative GR 3 are somewhat higher than Alternative GR 2 since Alternative GR 3 would involve the operation of a second treatment facility. It is presumed that both Alternatives GR 2 and GR 3 would require O,M&M for a period of 30 years.

8. <u>Community Acceptance</u>
A "Responsiveness Summary" will be prepared and attached to the Record of Decision for the Site that describes public comments received during the public comment period and how the comments and concerns will be addressed. If the final remedy selected differs significantly from the proposed remedy, the Record of Decision will describe the differences and reasons for the changes.

7.2.3 Evaluation of Contaminated Subsurface Soils on the MRIP Property Source Control Alternatives

1. <u>Compliance with New York State Standards, Criteria, and Guidance (SCGs)</u>
The most significant SCG for the subsurface contaminated soils on the MRIP property is the NYS Recommended Soil Cleanup Objectives contained in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046. Disposal of the contaminated soils must comply with the Resource Conservation and Recovery Act (RCRA, 42 U.S.C. Section 6901 et seq.) and the NYS solid and hazardous waste regulations (6 NYCRR Parts 370-376).

The no further action alternative SC 1 for the contamination in the MRIP subsurface soils would not take any active measures to achieve the SCGs. Alternative SC 2 would achieve applicable soil cleanup objectives through excavation and on-Site treatment, and Alternative SC 3 would achieve soil cleanup objectives through excavation and shipment to an appropriate off-Site disposal facility. Although the current areas of excavation are outside floodplains, wetlands, and cultural resources, if additional areas are excavated or the existing areas are expanded, the alternatives would also need to comply with the National Historic Preservation Act (NHPA), Executive Order 11988 - Flood Plain Management, Executive Order 11990 - Protection of Wetlands and 40 CFR 6 Apx. A (Policy on Implementing Executive Order 11990), EPA's 1985 Statement of Policy on Floodplains/Wetlands Assessments for CERCLA Actions, and New York State wetland protections under 6 NYCRR Part 662.

2. <u>Protection of Human Health and the Environment</u>
The no further action Alternative SC 1 for the soils on the MRIP property would provide minimal protection of human health and the environment as the contaminants would remain in the environment, because access would be restricted by fencing. It is noted that surface soils (0 to 2 ft below grade) in Areas 1, 2, and D-2 do not contain COCs above cleanup goals and would act as a barrier to human contact with any contaminated soil in the subsurface. The concrete floor inside the building would

act as a barrier to the contaminated soil in Area D-1.

Alternatives SC 2 and SC 3 would be equally protective of human health and the environment. Alternative SC 2 would remove the contaminants through excavation and treatment on the MRIP property. Alternative SC 3 would remove the contaminants through excavation and disposal at an off-Site facility.

3. Short-term Effectiveness

Alternative SC 1 for contaminated soil on the MRIP property would not result in short-term health or environmental impacts. Daily activities conducted by the current Site tenants may be disrupted by the excavation and construction activities that would be required to implement Alternatives SC 2 and SC 3. However, these impacts can be minimized by employing appropriate construction techniques and practices.

4. Long-term Effectiveness and Permanence

Alternative SC 1 for contaminated soil on the MRIP property would not provide long-term effectiveness or permanence since contaminants would remain at the Site, and the contaminated soils could continue to have impacts to groundwater. Alternatives SC 2 and SC 3 would be similarly effective in satisfying this criterion. Alternative SC 2 would permanently remove contaminants from Site subsurface soils through biodegradation; Alternative SC 3 would remove the contaminated subsurface soils and dispose of them off-Site.

5. Reduction of Toxicity, Mobility or Volume Through Treatment

Alternative SC 1 for contaminated soil on the MRIP property would not reduce toxicity, mobility or volume of contamination present in the subsurface soils. Both Alternatives SC 2 and SC 3 reduce the mobility and volume of the VOCs through excavation. However, only Alternative SC 2 would reduce the toxicity of the subsurface soils through biodegradation. Based on existing RI data, it is not expected that the soils excavated under Alternative SC 3 would require treatment for disposal at an off-Site facility.

6. Implementability

Subsurface contaminated soil remedial alternatives on the MRIP property are all implementable; however, Alternative SC 2 would require a treatability study to determine the effectiveness of the enhanced biodegradation/aeration of Site soils. Alternative SC 3 would require waste acceptance by the off-Site disposal facility, although this is not expected to be a problem.

7. Cost

The capital cost for the no further action Alternative SC 1 is limited to the installation of fencing. The capital costs for Alternatives SC 2 and SC 3 are somewhat similar since both alternatives involve the excavation of the contaminated subsurface soils. Alternative SC 2 has O,M&M costs for two years since the contaminated soils would be treated on the MRIP property. Alternative SC 3 has no O,M&M costs since the contaminated soils would be disposed of off-Site.

8. Community Acceptance

A "Responsiveness Summary" will be prepared and attached to the Record of Decision for the Site that describes public comments received during the public comment period and how the comments and concerns will be addressed. If the final remedy selected differs significantly from the proposed remedy, the Record of Decision will describe the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PREFERRED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC, with the support of EPA, is proposing the following as a remedy for the Site:

Potable Water Supply

Alternative AWS 3 - The construction and operation of a new public water supply system to provide clean and safe potable water to the residences or businesses in the Towns of Marbletown and Rosendale with impacted or threatened private supply wells. The proposed primary water supply for this new water district is the Catskill Aqueduct.

Alternative AWS 3 is being proposed because it eliminates inhalation, ingestion and dermal contact with contaminated groundwater associated with the Site that does not meet the State or Federal drinking water standards. Alternative AWS 3 is the preferred alternative because it is considered to be the most reliable source of potable water over the long term. The potential for breakthrough exists with the GAC filtration systems (Alternative AWS 2). GAC filters are not considered a long-term remedy, and it is more efficient to operate a central treatment plant rather than maintain an estimated 145 individual GAC units. In addition, selection of Alternative AWS 2 would hinder Site-wide remediation because, in the absence of a public water supply system, groundwater extraction to address the farfield plume (Alternative GR 3) may depress the water table and have an adverse impact on local private wells. The use of a well field as the primary source of potable water (AWS 4) is considered less desirable, since the wells could run dry during drought conditions; would likely be high in iron content which would require iron removal and the resulting generation and disposal of sludge from this operation; and would be more susceptible to possible future contamination. Selection of Alternative AWS 3 as a preferred remedy to provide a permanent, alternative water supply is consistent with the recommendations made in the NYSDOH Health Consultation completed for the Site in December 1997.

The estimated present worth cost to implement the potable water supply portion of this remedy is $8.6 million. The cost to construct the remedy is estimated to be $7.6 million and the estimated average annual operation and maintenance cost for 30 years is $64,000.

The elements of the proposed potable water supply remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction and operation of a new public water supply system.

- The construction of a water treatment plant with a maximum daily design flow of approximately 126,100 gallons. The primary source of water would be the Catskill Aqueduct with a connection located at the NYCDEP dewatering chamber on Canal Road. During periods of time when the Catskill Aqueduct may be temporarily out of service, a backup supply of water from either the Rondout Creek or a backup supply well(s) would be used to provide raw water to the treatment plant. The actual backup supply would be determined during the design phase of the project.

- The construction of a water distribution system for the PWSA as depicted in Figure 9.

This system would include a 150,000-gallon storage tank, 8-inch diameter transmission main and provide fire protection.

- The continued operation of the NYSDEC Interim Remedial Measure (IRM) to monitor and maintain the individual granular activated carbon (GAC) filtration systems in use until such a time that the new public water supply system is fully operational. If additional wells are impacted in the interim, GAC filtration systems would be added.

The proposed remedy is contingent on the creation of a new public water service district by local authorities which would include 174 properties in the Towns of Marbletown and Rosendale. The boundaries of the proposed district are depicted in Figure 6.

Contaminated Bedrock Aquifer

Alternative GR 3 - The continued operation of the EPA's NTCRA (the extraction and treatment of contaminated bedrock groundwater on the MRIP property) and the design, construction and operation of an extraction and treatment system off the MRIP property to address the farfield VOC plume.

Based on an evaluation of the response alternatives with the eight evaluation criteria, Alternative GR 3 is being proposed. Alternative GR 3 is the only alternative that will attempt to actively achieve applicable SCGs in the entire contaminant plume. Alternative GR 1 relies only on natural processes to reduce the toxicity, mobility or volume of contamination present in the groundwater. Alternative GR 2 provides prevention of human contact through institutional controls and extraction and treatment of contaminated groundwater in the nearfield plume for 1 year, but relies on natural processes to address the farfield plume. Alternative GR 3 reduces the volume, mobility and toxicity of the contaminated groundwater both in the nearfield and farfield plumes in the shortest amount of time. Alternative GR 3 would be designed to prevent the migration of the VOC contaminants in the groundwater to areas outside the proposed PWSA and possibly impacting additional private water supply wells.

The estimated present worth cost to implement the groundwater restoration portion of this remedy is $6 million. The cost to construct the remedy is estimated to be $1.2 million and the estimated average annual operation and maintenance cost for 30 years is $312,000.

The elements of the proposed groundwater response remedy are as follows:

- The design and construction of a series of 3 to 6 new bedrock groundwater pumping wells to gain hydraulic control over the contaminant plume and prevent the plume from migrating further downgradient. The exact location and number of these new pumping wells would be determined by conducting pump tests and groundwater modeling during the pre-design phase of the project.

- The design and construction of a new water treatment plant to remove VOCs from the groundwater. Treated water would be discharged to the Rondout Creek in compliance with effluent limitations for this surface water body. Conceptually, the location of the treatment plant would be near the Rondout Creek and north of Route 213. The exact location of the plant would be determined during the pre-design phase of the project. The cultural resources and the aesthetics of the neighborhood would be an important factor in the final design of the treatment plant.

- The continued operation of the groundwater pumping wells and treatment system on the MRIP property, which are part of EPA's NTCRA to address the most contaminated portion of the groundwater plume.

- The implementation of a long-term groundwater monitoring program that would assess the effectiveness of groundwater pumping and treatment on the contaminant levels in the aquifer over time. The need for additional monitoring wells would be assessed during the remedial design.

- The collection and analysis of surface water samples from the Rondout Creek and the Coxing Kill as part of the long-term monitoring program to ascertain that the groundwater plume has not migrated into these water bodies.

Subsurface Contaminated Soils on the MRIP Property

Alternative SC 3 - The excavation and off-Site disposal of contaminated subsurface soils located on the MRIP property. The paint waste area identified by EPA's Removal Program would also be excavated for off-Site disposal if it is not addressed as a removal action.

Alternative SC 3 is proposed because it is cost-effective, would permanently mitigate the threat posed by Site soils, and would result in less disruption of MRIP property operations than Alternative SC 2. Unlike Alternative SC 1, which takes no active measures to achieve Site cleanup objectives, Alternative SC 3 would remove the sources of contamination in the subsurface soils on the MRIP property, reduce the volume and mobility of VOCs in the soils, and achieve applicable soil cleanup objectives through excavation.

The estimated present worth cost to implement the contaminated soils portion of this remedy is $253,000; and there are no long-term operation and maintenance costs. If the recently discovered paint waste area cannot be addressed by EPA as a removal action, the cost for this alternative would increase by approximately $80,000. With the inclusion of these costs, this alternative remains cost-effective.

The elements of the proposed remedy for subsurface contaminated soils on the MRIP property are as follows:

- The excavation and off-Site disposal and treatment (if necessary) of soil containing contaminants at levels that exceed RAOs. Contaminated soil would be stockpiled or placed in rolloff containers on the MRIP property. Once characterized for disposal, the soil would be transported off-Site to a waste treatment or disposal facility. Uncontaminated soil would be stockpiled and used as a portion of the backfill to the excavation. If not addressed by EPA as a removal action, soils and other materials in the recently identified paint waste area, estimated to be approximately 300 cubic yards, would also be excavated and transported in the same manner.

- Additional sampling during design to delineate the soils exceeding the RAOs further.

- The collection of soil samples from the side walls and bottoms of the excavations to verify that RAOs are achieved.

- Once the completion of excavation is confirmed, the excavated areas will be backfilled with clean fill and restored to pre-remediation conditions.

Total Estimated Cost

The estimated capital and present worth cost for each proposed alternative and the sum for all the proposed alternatives, which represents the total estimated cost, is provided below:

Alternative	Capital Cost	Present Worth
AWS 3	$ 7,589,000	$ 8,573,000
GR 3	$ 1,247,000	$ 6,043,000
SC 3	$ 253,000	$ 253,000
Total cost	$ 9,089,000	$ 14,869,000

Written comments on the PRAP can be submitted until January 15, 2000 to Patrick Hamblin, EPA Project Manager, at the following address:

EPA
Emergency & Remedial Response Division
290 Broadway, 20th Floor
NY, NY 10007-1866
Phone: (212) 637-3314
Fax: (212) 637-3966

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Table 1
Nature and Extent of Contamination

MEDIA	CLASS	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of EXCEEDING SCGs	RAO (ppb)
Groundwater (1)	Volatile Organic Compounds (VOCs)	1,1,1-Trichloroethane	ND to 87,000	51 of 85	5
		1,1-Dichloroethylene	ND to 10,000	33 of 85	5
		1,1-Dichloroethane	ND to 6,700	32 of 85	5
		Trichloroethylene	ND to 3,300	26 of 85	5
Subsurface Soils (2)	Volatile Organic Compounds (VOCs)	1,1,1-Trichloroethane	ND to 4,600	2 of 62	800
		1,1-Dichloroethylene	ND to 250	0 of 62	400
		1,1-Dichloroethane	ND to 1,300	2 of 62	200
		1,2-Dichloroethylene	ND to 6900	2 of 62	300
		Trichloroethylene	ND to 730	1 of 62	700
		Tetrachloroethylene	ND to 25,000	4 of 62	1400
		Xylene	ND to 570,000	2 of 24	1200
		Ethyl benzene	ND to 61,000	2 of 24	5500

(1) Data from six rounds of groundwater monitoring well sampling was utilized. All monitoring wells were not sampled in every round. Monitoring wells include upgradient wells and off-site plume boundary wells. The dates of the sampling events were November 1996, May 1997, September 1997, December 1997, May 1998 & October 1998.

(2) Data from the October 1996 soil probe samples (RI Report Figure 3-1), the July 1997 test pit samples (RI Report Table 6-10), the October 1997 hand auger samples (RI Report Table 6-11) and the April-May 1998 supplemental RI subsurface soil sampling (RI Report Table 6-15) were utilized. See RI Report Tables 7-5 through 7-8 for additional presentations of these data. Background subsurface soil samples are included.

RAO - Remedial Action Objective
ppb - parts per billion.

Table 2
Remedial Alternative Costs*

Remedial Alternative	Capital Cost	Annual O,M&M	Total Present Worth
Potable Water Supply Alternatives			
AWS 1 - No Further Action	$0	$0	$0
AWS 2 - Installation & Maintenance of Additional GAC Filter Systems	$384,000	$321,000	$5,319,000
AWS 3 - Public Water Supply Using Catskill Aqueduct	$7,589,000	$64,000	$8,573,000
AWS 4 - Public Water Supply Using Well Field	$7,620,000	$88,000	$8,973,000
Contaminated Bedrock Aquifer Response Alternatives			
GR 1 - No Further Action	$131,000	$34,000	$654,000
GR 2 - Minimal Action	$131,000	$218,000	$3,482,000
GR 3 - Extraction and Ex Situ Treatment	$1,247,000	$312,000	$6,043,000
Contaminated Subsurface Soil on the MRIP Property Source Control Alternatives			
SC 1 - No Further Action	$25,000	$0	$25,000
SC 2 - Excavation and Ex Situ Treatment Performed on the MRIP Property	$177,000	$63,000	$294,000
SC 3 - Excavation and Off Site Disposal	$253,000	$0	$253,000

* The capital costs have been estimated for each alternative. Operations, monitoring and maintenance (O,M&M) costs for each alternative are included based on a 30-year time frame. Actual operational time frames (time required for long-term groundwater monitoring or pumping and treatment of groundwater) may be shorter or longer than 30 years depending on the time for achievement of site remedial action objectives. These cost estimates are for comparative purposes; detailed cost estimates will be prepared in the remedial design phase.

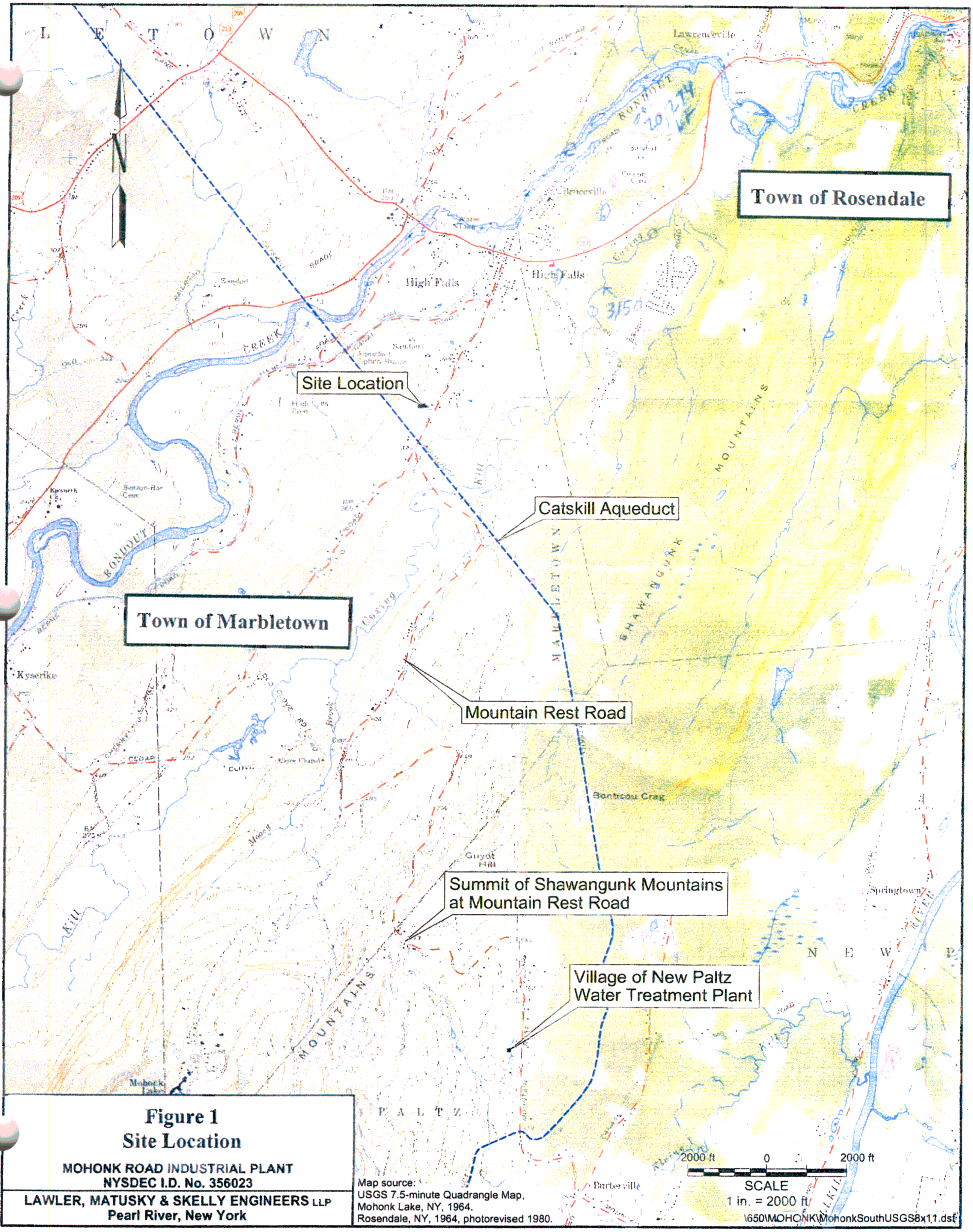
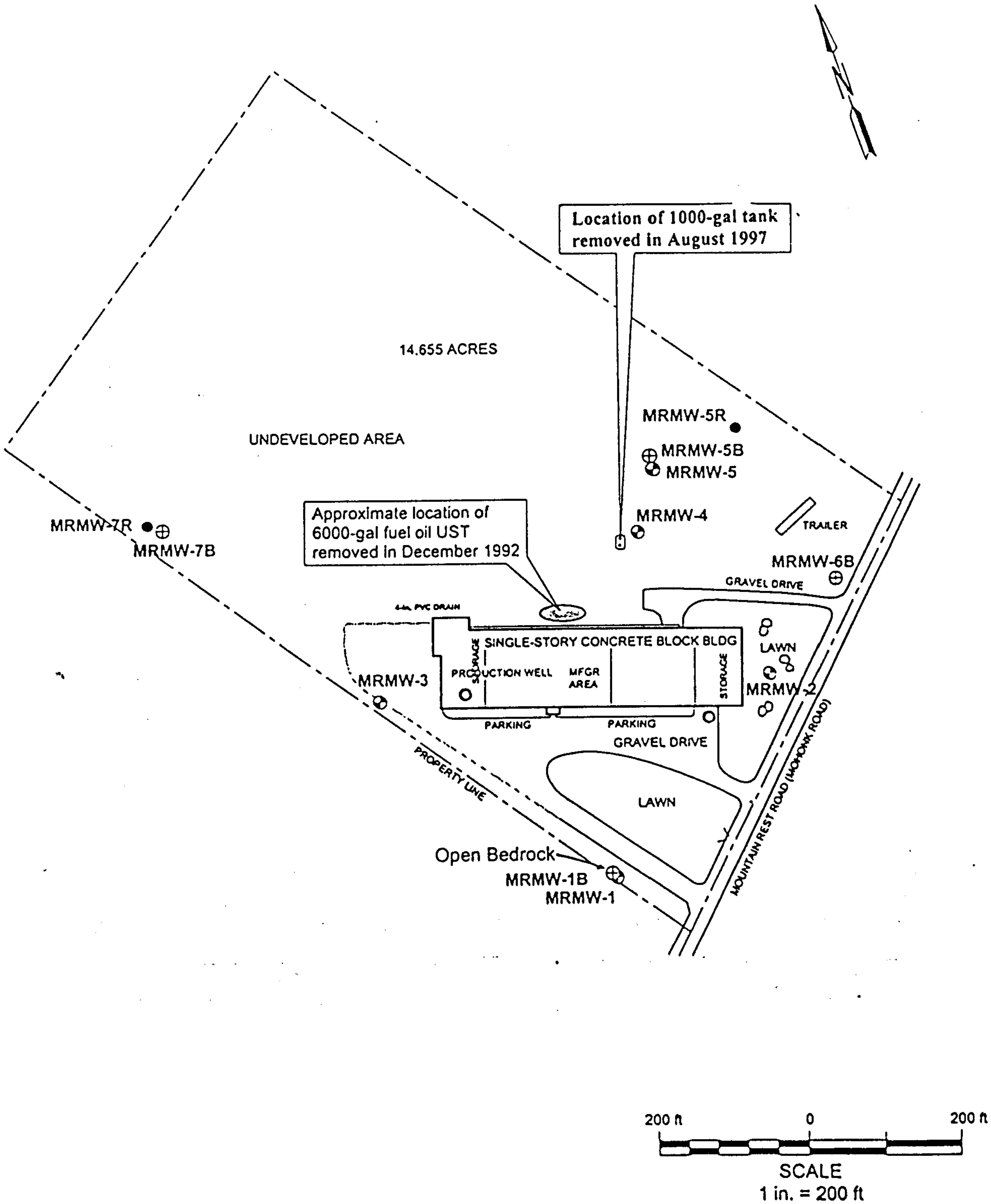


Figure 1
Site Location

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Map source:
USGS 7.5-minute Quadrangle Map,
Mohonk Lake, NY, 1964.
Rosendale, NY, 1964, photorevised 1980.



Legend

- ⊖ Bedrock wells
- Interface wells
- ○ Existing production wells
- ● Recovery wells

Map source: Richard T. Sherman, P.C., 1981.

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Figure 2

Site Plan

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

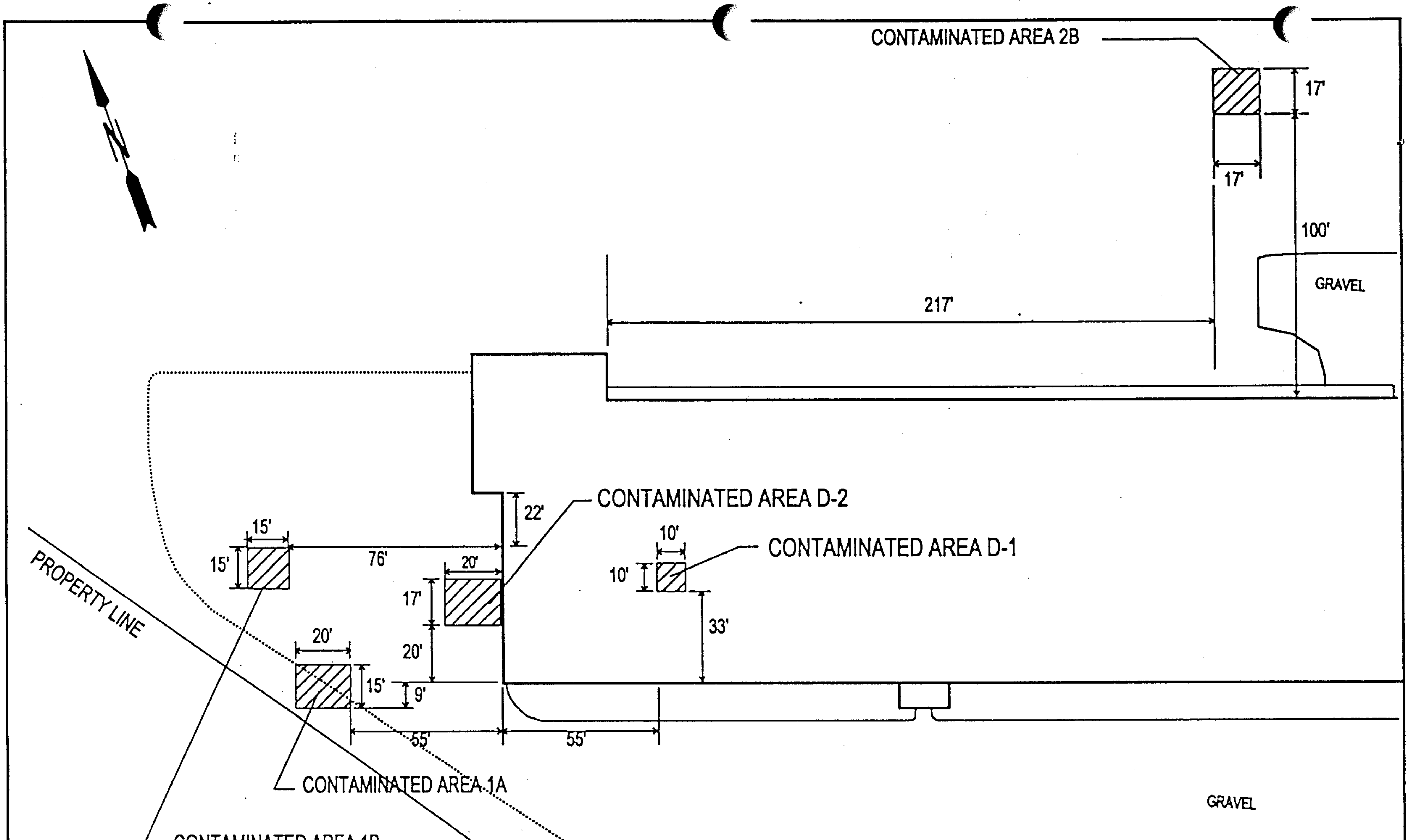
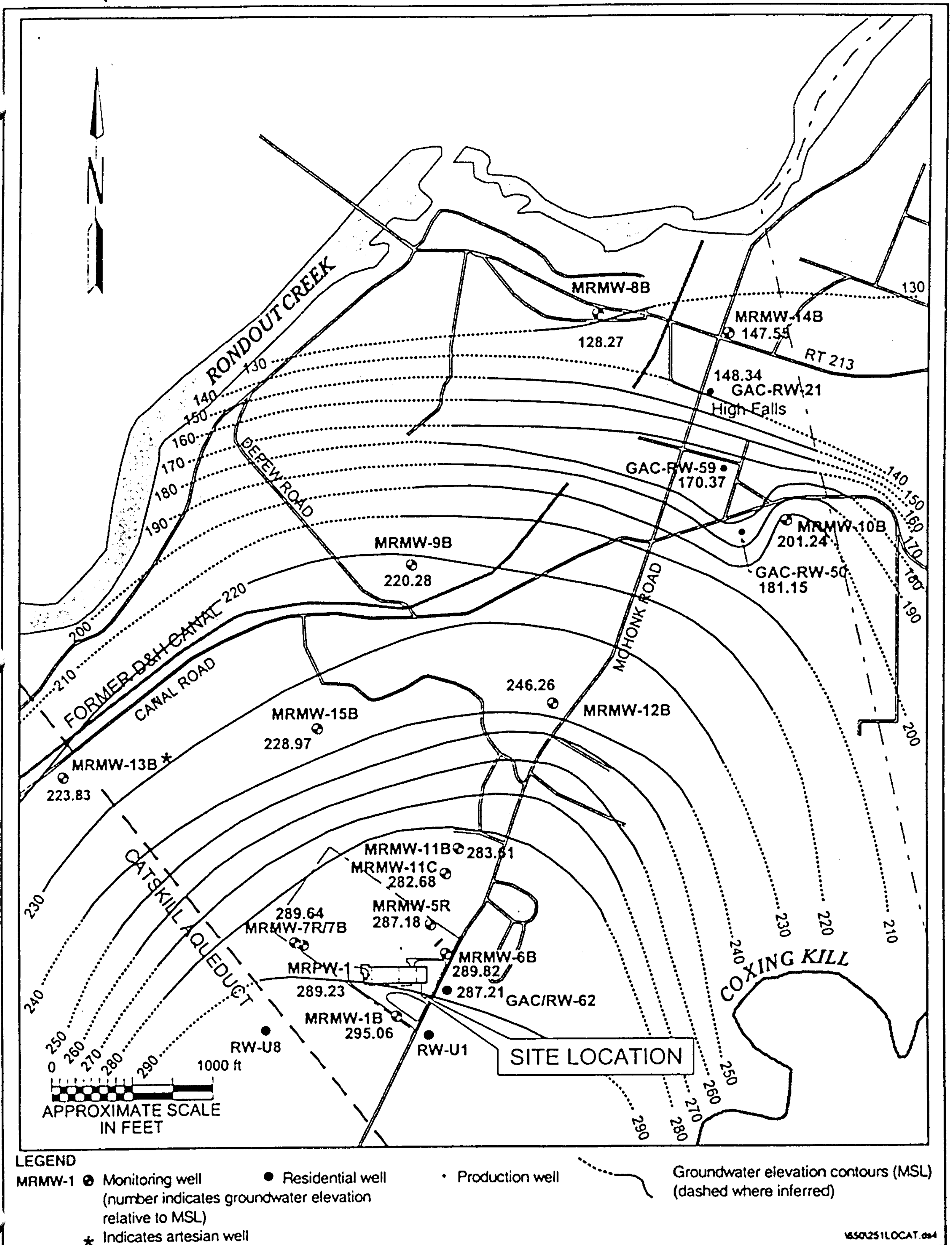


Figure 3

Location of Contaminated Soil Areas

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC Site I.D. No. 3-56-023
Modified From Original LLP Figure by NYSDEC

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

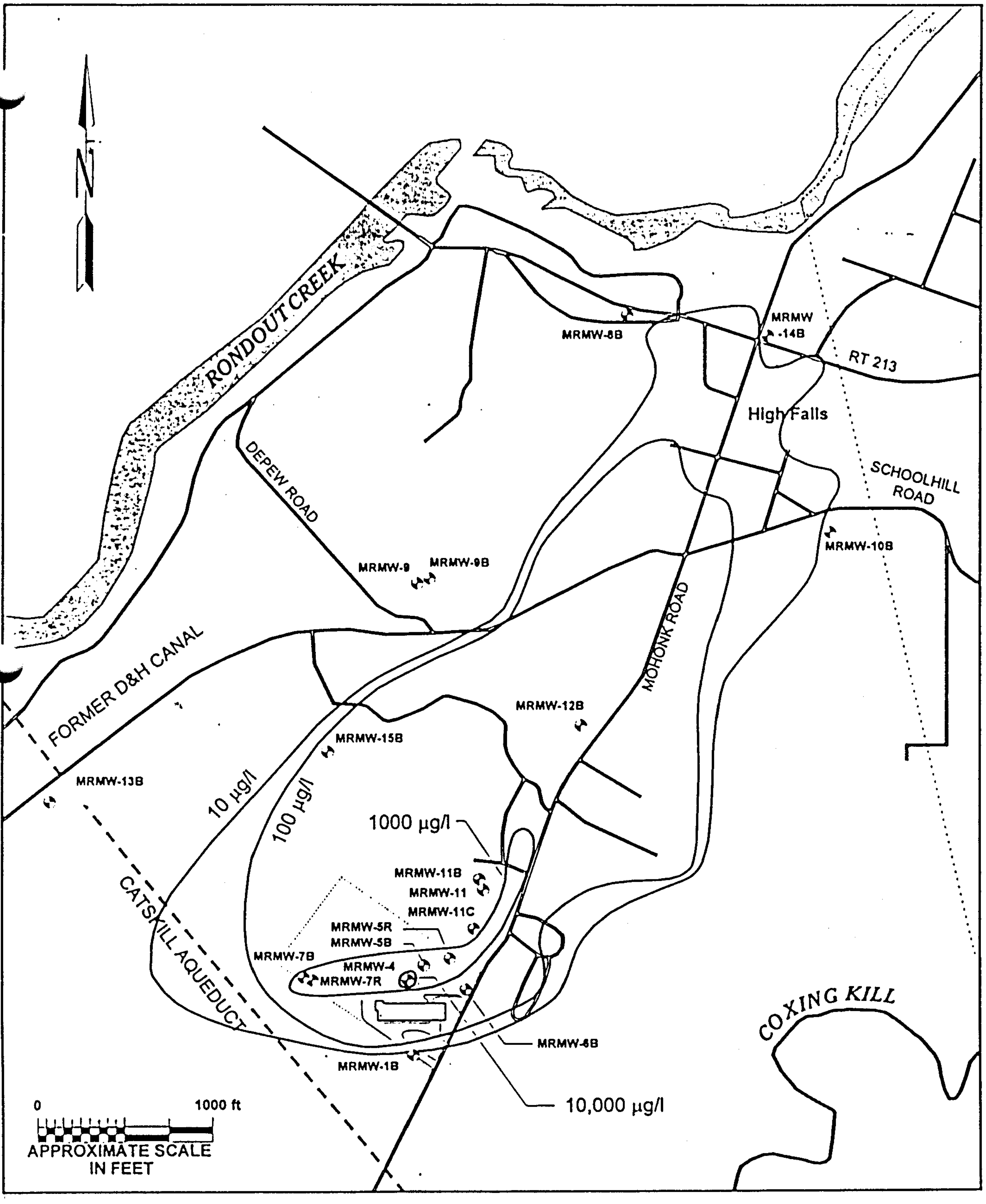


Lawler, Matusky & Skelly Engineers LLP
One Blue Hill Plaza • Pearl River, New York 10965
ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS

Bedrock Groundwater Contour
May 1998

Mohonk Road Industrial Plant NYSDEC I.D. No. 356023

Figure 4



Concentrations are for Total Volatile Organic Compounds (VOCs) in the Bedrock Aquifer
µg/l = parts per billion (ppb)

LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza • Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	Approximate Groundwater Plume Based on May and June 1998 Groundwater Sampling Results Mohonk Road Industrial Plant NYSDEC I.D. No. 356023	Figure 5

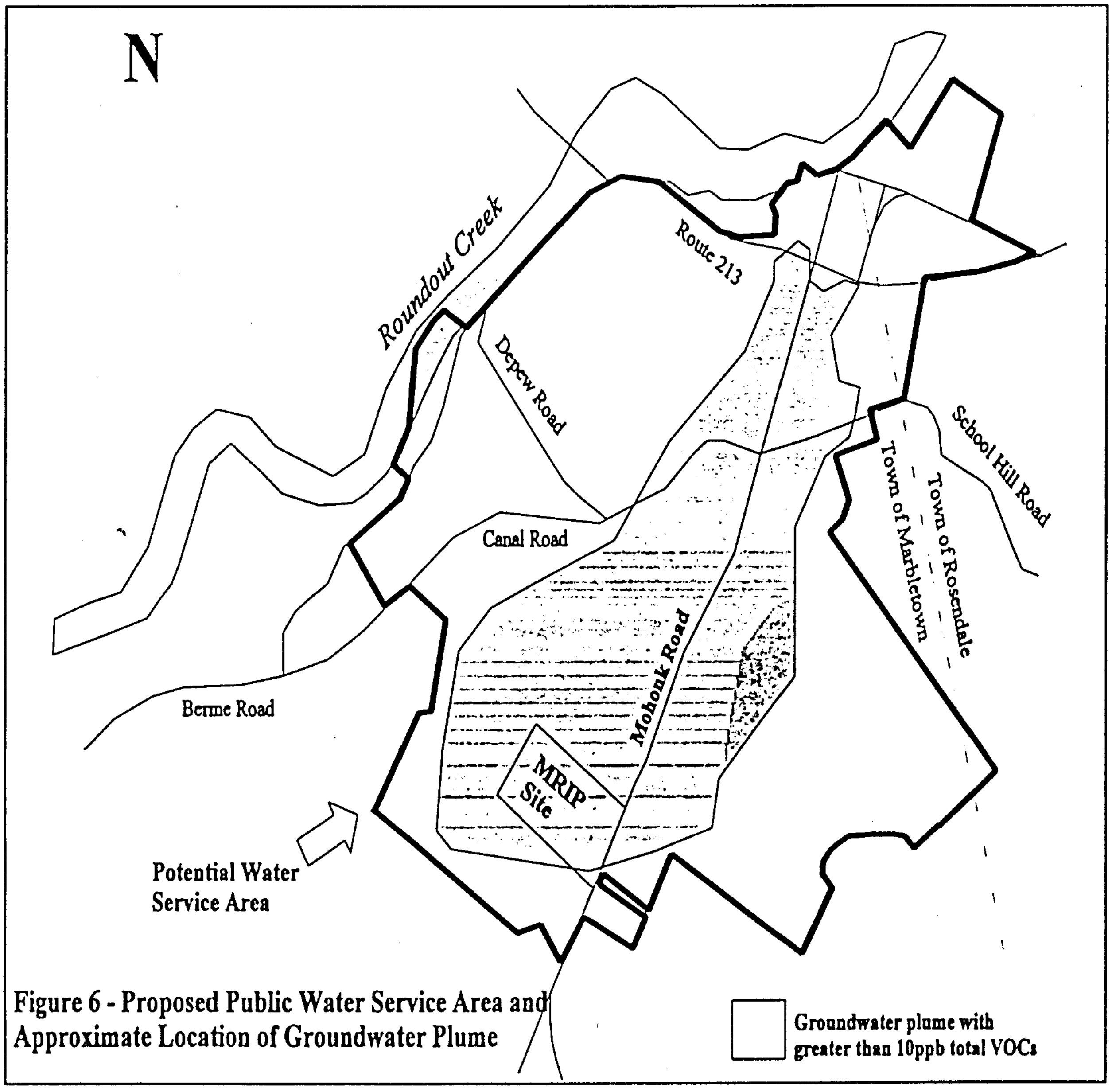


Figure 6 - Proposed Public Water Service Area and Approximate Location of Groundwater Plume

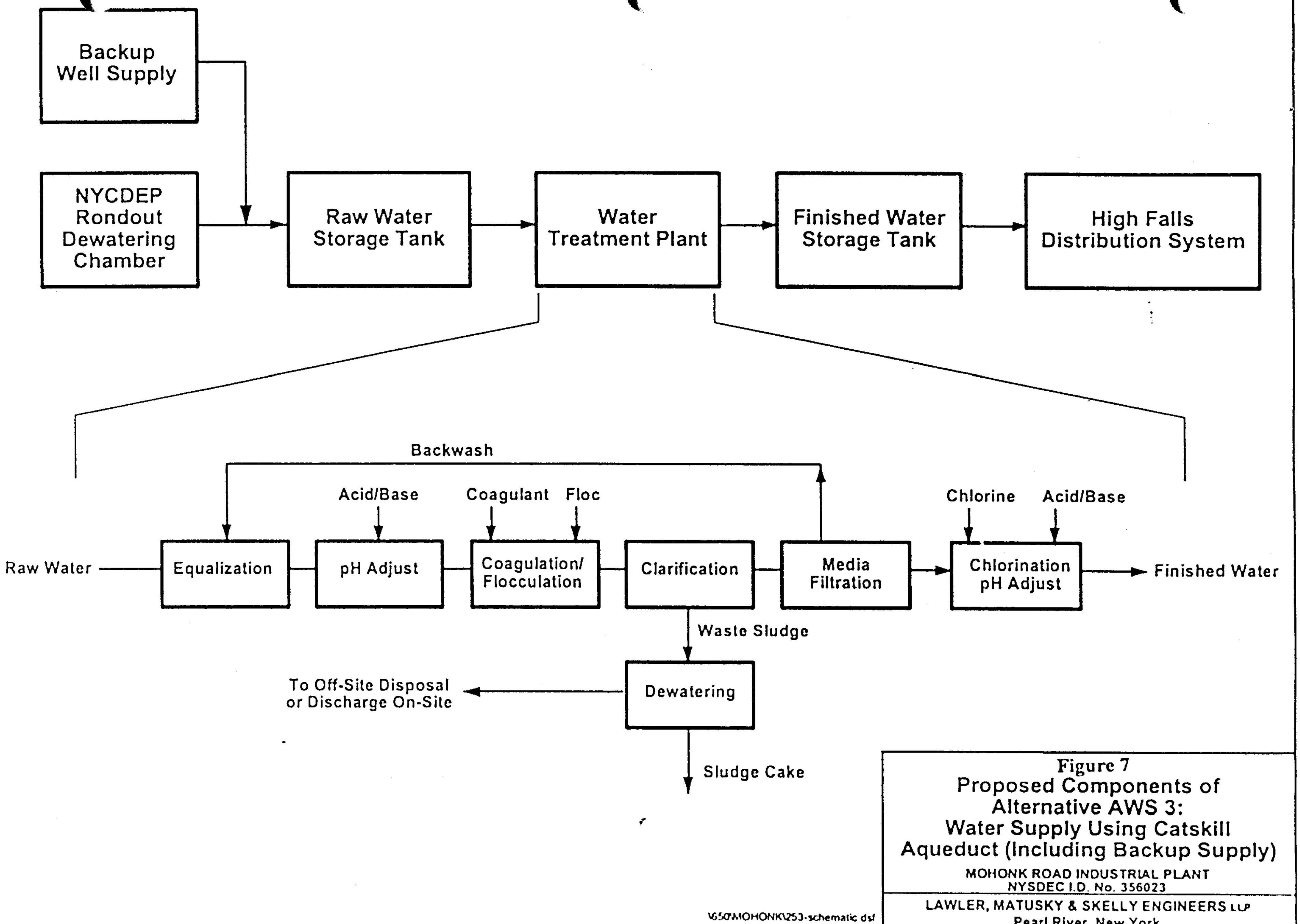
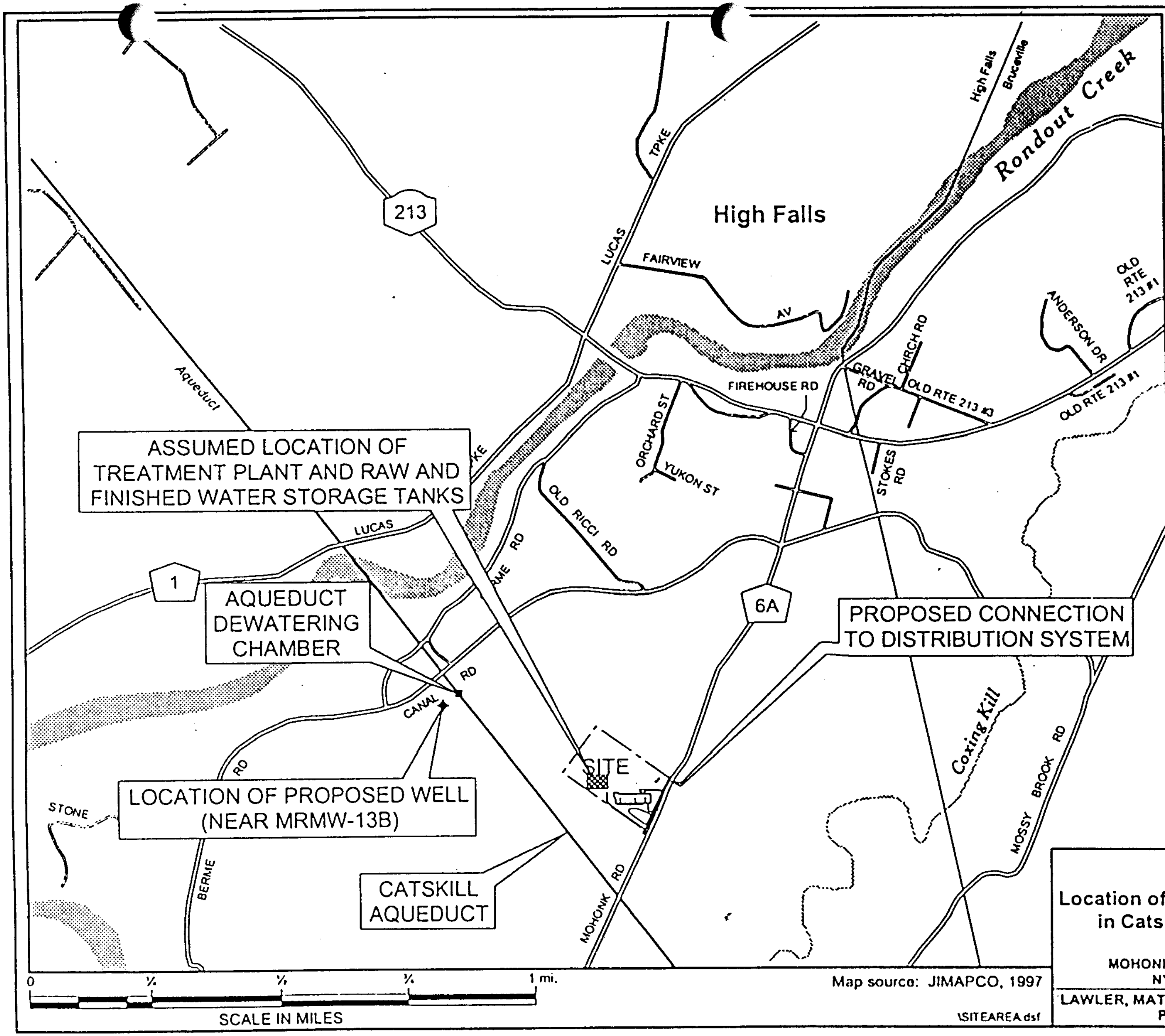


Figure 7
Proposed Components of
Alternative AWS 3:
Water Supply Using Catskill
Aqueduct (Including Backup Supply)
MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York



Map source: JIMAPCO, 1997

Figure 8

Location of Water Supply Structures in Catskill Aqueduct System

AWS 3

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023

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Pearl River, New York

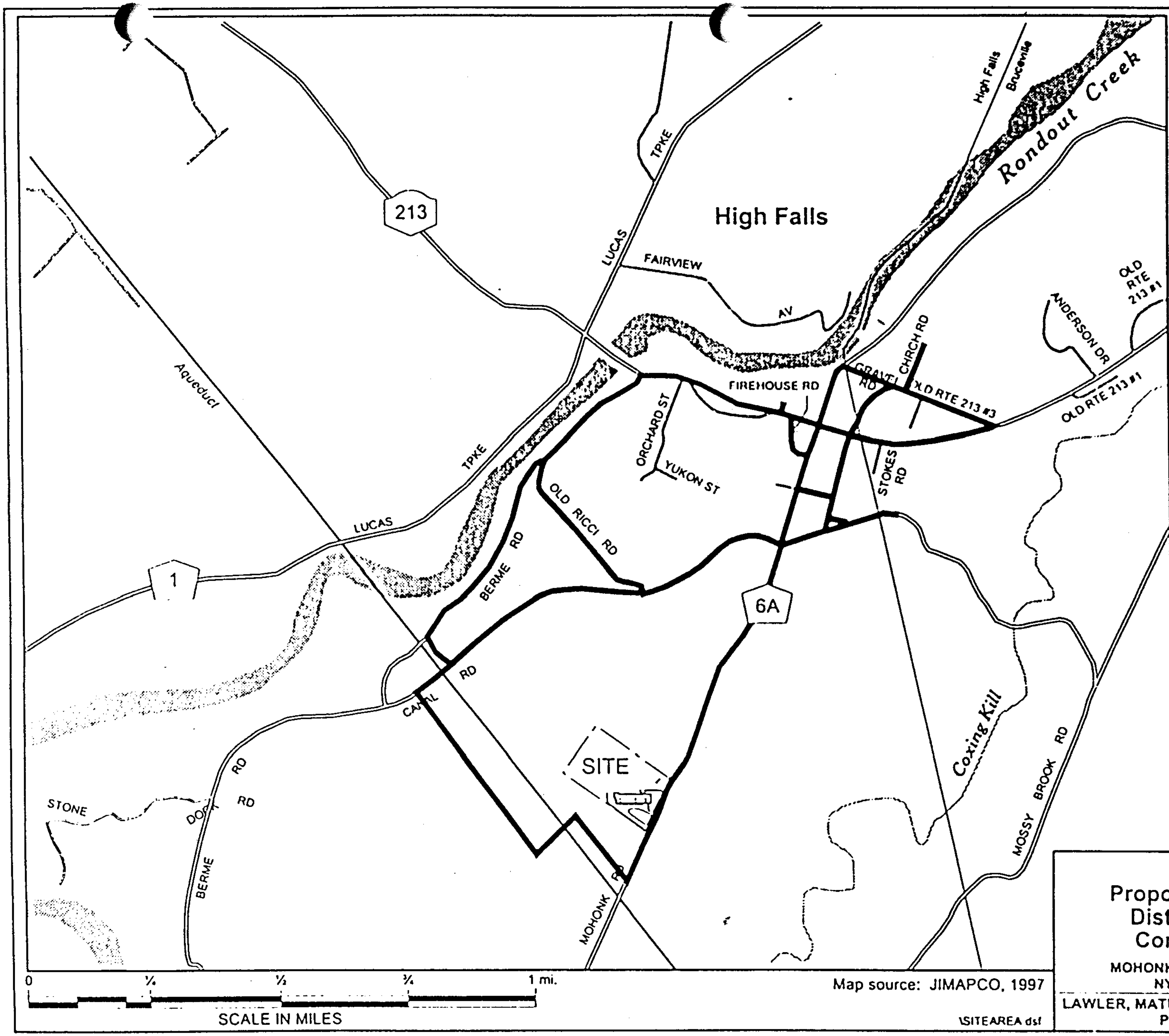

Figure 9
Proposed Water Supply Distribution System Conceptual Layout

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023

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Pearl River, New York

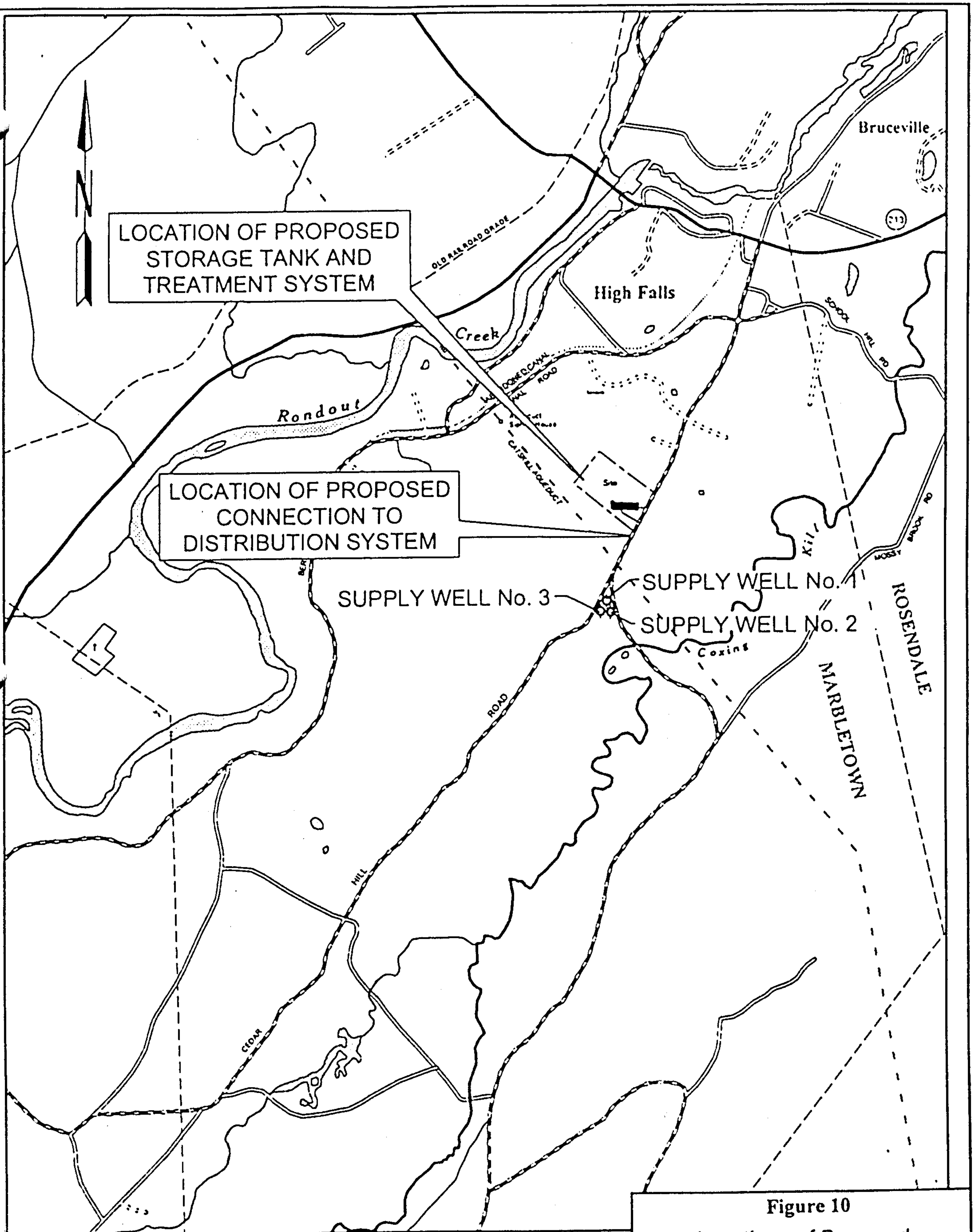

Figure 10

Locations of Proposed Components of Alternative AWS 4

0 2000 ft
SCALE
1 in. = 2000 ft

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Map source: Based on USGS 7.5-minute Quadrangle Map, Mohonk Lake, NY, 1964. Rosendale, NY, 1964, photorevised 1980.

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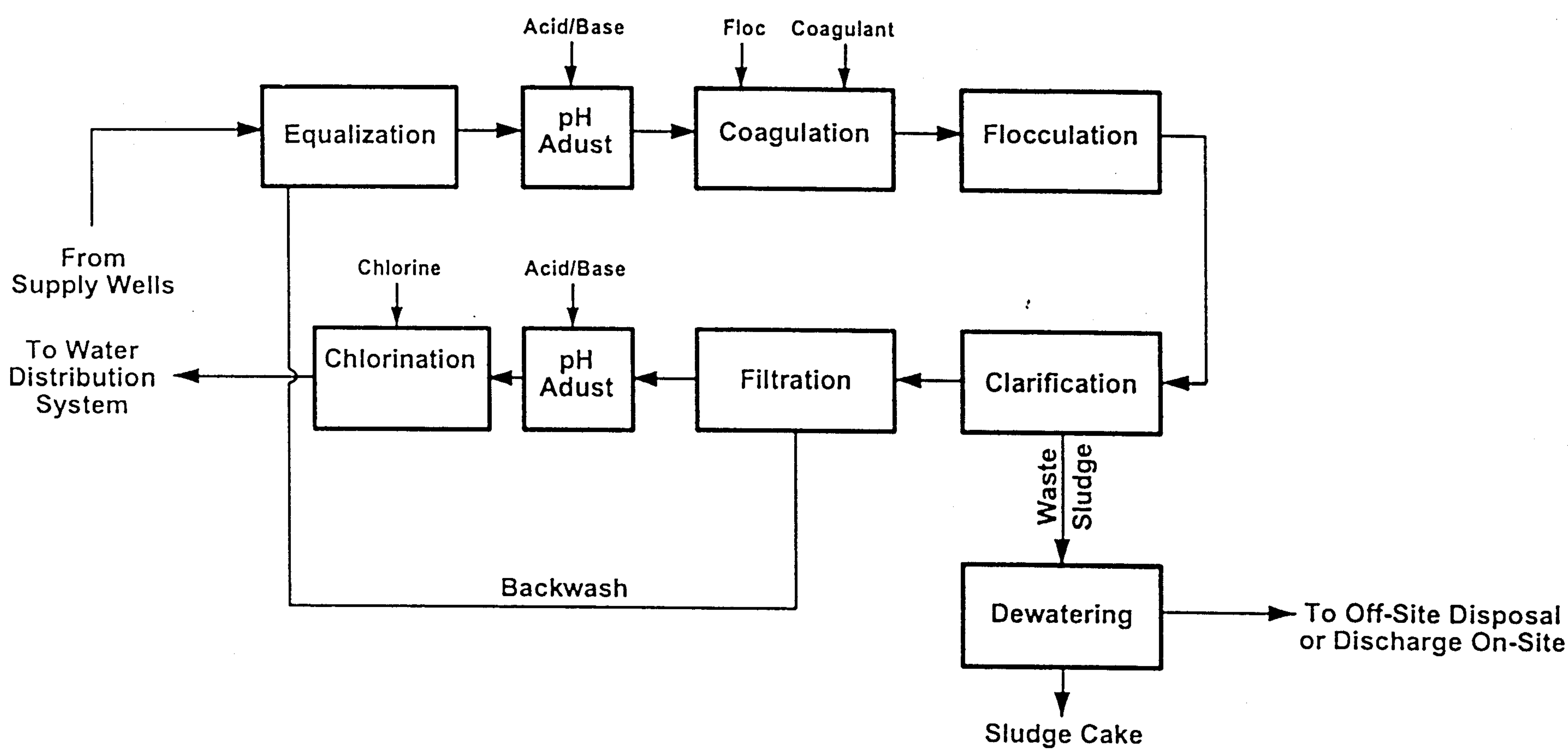

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Figure 11

Treatment Units of Alternative AWS 4

MOHONK ROAD INDUSTRIAL PLANT
NYSDEC I.D. No. 356023

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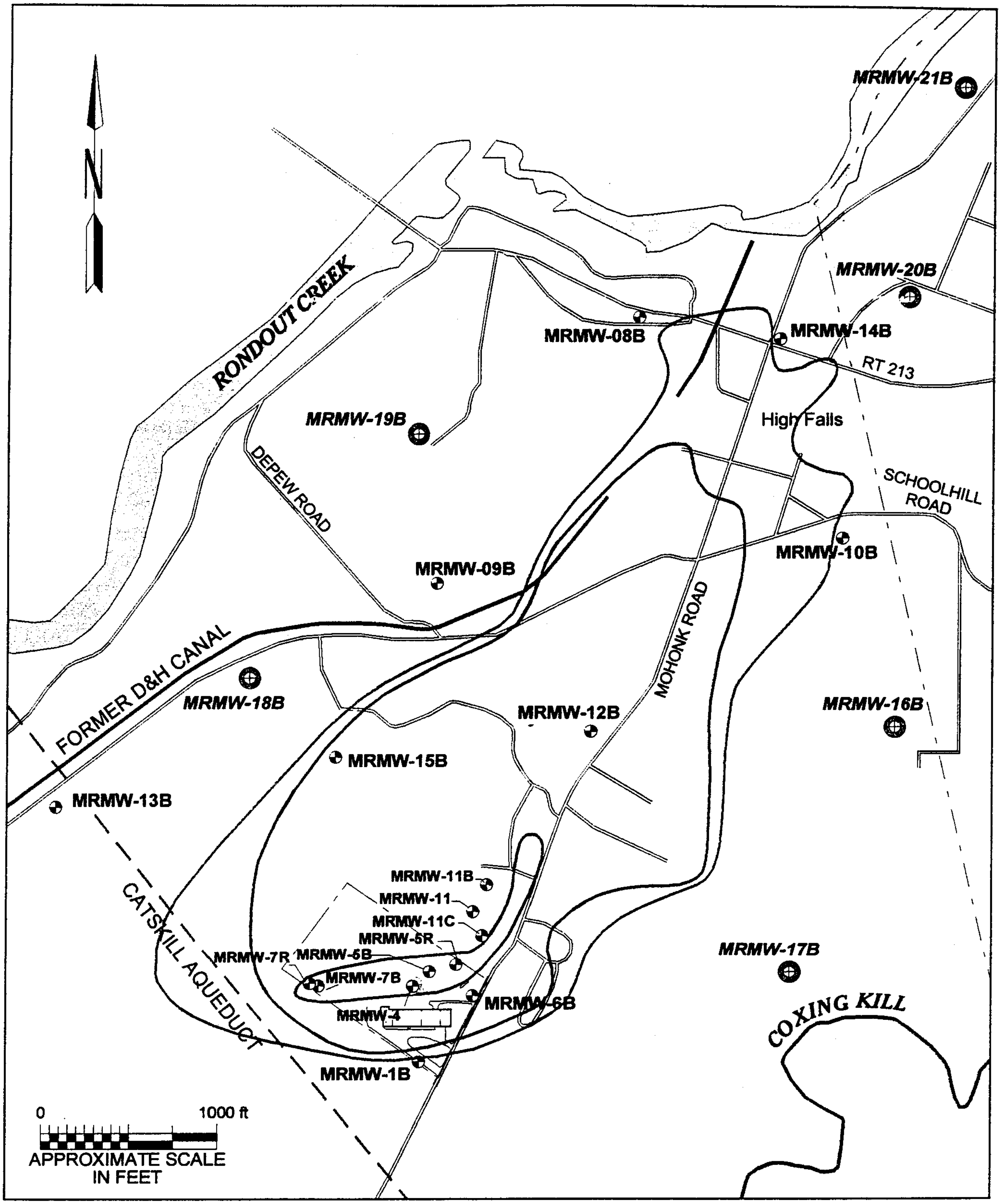
Pearl River, New York



Legend Total VOC results

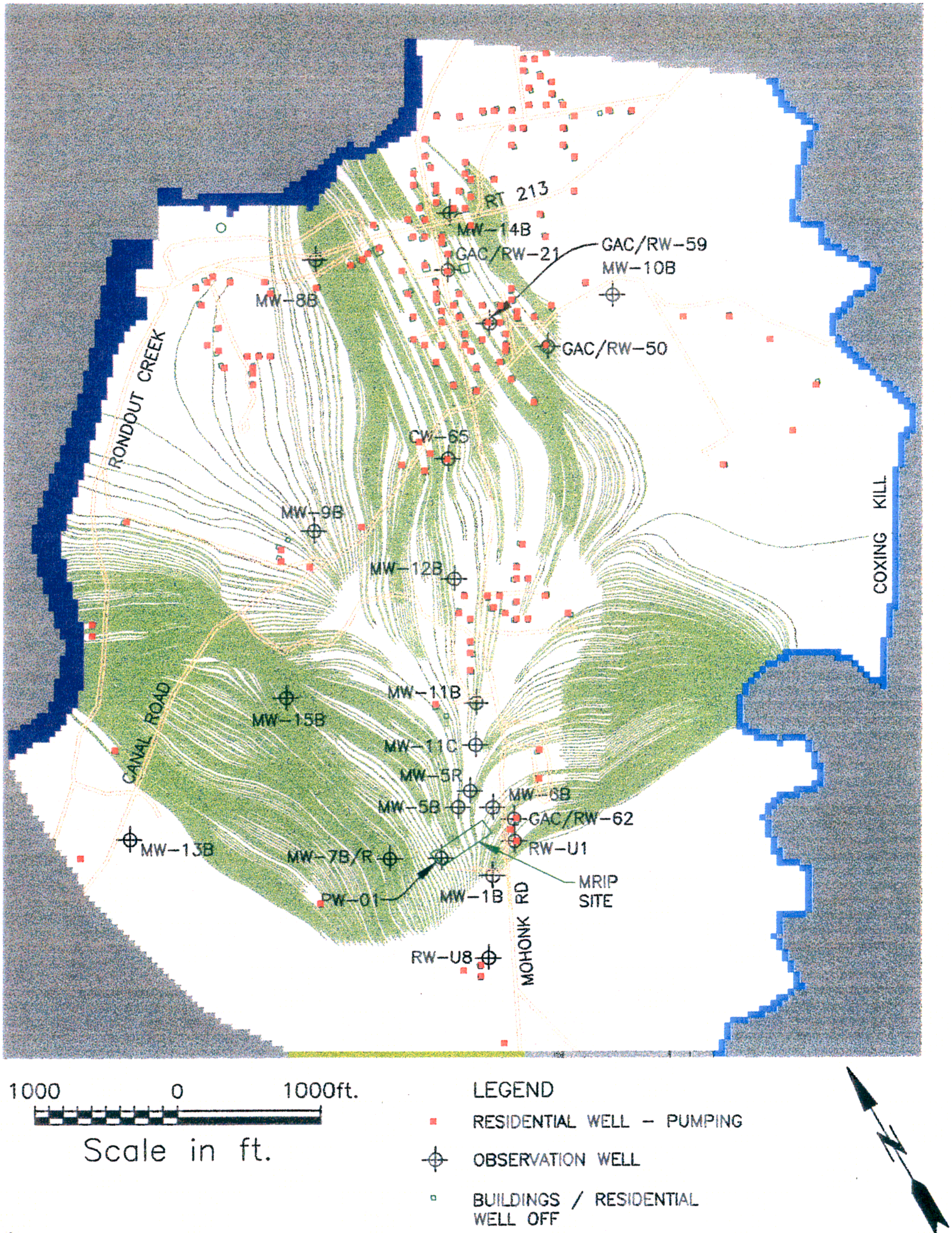
- 10 µg/l
- 100 µg/l
- 1000 µg/l
- 10,000 µg/l

MRMW-11 ◐ Existing monitoring well

MRMW-17B ⊕ Proposed monitoring well

\650\251LOCAT.ds4

LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza • Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	**Proposed Monitoring Well Locations for Alternatives GR-1 & GR-2** **Mohonk Road Industrial Plant** **NYSDEC I.D. No. 356023**	**Figure 12**



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LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	MOHONK ROAD INDUSTRIAL PLANT SITE STEADY STATE PARTICLE TRACKING EXISTING CONDITIONS	Figure 13