Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Arkwin Industries Site
Town of North Hempstead, Nassau County
Site Number 1-30-043 D
Operable Unit 02 - Groundwater

December 1999

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

DECLARATION STATEMENT - RECORD OF DECISION

Arkwin Industries Inactive Hazardous Waste Disposal Site
Town of North Hempstead, Nassau County, New York
Site No. 1-30-043 D
Operable Unit 02 - Groundwater

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Arkwin Industries inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Arkwin Industries Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Arkwin Industries site and the criteria identified for evaluation of alternatives the NYSDEC has selected Air Sparging/Soil Vapor Extraction to remediate on-site groundwater contamination. The components of the remedy are as follows:

- *A remedial design, including pilot tests, to verify the components of the conceptual design and provide the details necessary for the construction, operation, and monitoring of the remedial program.*
- *Installation of injection wells to introduce air into the groundwater to promote volatilization of the VOC contamination.*
- *Installation of extraction wells to capture contaminants volatilized from the groundwater.*
- *Installation of granular activated carbon (GAC) filters to treat volatilized contaminants prior to release to the atmosphere.*

- *Semiannual sampling of eleven (11) existing groundwater monitoring wells will be conducted to monitor the effectiveness of the system. This monitoring data will be reviewed annually to determine if the system has reached its objectives and can be deactivated.*

- *Implementation of institutional controls and the recording of deed restrictions to restrict the future use of groundwater at the site.*

New York State Department of Health Acceptance

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

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

12/6/99
Date

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

TABLE OF CONTENTS

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) has selected the remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the Arkwin Industries Inactive Hazardous Waste Disposal Site. Disposal to on-site cesspools has resulted in the discharge of hazardous wastes, including 1,1,1 trichloroethane (1,1,1 TCA), at the site. The site has been investigated to find source areas of contamination. Arkwin removed source areas (soils) of contamination in previous remedial actions. The January 1998 Record of Decision, for the Arkwin Industries Site - Operable Unit 01 (soils), fully describes this work. This Record of Decision (ROD) addresses the investigation and remediation of on-site groundwater contamination. On-site groundwater is contaminated with volatile organic compounds (VOCs) as high as 864 parts per billion (ppb). 1,1,1 TCA was the primary VOC detected at the site at 580 ppb which exceeds the groundwater standard of 5 ppb.

Disposal activities have resulted in the following significant threat to the public health and the environment:

- *A significant threat to human health and the environment associated with this site's contravention of groundwater standards in a sole source aquifer.*

The contaminated groundwater at the Arkwin Industries site and within the entire New Cassel Industrial Area (NCIA) presents a potential route of exposure to humans. While public water serves the area, the underlying aquifer is the source of the water supply for the Bowling Green Water District customers. In order to prevent human exposure to site-related contaminants, a supplemental treatment system, air stripping followed by carbon polishing was constructed in 1996 to mitigate the impact of the groundwater contamination on the Bowling Green water supply wells. The Bowling Green water supply wells are routinely monitored for purity and quality and guard wells have been installed up-gradient of the water supply wells as a precautionary measure. Therefore, use of the groundwater in the area is not currently considered an exposure pathway of concern.

Currently, there are thirteen (13) Class 2 sites in the NCIA. A Class 2 site is a site at which hazardous waste constitutes a significant threat to the environment or the public health and action is required. The Department has been using a three-prong strategy in remediating Class 2 sites in the New Cassel Industrial Area (NCIA). The first action identifies source areas at each site which will be remediated or removed; the second action includes the investigation and proper remediation of groundwater contamination at and beneath each site; and the third action is the ongoing efforts by the Department which include a detailed investigation of groundwater contamination that is migrating off-site from all Class 2 sites within the New Cassel Industrial Area. Upon completion of this comprehensive groundwater investigation, the Department will propose a remedy to the public. After public review, a final groundwater remedy will be selected.

To restore the Arkwin Industries inactive hazardous waste disposal site to pre-disposal conditions to the extent feasible and authorized by law, but at a minimum to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous waste disposed at the site has caused, the Department has selected the following remedy:

- *An air sparging/soil vapor extraction system (AS/SVE) to address volatile organic contamination (VOC) in the on-site groundwater.*

- *A remedial design, including pilot tests, to verify the components of the conceptual design and provide the details necessary for the construction, operation, and monitoring of the remedial program. This will include the following elements:*

- *Installation of injection wells to introduce air into the groundwater to promote volatilization of the VOC contamination.*

- *Installation of extraction wells to capture contaminants volatilized from the groundwater.*

- *Installation of GAC filters to treat volatilized contaminants prior to release to the atmosphere.*

- *The system will be in operation for an estimated period of three years.*

- *Semiannual sampling of eleven (11) existing groundwater monitoring wells will be conducted to monitor the effectiveness of the system. This monitoring data will be reviewed annually to determine if the system reached its objectives and can be deactivated.*

- *Implementation of institutional controls and the recording of deed restrictions to restrict the future use of groundwater at the site.*

The selected remedy is intended to attain the remediation goals selected for this site, in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The Arkwin Industries site, Site No. 1-30-043D, is located west of the intersection of Old Country Road and the Wantagh State Parkway in the New Cassel Industrial Area (NCIA), an approximately 170 acre industrial and commercial area, in the unincorporated Village of Westbury, Town of North Hempstead, Nassau County, New York. See figures 1, 2, and 3.

Arkwin started operations in the New Cassel Industrial Area (NCIA) in 1955 and now occupies several buildings located at 648 Main Street, 656 Main Street, 662 Main Street, 670 Main Street, and 66 Brooklyn Avenue. The site covers approximately 1.7 acres of land and is bounded by Main Street to the north, New York Avenue to the west, and State Street to the east. Arkwin uses

these buildings for the production of parts for the aerospace industry and as office and warehouse space. The properties are entirely paved or developed with the exception of several small landscaped areas.

No significant surface water sources exist near the Arkwin Industries site. The closest surface waters are the small ponds within the Eisenhower Memorial Park, approximately two miles to the southwest.

Arkwin used 1,1,1 TCA in their production process. The on-site soils contamination was addressed as Operable Unit No. 01 (OU 1) (see January 1998 ROD). The on-site groundwater associated with this site has been designated as Operable Unit No. 02.

An Operable Unit represents a discrete portion of the remedy for a site that, for technical or administrative reasons, can be addressed separately to eliminate or mitigate a release, a threat of release or exposure pathway resulting from the site contamination.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Arkwin Industries, Inc. has occupied the site since 1955, performing precision machining for the aerospace industry. Operations consist of the machining and assembing of small aircraft parts. As part of the manufacturing process chlorinated solvents were used in degreasing operations. In 1986, extensive chlorinated solvent contamination was discovered in the Upper Glacial Aquifer and Magothy Aquifer, which underlie the NCIA and Arkwin site.

Public sewers did not service the NCIA until the 1980s and some industries discharged industrial wastes to on-site drainage structures. In 1995 and 1996 Arkwin completed soil investigations to determine the extent of soil contamination in several on-site drywells. Arkwin removed contaminated sediments from several of the drywells and completed an Interim Remedial Measure (IRM) in the most heavily contaminated drywell. These previously contaminated drywells are the apparent source of the existing on-site groundwater contamination.

3.2: Remedial History

In 1988, the entire New Cassel Industrial Area was listed in the New York State Registry of Inactive Hazardous Waste Disposal Sites (the Registry) as a Class 2 site due to the presence of volatile organic compounds (VOCs) in the groundwater.

In February 1995, Lawler, Matusky, and Skelly Engineers (LMS) completed a site investigation report for the NCIA under the New York State Superfund program. Based on this report, in March 1995, the Department removed most of the NCIA from the Registry. Concurrently, the Arkwin Industries site was added to the Registry as an individual class 2 site. The Site Investigation Report is available for review at the document repositories.

Arkwin Industries, the Responsible Party (RP), addressed Operable Unit No. 01 (soils) in previous investigations. The following is a summary of these investigations, and their findings:

In March 1995, Arkwin completed soil investigations at several on-site drywells. See figure 4 for the locations of the drywells. Arkwin removed sediments from four drywells (DW1, DW2, DW3, and DW6). The endpoint samples collected for each of these drywells indicate that VOCs remaining in the soil are below soil cleanup objectives. Sampling results at all three other drywells on the site (DWX4, DWX5, and DWX9) showed VOC levels to be below cleanup objectives.

In July 1996, Arkwin Industries signed a FRI/FS consent order with the Department and submitted a focused Remedial Investigation/Feasibility Study (FRI/FS) and Interim Remedial Measure (IRM) work plan for the soils located on-site. Fieldwork was completed in December 1996. The focused Feasibility Study and IRM work plan was completed in June 1997.

An IRM was conducted by Arkwin under the Department's oversight to address contamination in the remaining drywell (DWX8). This IRM consisted of the excavation of 123 tons of contaminated soils and backfilling with clean soils. Work was completed on June 18, 1997.

Groundwater data collected in September 1996 showed groundwater VOC contamination in the on-site monitoring wells ranging from 19 to 722 ppb. Contamination was also detected in a down-gradient monitoring well at 88,500 ppb total VOCs but this is primarily attributable to the Tishcon at Brooklyn Avenue Site (Site No. 1-30-043E). This limited work demonstrated the need for an additional groundwater investigation.

The Department issued a ROD in January 1998 for Operable Unit No. 01 (soils). This ROD required no further action for the on-site soils since the June 1997 IRM had already addressed the remaining on-site soil contamination. This ROD also mentioned that the contaminated groundwater will be addressed in a separate operable unit.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Focused Remedial Investigation/Feasibility Study (FRI/FS).

4.1: Summary of the Focused Remedial Investigation

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

The field work was completed in October 1998. LMS prepared and submitted a report entitled Focused Remedial Investigation Report, dated March 1999, that describes the field activities and

findings of the RI in detail.

These investigations were conducted in part using a geoprobe, a vehicle mounted probe unit capable of advancing a small diameter sampling device to depths of approximately 90 feet below ground surface (bgs) to collect either soil or groundwater samples.

The RI included the following activities:

- *Installation of six (6) new up-gradient monitoring wells to assess the quality of groundwater entering the site. These were installed as two clusters of three wells at depths of approximately 70, 90 and 150 feet bgs.*

- *Installation of six (6) new down-gradient monitoring wells to assess the vertical and horizontal extent of contamination attributable to the site. These were installed as two clusters of three wells at depths of approximately 70, 90, and 150 feet bgs.*

- *Sampling of five existing monitoring wells to assess on-site and down-gradient water quality. These wells are screend in the shallow aquifer, or approximately 60 feet bgs.*

- *Completion of three geoprobe borings near drywells sampled at three discrete depths (approx. 60, 70, and 80 feet) for soil and groundwater. These samples were used to confirm that on-site soils near the previously contaminated drywells were clean.*

To decide which media (soil, groundwater, etc.) contain contamination at levels of concern, the RI analytical data was compared with environmental Standards, Criteria, and Guidance values (SCGs). Groundwater and drinking water SCGs identified for the Arkwin Industries site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of NYS Sanitary Code. For soils, NYSDEC TAGM 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, groundwater at the site requires remediation. The nature and extent of contamination is summarized below. More comprehensive information can be found in the RI Report.

The report gives chemical concentrations in parts per billion (ppb) for groundwater and parts per million (ppm) for soil. For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1 Geology and Hydrogeology

The Upper Pleistocene deposits of poorly sorted sands and gravel that make up the Upper Glacial Aquifer (UGA) are found from the surface to a depth of approximately 80 ft bgs. The UGA is an unconfined aquifer consisting of poorly sorted sands and gravels. The Magothy consists of finer

sands, silt and small amounts of clay.

At the site there are no other hydrogeologic units located between UGA and the underlying Magothy formation. In general, the upper surface of the Magothy formation is found at least 100 ft bgs. However, based on observations during installation of wells for this investigation, the Magothy is found at significantly shallower depths (60-87 ft bgs) in the NCIA than in many other areas of Long Island. The UGA and the Magothy are in direct hydraulic connection; however, clay lenses are often found in the upper Magothy in this area. Depth of water is about 52 ft bgs in the area of the site and groundwater flows in a southwesterly direction. Both the UGA and Magothy have been designated as sole-source aquifers and are protected under state and federal legislation.

4.1.2 Nature of Contamination

As described in the RI Report, soil and groundwater samples were collected at the site to characterize the nature and extent of contamination. The main category of contaminants that exceed their SCGs is volatile organic compounds (VOCs).

The VOC contaminants of concern are 1,1,1 trichloroethane (1,1,1 TCA), 1,1 dichloroethene (1,1 DCE), 1,1 dichloroethane (1,1 DCA), 1,2 dichloroethene (1,2 DCE), perchloroethene (PCE), and trichloroethene (TCE).

4.1.3 Extent of Contamination

Tables 1 and 2 summarize data for the contaminants of concern in groundwater and compare the data with the SCGs for the Site. The following are the media investigated and a summary of the findings of the investigation.

Soil

Three geoprobe borings were completed next to drywells that were investigated in 1995 and remediated in 1995 and 1997. These borings were sampled at three discrete depths of approximately 60, 70, and 80 feet bgs. See Figure 5 for locations and depths of borings, and their associated analytical data. Data for the six samples obtained from AIGP-1 and AIGP-2 soil borings showed no VOC detections. Soil obtained from AIGP-3 showed concentrations of VOCs up to 0.006 ppm of 1,1 DCE, 0.003 ppm of 1,1,1 TCA, 0.021 ppm of PCE, and 0.024 ppm of xylene. These concentrations are all below the cleanup objectives of 0.4, 0.76, 1.4, and 1.2 ppm, respectively, for these compounds.

The limited soil work completed as a part of this recent investigation confirmed that the on-site soil is clean. The previous Record of Decision for OU 1 called for no further action for the soils at the Arkwin site.

Groundwater

The Department has been using a three-prong strategy in remediating Class 2 sites in the New Cassel Industrial Area (NCIA). The first action identifies source areas at each site which will be remediated or removed; the second action includes the investigation and proper remediation of groundwater contamination at and beneath each site; and the third action is the ongoing efforts by the Department which include a detailed investigation of groundwater contamination migrating off-site from all Class 2 sites within the New Cassel Industrial Area. Upon completion of this groundwater investigation, the Department will propose a remedy to the public. After public review, a final groundwater remedy will be selected.

The groundwater investigation recently completed at the Arkwin site included the installation and sampling of twelve groundwater monitoring wells and sampling of the five existing groundwater monitoring wells. Also, groundwater samples were obtained from three discrete depths at each of the three geoprobe locations, for a total of nine additional samples. These geoprobe locations and depths are the same as were sampled for soils.

As part of the investigation, the groundwater flow direction was determined for three depth horizons with monitoring wells screened at 50 to 70 feet bgs, 80 to 90 feet bgs, and 130 to 150 bgs. The groundwater elevation data at all three depths showed groundwater flows from the northeast to the southwest. This groundwater flow direction is in agreement with previous investigations completed throughout the NCIA.

Results from the groundwater investigation show that groundwater leaving the site contains higher levels of VOCs than groundwater entering the site. Please see figures 6, 7, 8, and 9 and tables 1 and 2 for groundwater flow direction, sampling locations, and the associated analytical data. The following is a discussion of the groundwater data at each interval investigated:

Shallow Groundwater (50-80 feet bgs)
Three geoprobe locations, AIGP-1, AIGP-2, and AIGP-3, were sampled at three discrete depths (approximately 57, 67, and 77 feet below ground surface). These on-site groundwater samples were collected in the vicinity of the previously investigated drywells. The data showed total VOC contamination ranging from 13 to 115 ppb. See figure 6 for exact depths and results of the geoprobe sampling.

Monitoring wells AIMW-8A and AIMW-9A are up-gradient wells. The sampling data from these wells show that shallow groundwater entering the site has total VOC contamination ranging from 2 to 47 ppb. The average up-gradient VOC contamination in the shallow aquifer is 25 ppb.

Monitoring wells MW-1, MW-2, MW-3, MW-4, and MW-7 are on-site monitoring wells. The on-site shallow groundwater has total VOC contamination ranging from non-detect (ND) to 864 ppb. Monitoring well MW-7 was contaminated with 1,1,1 TCA at 560 ppb compared to the groundwater standard of 5 ppb. The average on-site shallow groundwater VOC contamination was 282 ppb.

Monitoring wells AIMW 10A and AIMW 11A are shallow down-gradient wells. These wells showed total VOC contamination of 117 ppb and 513 ppb, respectively. The average down-gradient shallow groundwater VOC contamination was 315 ppb. See figure 7 for results of the shallow groundwater sampling.

Monitoring well NC-24 is a shallow down-gradient monitoring well. This well showed total VOC contamination at 24,775 ppb. The Tishcon at Brooklyn Avenue site (site no. 1-30-043 E) is primarily responsible for this contamination and it will be addressed as part of the remedial action for Tishcon.

The shallow aquifer data indicate that on-site and down-gradient groundwater is more contaminated than the up-gradient groundwater.

Intermediate Groundwater (80-90 feet bgs)
Monitoring wells AIMW-8B and AIMW-9B are up-gradient wells. The data showed total VOC contamination of 6 and 211 ppb, respectively.

Monitoring wells AIMW-10B and AIMW-11B are down-gradient wells. These wells had total VOC contamination of 3 and 35 ppb, respectively. See figure 8 for results of the intermediate groundwater investigation.

The intermediate groundwater data show up-gradient contamination (6 to 211 ppb) is higher than the down-gradient contamination (3 to 35 ppb).

Deep Groundwater (130-150 feet bgs)
Monitoring wells AIMW-8C and AIMW-9C are up-gradient wells. The data from these wells revealed total VOC contamination of ND and 80 ppb, respectively.

Monitoring wells AIMW-10C and AIMW-11C are down-gradient wells. These wells showed total VOC contamination of 6 and 5 ppb, respectively. See figure 9 for the results of the deep groundwater investigation.

The deep groundwater data show up-gradient contamination (non-detect to 80 ppb) is higher than the down-gradient contamination (5 to 6 ppb).

Summary
Groundwater data for the shallow aquifer indicate that on-site and down-gradient groundwater quality has been impacted by the site. For example, 1,1,1 TCA was detected in MW-7 (an on-site location) at 560 ppb which exceeds the groundwater standard of 5 ppb for this compound. Shallow groundwater entering the site shows 1,1,1 TCA at 2 and 4 ppb which is significantly less than that found on-site and down-gradient.

As discussed in section 1, the groundwater contamination migrating from the New Cassel Industrial Area has impacted the Bowling Green Water District supply wells. An active

supplemental treatment system is in place to mitigate the impact of the contamination before the water is delivered to the Bowling Green Water District customers. However, contamination leaving the sites, including the Arkwin Industries site, remains a threat to the water quality in the aquifer and at the Bowling Green well field.

4.2 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events. Pathways that we know to or may exist at the site include:

- *Ingestion of contaminated groundwater. Since an active supplemental treatment system is in place that prevents the completion of this exposure pathway, no known completed exposure pathways exist.*

The contaminated groundwater at the Arkwin Industries site and within the entire New Cassel Industrial Area represents a potential route of exposure to humans. The Bowling Green Water District, located down-gradient of the site, derives its water from the Magothy Aquifer which has been impacted by the contaminants associated with the NCIA. After detection of site related contaminants during routine monitoring, an air stripping treatment system followed by carbon polishing was constructed in 1996 to mitigate the impact of the groundwater contamination on the Bowling Green public water supply wells. The Bowling Green Water Supply District routinely samples the water supply to monitor the effectiveness of the treatment system. No site related contaminants have been detected exceeding drinking water standards in the water distributed to the public. Guard wells have been installed up-gradient of the water supply wells as a precautionary measure to detect any migrating plumes that could impact the well field. With these measures in place, the use of the groundwater in the area is not currently considered an exposure pathway of concern. Also, an active supplemental treatment system is in place that prevents the completion of this exposure pathway and no known completed exposure pathways exist.

4.3 Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures that may be presented by the site. Due to the density of commercial and industrial buildings in the New Cassel Industrial Area, there are no significant sources of surface water in close proximity to the site. Nearly every open space in the industrial area has been developed with asphalt, concrete or buildings. As a result of the industrial area being so highly developed, no wildlife habitat exist in or near the site. The

nearest surface water sources are several small ponds in and around Eisenhower Memorial Park, approximately two miles southwest of the site across Old Country Road.

There are no known exposure pathways of concern between the contaminated groundwater and the environment. The potential for plants or animal species being exposed to site-related contaminants is unlikely.

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 only Potential Responsible Party (PRP) for the site, documented to date, is Arkwin Industries.

The NYSDEC and Arkwin Industries entered a Consent Order on July 26, 1996. The Order obligated the PRP to carry out a Focused Remedial Investigation/Feasibility Study (FRI/FS) for the on-site source. After the completion of the OU 1 (soils) remediation, the PRP declined to complete the investigation and remediation of groundwater contamination resulting from the site.

The PRP declined to carry out the RI/FS for Operable Unit No. 02 (groundwater) at the site when requested by the NYSDEC. After the remedy is selected, the PRP will again be contacted to assume responsibility for the remedial program. If the Department cannot reach an agreement with the PRP, the NYSDEC will evaluate the site for further action under the State Superfund. The PRP is subject to legal actions by the State for recovery of all response costs the State has incurred.

The following is the chronological enforcement history of this site.

Date	Index No.	Subject of Order
07/96	W1-0754-95-06	Focused RI/FS -Soils

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all SCGs and be protective of human health and the environment.

The Department has been using a three-prong strategy in remediating Class 2 sites in the New Cassel Industrial Area (NCIA). The first action identifies source areas at each site which will be remediated or removed; the second action includes the investigation and proper remediation of groundwater contamination at and beneath each site; and the third action is the ongoing efforts by the Department which include a detailed investigation of groundwater contamination that is migrating off-site from all Class 2 sites within the New Cassel Industrial Area. Upon completion of this groundwater investigation, the Department will propose a remedy to the public. After

public review, a final groundwater remedy will be selected.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Eliminate, to the extent practicable, ingestion of groundwater affected by the site that does not attain NYSDOH Drinking Water Standards.*
- *Eliminate, to the extent practicable, off-site migration of groundwater that does not meet NYSDEC Class GA Ambient Water Quality Criteria and NYSDOH Drinking Water Standards.*

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Arkwin Industries site were identified, screened and evaluated in the report entitled Feasibility Study Report, dated June 1999.

A summary of the detailed analysis follows. As presented below, the time to construct does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy. Time to implement is the expected time for the alternative to reach remedial objectives.

7.1: Description of Alternatives

The potential remedies are intended to address the contaminated shallow groundwater at the site. The groundwater quality at the deeper depths will improve when the more highly contaminated shallow groundwater (the top thirty feet of the aquifer, or approximately 80 feet below ground surface) is remediated. Finally, any residual off-site groundwater contamination will be addressed by the comprehensive NCIA groundwater investigation.

Alternative #1: No Action

Present Worth:	*$ 170,000*
Capital Cost:	*$ 0*
Annual O&M (years 1-5):	*$ 22,000*
Annual O&M (years 6-30):	*$ 5,500*
Time to Construct	*None*
Time to Implement	*30+ years*

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. The site would remain as a Class 2 site.

Groundwater use restrictions would be implemented to prevent development of the underlying groundwater as a potable or process water source without the necessary water quality treatments. Quarterly sampling of eleven (11) existing monitoring wells would be conducted for the first five years. Annual sampling of the same eleven (11) monitoring wells would continue for years six through thirty.

Alternative #2: *Monitored Natural Attenuation*

Present Worth:	*$ 480,000*
Capital Cost:	*$ 151,000*
Annual O&M (years 1-5):	*$ 47,000*
Annual O&M (years 6-30):	*$ 15,000*
Time to Construct	*2 months*
Time to Implement	*20 years*

Monitored Natural Attenuation includes a variety of physical, chemical, and/or biological processes that act without intervention to reduce the mass, toxicity, mobility, and/or concentration of contaminants in the groundwater. This alternative would include the monitoring and modeling of processes involved in natural attenuation. Monitoring of natural attenuation processes and the contaminant plume would be completed quarterly for the first five years, then annually for the last 25 years. A time of 20 years was estimated using the maximum concentrations of the VOCs, their half-lives, and the assumption that groundwater standards would be met. Using this methodology, the calculation for 1,2 DCE yielded the longest time period (16 years) to meet the groundwater standard. An additional four years was added to have a conservative estimate for costing purposes. Groundwater use restrictions would be set up to prevent development of the underlying groundwater as a potable or a process water source without the necessary water quality treatments.

As a part of this alternative two additional well couplets would be installed for a total of four new wells. These wells would be needed to further characterize the natural attenuation processes down-gradient of the site further.

Alternative #3: Air Sparging/Soil Vapor Extraction

Present Worth:	*$ 840,000*
Capital Cost:	*$ 564,000*
Annual O&M (years 1-3):	*$ 96,000*
Annual O&M (years 4-5):	*$ 10,000*
Time to Construct	*6 months*
Time to Implement	*3 years*

Air Sparging/Soil Vapor Extraction (AS/SVE) is a demonstrated in-situ physical/chemical treatment for remediating the shallow contaminated groundwater. The AS/SVE system would involve the installation of injection/extraction wells to volatilize and capture contaminants in the

groundwater. Off-gas treatment and long-term groundwater monitoring would also be included as part of this alternative.

The Air Sparging component would consist of wells installed in the upper thirty feet of the aquifer. These wells would inject air via compressors into the contaminated groundwater at controlled pressures and volumes to increase groundwater/air contact. The air channels promote the volatilization of dissolved VOCs and adsorbed phase contamination. The volatilized contaminants would then travel from the saturated zone into the unsaturated soils. The injection wells would be installed to ensure the entire area of concern would be effectively aerated, which may include overlapping zones of influence.

The vapor-phase contaminants would be collected with the use of a vacuum pump and extraction wells. These wells would collect all vapor-phase contaminants and transport them to the surface. All vapors would be treated with a granular activated carbon filter before discharge to the atmosphere.

Pilot testing and field measurements would be necessary to determine the exact number of AS/SVE wells necessary to effectively remediate the areas of concern. For costing purposes it was assumed six (6) air sparge and seven (7) soil vapor extraction points would be required. These points would be located on the southern or down-gradient portion of the Arkwin property. The pilot testing data would be used in part to design the SVE system to ensure that all contaminants volatilized from the groundwater are captured and treated before release to the atmosphere. This would be done by ensuring the radius of influence of the extraction wells completely overlaps the radius of influence for the sparging wells.

This system would be expected to stay in operation for three years. To confirm the AS/SVE system is achieving remedial objectives, groundwater quality would be monitored semiannually at eleven (11) existing wells. This data would be reviewed annually to determine if the remedial system should be shut-off or remain in operation.

Alternative #4: In Well Vapor Stripping/ Vapor Treatment

Present Worth:	*$ 940,000*
Capital Cost:	*$ 601,000*
Annual O&M (years 1-4):	*$ 94,000*
Annual O&M (years 5):	*$ 8,000*
Time to Construct	*6 months*
Time to Implement	*4 years*

Under this alternative, the shallow groundwater contaminant plume would be treated in-situ using a series of groundwater circulation wells (or in-well stripping) to capture and re-circulate groundwater within the aquifer. The groundwater circulation well system creates in-situ vertical groundwater circulation cells by drawing groundwater from an aquifer formation through one screen section of a double-screened well and discharging it through the second screen section.

While groundwater circulates in and out of the stripping cell, no groundwater is removed from the ground. Air is injected into the well through a gas injection line and diffuser, releasing bubbles into the contaminated groundwater. These bubbles aerate the water and form an air-lift pumping system (due to an imparted density gradient) that causes groundwater to flow upward in the well. As the bubbles rise, VOC contamination in the groundwater is transferred from the dissolved state to the vapor state through an air stripping process.

The air/water mixture rises in the well until it encounters the dividing device within the inner casing. The divider is designed to maximize volatilization. The air/water mixture flows from the inner casing to the outer casing through the upper screen. A vacuum is applied to the outer casing, and contaminated vapors are drawn upward through the annular space between the two casings. The partially treated groundwater re-enters the subsurface through the upper screen and infiltrates back to the aquifer and the zone of contamination where it is eventually cycled back into the well. This pattern of groundwater movement forms a circulation cell in the subsurface around the well that allow groundwater to undergo sequential treatment cycles until remedial objectives are met.

Off gas from the stripping system would be collected and treated using granular activated carbon filters.

Aquifer pump testing and field measurements would be necessary to determine the exact number of In Well Vapor Stripping wells necessary to effectively remediate the areas of concern. For costing purposes it was assumed that two (2) groundwater circulation/stripping wells would be required. These points would be located on the southern or down-gradient portion of the Arkwin property.

This system would remain in operation for four years. To ensure the system is achieving remedial objectives, groundwater quality would be monitored semiannually at eleven (11) existing wells . This monitoring data would be reviewed annually to determine if system has reached its objectives and could be deactivated.

Alternative #5: Groundwater Extraction/ Air Stripping/Re-Injection

Present Worth:	*$ 1,130,000*
Capital Cost:	*$ 714,000*
Annual O&M (years 1-4):	*$ 116,000*
Annual O&M (years 5):	*$ 9,000*
Time to Construct	*6 months*
Time to Implement	*4 years*

The groundwater extraction system would draw shallow contaminated groundwater from the pumping well's zone of capture. The recovery flow rate is increased until the capture zone radius is sufficient to cover the lateral dimensions of the area of concern. The recovery wells would be located on the down-gradient portion of the property so that contaminated water would naturally flow to the capture zone.

The pumped groundwater would be collected at the surface for treatment. First it would enter a flow equalization tank, then a pH adjustment tank. The pH would be raised to about 8 to 10, and a coagulant would be added into the reaction tank to help flocculate and precipitate soluble inorganic constituents. Then, after passing through a mixer, the groundwater would enter a settling tank where an iron/manganese sludge would settle to the bottom of the tank. The groundwater then passes through a media filter to remove dissolved solids. An acidic compound would be added to lower the pH to 6 or 7 before the water is fed into a low profile tray air stripper. The low profile stripper would be selected over a stripping tower because the surrounding buildings are typically one story tall.

The vapor phase emitted from the air stripper would be collected and treated with granular activated carbon prior to discharge to the atmosphere.

The liquid effluent leaving the air stripper would be passed through a filter to remove any remaining solids before being discharged to the on-site infiltration gallery. The infiltration gallery would consist of four wet wells (injection wells).

Aquifer pump testing and field measurements would be necessary to determine the exact number and placement of extraction wells necessary to effectively remediate the areas of concern. For costing purposes it was assumed that two (2) extraction wells would be required. These points would be located on the southern or down-gradient portion of the Arkwin property.

This system would remain in operation for four years. To ensure the system is achieving remedial objectives, groundwater quality would be monitored semiannually at eleven (11) existing wells . The monitoring data would be reviewed annually to determine if the system has reached remedial objectives and could be deactivated.

7.2 Evaluation of Remedial Alternatives

The 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). For each criterion, a brief description, followed by an evaluation of the alternatives against that criterion are provided. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

The data for the site shows SCGs are exceeded for VOCs in the on-site groundwater. The remedy selected for this site must remediate the groundwater to Class GA groundwater standards.

Since no remedial actions are included in Alternatives 1 and 2, SCGs would not be met and concentrations of groundwater contaminants would remain at unacceptable levels. Alternative 2

involves natural processes such as dilution, dispersion, sorption, volatilization, and bio-degradation, that would reduce contaminant levels over a period of time.

Alternatives 3, 4, and 5 would involve actively treating the groundwater and would be designed to effectively remove VOCs to levels that meet SCGs.

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

Alternatives 1 and 2 would not present an imminent public health concern since the Bowling Green Water District treats and routinely monitors groundwater and drinking water quality. However, Alternatives 1 and 2 provide the least protection to human health and the environment as they do not provide for any active treatment of on-site groundwater.

Alternatives 3, 4, and 5 offer the greatest protection to public health and the environment by actively treating and reducing groundwater contamination.

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.

Alternative 1 would not include construction activities and therefore no impact to construction workers or neighbors. Groundwater contaminants would remain above SCGs and contribute to down-gradient groundwater contamination.

Alternative 2 would involve minimal construction resulting in construction workers and neighbors being exposed to fugitive dust and heavy machinery. A community air monitoring plan and health and safety plan would address these issues. Alternative 2 provides minimal short term effectiveness in remediating the contamination as it relies solely on natural processes.

Alternatives 3, 4, and 5 provide the greatest short term effectiveness as they actively remove contaminants in a relatively short period. These alternatives would require significant construction activity exposing workers and neighbors to dust and machinery. A community air monitoring plan and a health and safety plan would mitigate this problem.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would leave the site in its present condition. VOCs would remain at present levels and in excess of groundwater standards.

Alternative 2 would leave the site in its present condition. However, data would be collected to determine if natural processes were effectively reducing the levels of contaminants in the plume.

Alternatives 3, 4, and 5 would effectively and permanently remove VOCs from the groundwater.

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

Alternative 1 would not result in any reduction of toxicity, mobility or volume of contaminants.

Alternative 2 would not result in any reduction of toxicity, mobility or volume of contaminants. However, data would be available to show the rate at which natural processes were attenuating the contaminant levels.

Alternatives 3, 4, and 5 would greatly reduce the toxicity, mobility, and volume of contaminants by permanently removing VOCs from the groundwater.

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

Alternative 1 requires monitoring of existing monitoring wells only and would be easily implementable.

Alternatives 2, 3, and 5 are readily implementable with only minor property access issues that would need to be addressed.

Alternative 4, in-well vapor stripping, requires the use of one of a small number of vendors with specialized experience. This issue could result in Alternative 4 being slightly more difficult to implement than the other alternatives.

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 estimated present worth costs ranges from $170,000 (Alternative 1) to $1,130,000 (Alternative 5). Alternatives 2, 3, and 4 have estimated present worth costs of $480,000, $840,000, and $940,000, respectively.
The estimated capital costs range from $ 0 (Alternative 1) to $714,000 (Alternative 5). Alternatives 2, 3, and 4 have estimated capital costs of $151,000, $564,000, $601,000, and respectively.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised. No significant public comments were received pertaining to the selected remedy.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

The Department has been using a three-prong strategy in remediating Class 2 sites in the New Cassel Industrial Area (NCIA). In accordance with this strategy, on-site sources of contamination at the Arkwin Industries site were remediated in 1995 and 1997. It is expected that after remediating the on-site contaminated groundwater, down-gradient groundwater quality will improve. The Department is currently conducting a detailed investigation of groundwater contamination that is migrating off-site from all Class 2 sites, including the Arkwin Industries site, in the NCIA. Upon completion of this comprehensive groundwater investigation, a remedy will be proposed to the public. After public review, a final groundwater remedy will be selected.

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 3, Air Sparging/Soil Vapor Extraction, as the remedy for this site.

This selection is based upon the evaluation of the five (5) alternatives developed for this site. Alternatives 1 and 2 did not provide for protection of human health and the environment. This is considered a threshold criteria, and therefore, Alternatives 1 and 2 were dropped from further consideration. Alternatives 3, 4, and 5 met the threshold criteria and were similar in the remaining balancing criteria. Alternative 4 requires specialized pilot studies and has a higher capital cost and present worth cost than Alternative 3. Alternative 5 and Alternative 3 differ mainly in that Alternative 5 has significantly higher present worth cost ($840,000 -vs- $1,130,000).

Alternative 3, Air Sparging/Soil Vapor Extraction, will be protective of human health and the environment, provides a permanent solution for on-site shallow (the top thirty feet of the aquifer, or approximately 80 feet below ground surface) groundwater contamination, provides both short term and long term effectiveness, and is the least costly of the alternatives that satisfy all the criteria. The groundwater quality at the deeper depths would improve when the more highly contaminated shallow groundwater is remediated. Finally, any residual off-site groundwater contamination will be addressed by the comprehensive NCIA groundwater investigation. The system is expected to remain in operation for an estimated period of three years.

The estimated present worth cost to complete the selected remedy is $840,000 which includes the capital cost of $564,000. Annual Operation and Maintenance (O&M) costs for the first three years would be $96,000. The last two years would require O&M costs of $10,000. Refer to figures 10 and 11 for the conceptual schematic of the selected remedy. The elements of the remedy will include:

- *A remedial design, including pilot tests, to verify the components of the conceptual design and provide the details necessary for the construction, operation, and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved.*

- *Installation of injection wells to introduce air into the groundwater promoting volatilization of the VOC contamination.*

- *Installation of extraction wells to capture contaminants volatilized from the groundwater.*

- *Installation of GAC filters for treatment of volatilized contaminants prior to release to the atmosphere.*

- *Semiannual sampling of eleven (11) existing groundwater monitoring wells will be conducted to monitor the effectiveness of the system. This monitoring data will be reviewed annually to determine if the system has reached remedial objectives.*

- *Implementation of institutional controls and the recording of deed restrictions to restrict the future use of groundwater at the site.*

SECTION 9: HIGHLIGHTS OF THE COMMUNITY PARTICIPATON

As part of the remedial investigation process, a number of Citizen Participation (CP) activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

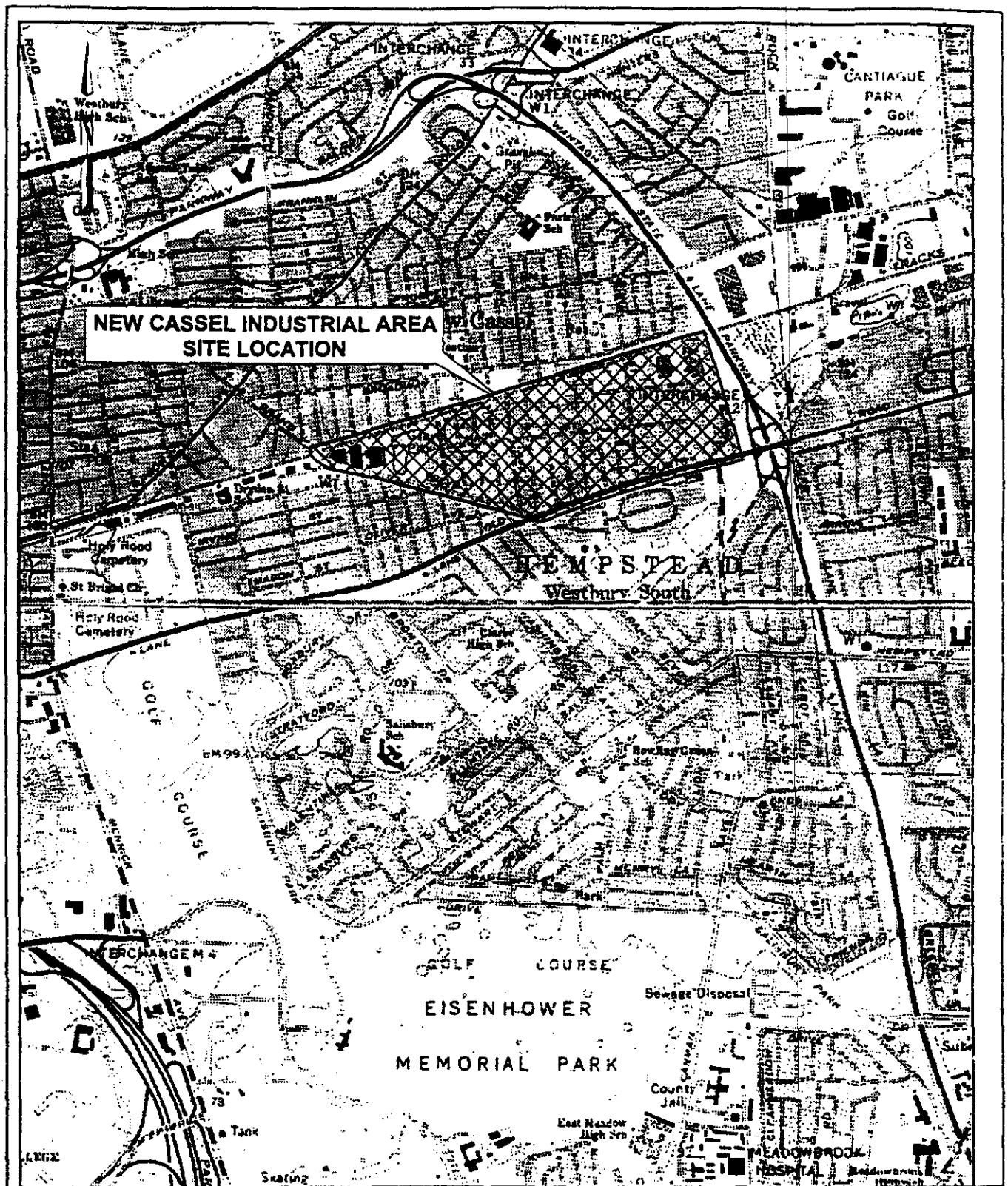
- Repositories for documents pertaining to the site were established.

- A site mailing list was established which included nearby property owners, local political officials, New Cassel Environmental Justice Project and local community groups, local media and other interested parties.

- Fact sheets were included as part of the public meeting notification mailings.

- Public meetings regarding the entire New Cassel Industrial Area were held on May 1995, January 1996, May 1996, October 1996, May 1997, December 1997, May 1998, December 1998, May 1999, and September 30, 1999. The Proposed Remedial Action Plan (PRAP), which was the basis for this ROD, was discussed at the September 30, 1999 public meeting.

- Included in this ROD, a Responsiveness Summary was prepared to address the comments received during the public comment period for the PRAP.



0 2000 ft

SCALE
1 in. = 2000 ft

Map source:
USGS 7.5-minute quadrangle series,
Freeport, NY, 1969, photorevised 1979,
Hicksville, NY, 1967, photorevised 1979.

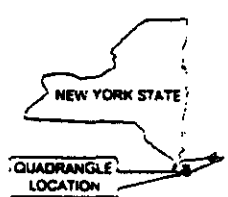
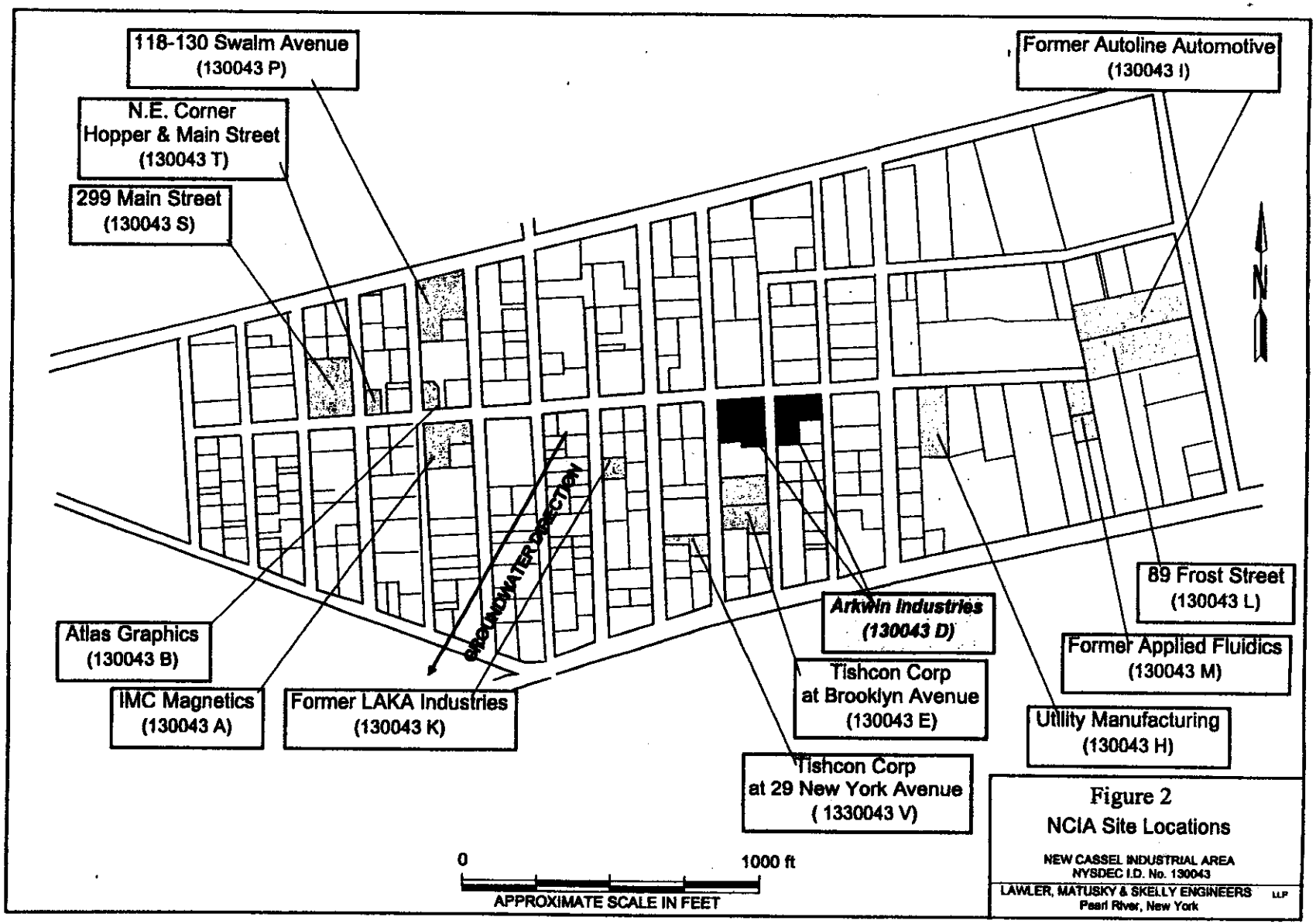


Figure 1

New Cassel Industrial Area
Site Location

ARKWIN INDUSTRIES R/I/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

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


118-130 Swalm Avenue
(130043 P)
N.E. Corner
Hopper & Main Street
(130043 T)
299 Main Street
(130043 S)
Former Autoline Automotive
(130043 I)
N
GROUNDWATER DIRECTION
89 Frost Street
(130043 L)
Arkwin Industries
(130043 D)
Former Applied Fluidics
(130043 M)
Atlas Graphics
(130043 B)
Tishcon Corp
at Brooklyn Avenue
(130043 E)
IMC Magnetics
(130043 A)
Former LAKA Industries
(130043 K)
Utility Manufacturing
(130043 H)
Tishcon Corp
at 29 New York Avenue
(1330043 V)
0
1000 ft
APPROXIMATE SCALE IN FEET
Figure 2
NCIA Site Locations
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043
LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

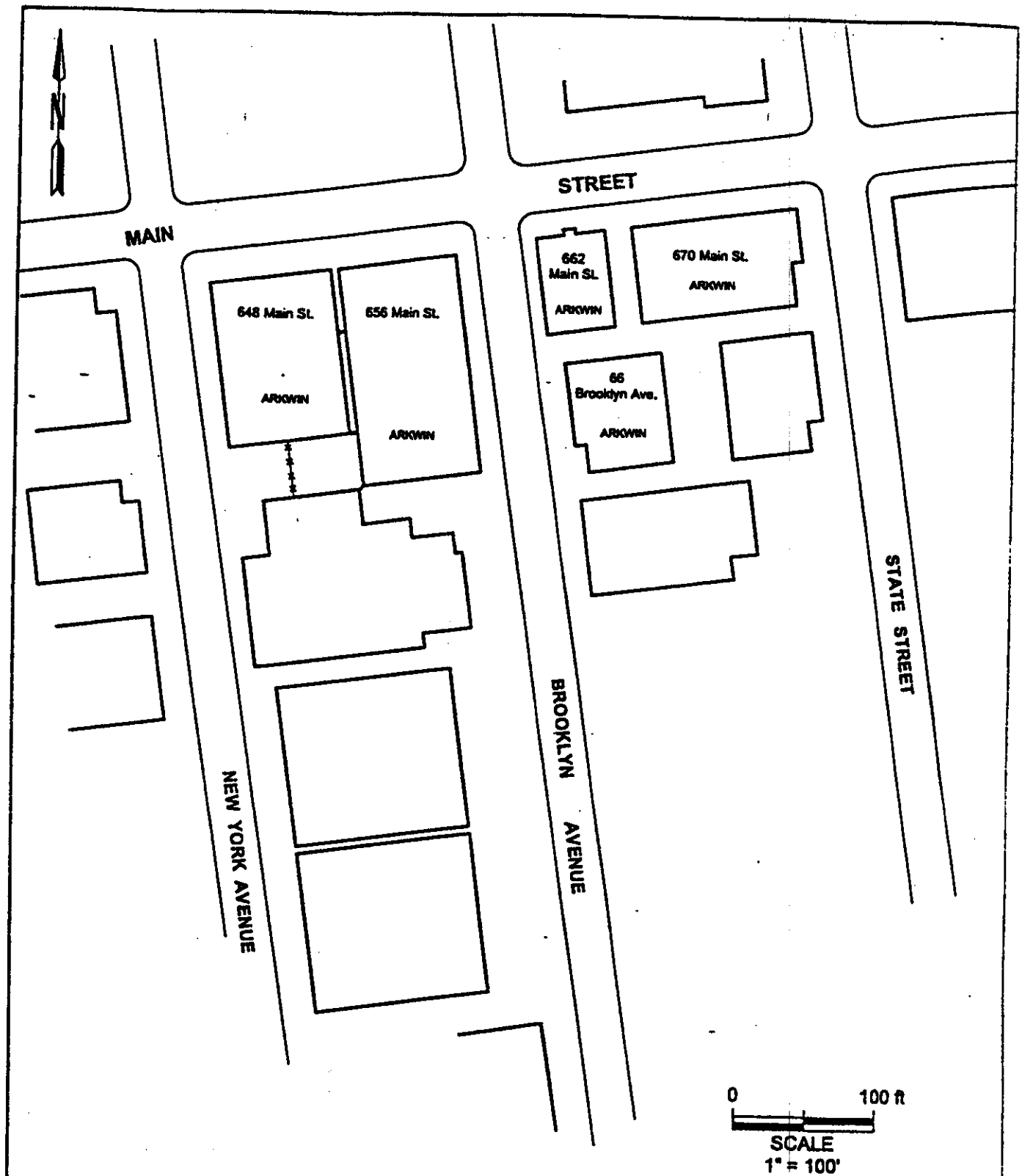


Figure 3

Site Plan

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 1300430

\650341NC-Samplers.dsf

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

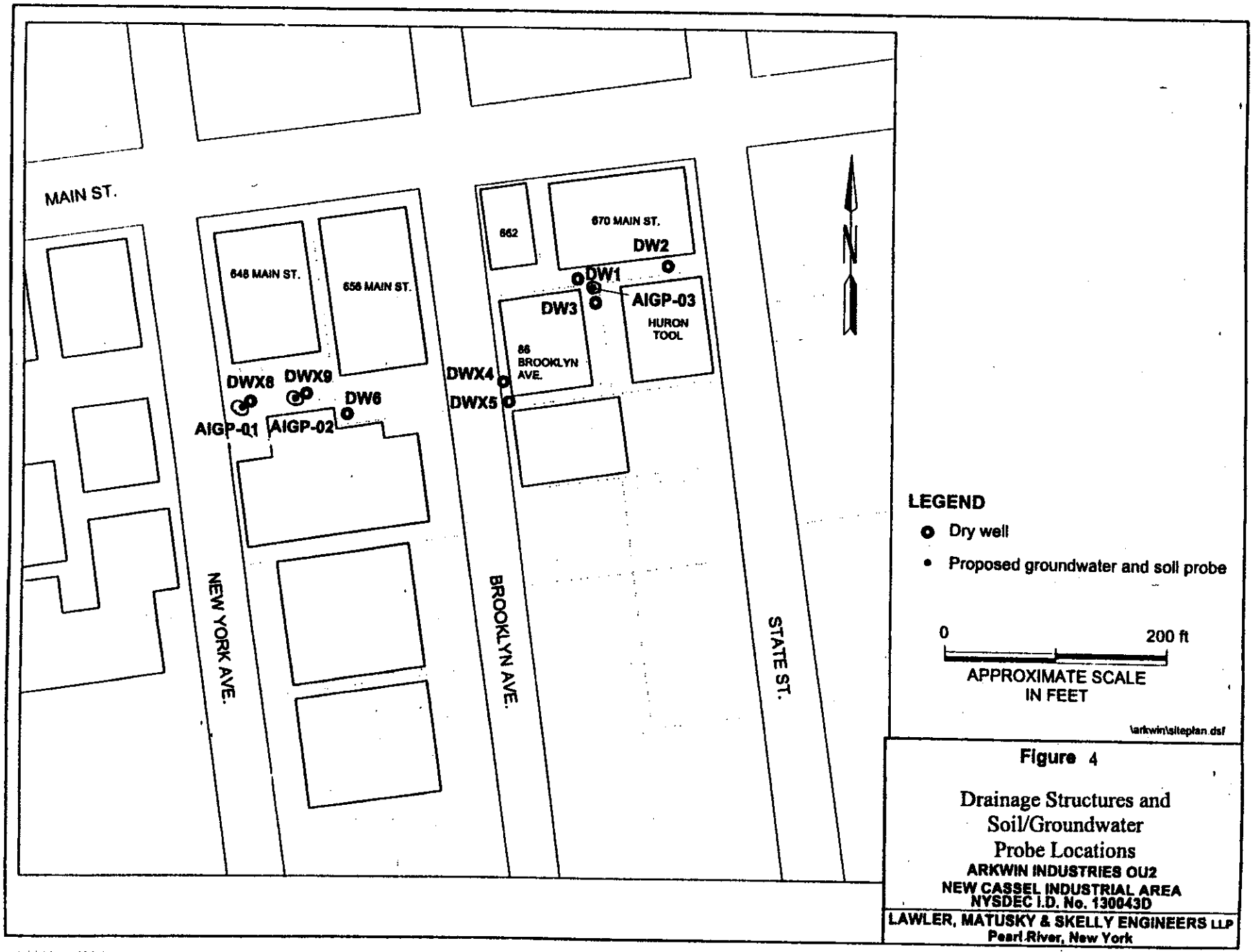
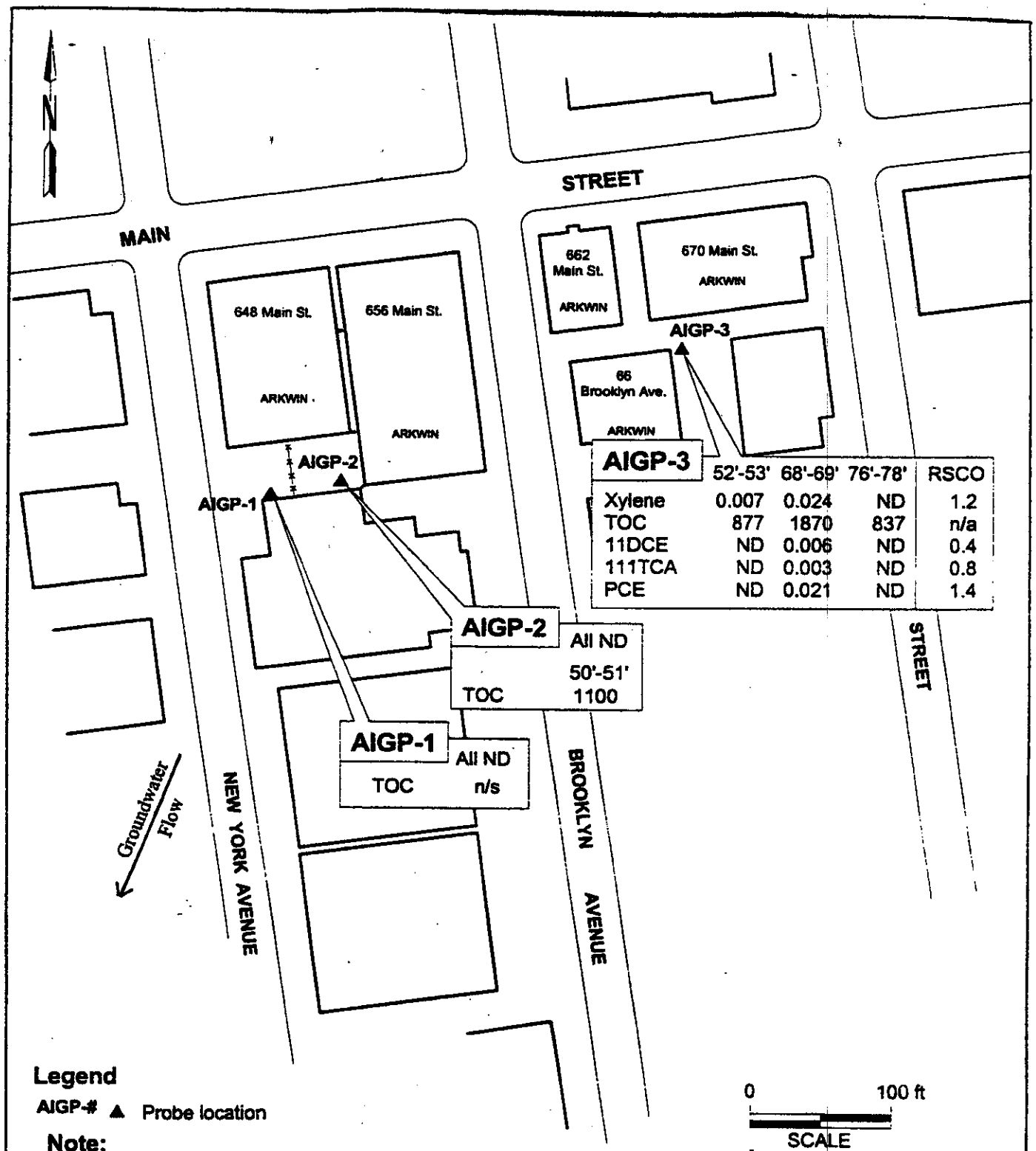


Figure 4

Drainage Structures and Soil/Groundwater Probe Locations

ARKWIN INDUSTRIES OU2
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

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



Legend

AIGP-# ▲ Probe location

Note:

Results are in mg/kg (ppm)
Depths are feet below grade

Abbreviations

111TCA	1,1,1-Trichlorethane	n/s	Not sampled
11DCE	1,1-Dichloroethylene	n/a	Not applicable
11DCA	1,1-Dichloroethane	ND	Not detected
PCE	Tetrachloroethylene	RSCO	Recommended soil cleanup objective
TOC	Total organic carbon		

\650342 site base.dsf

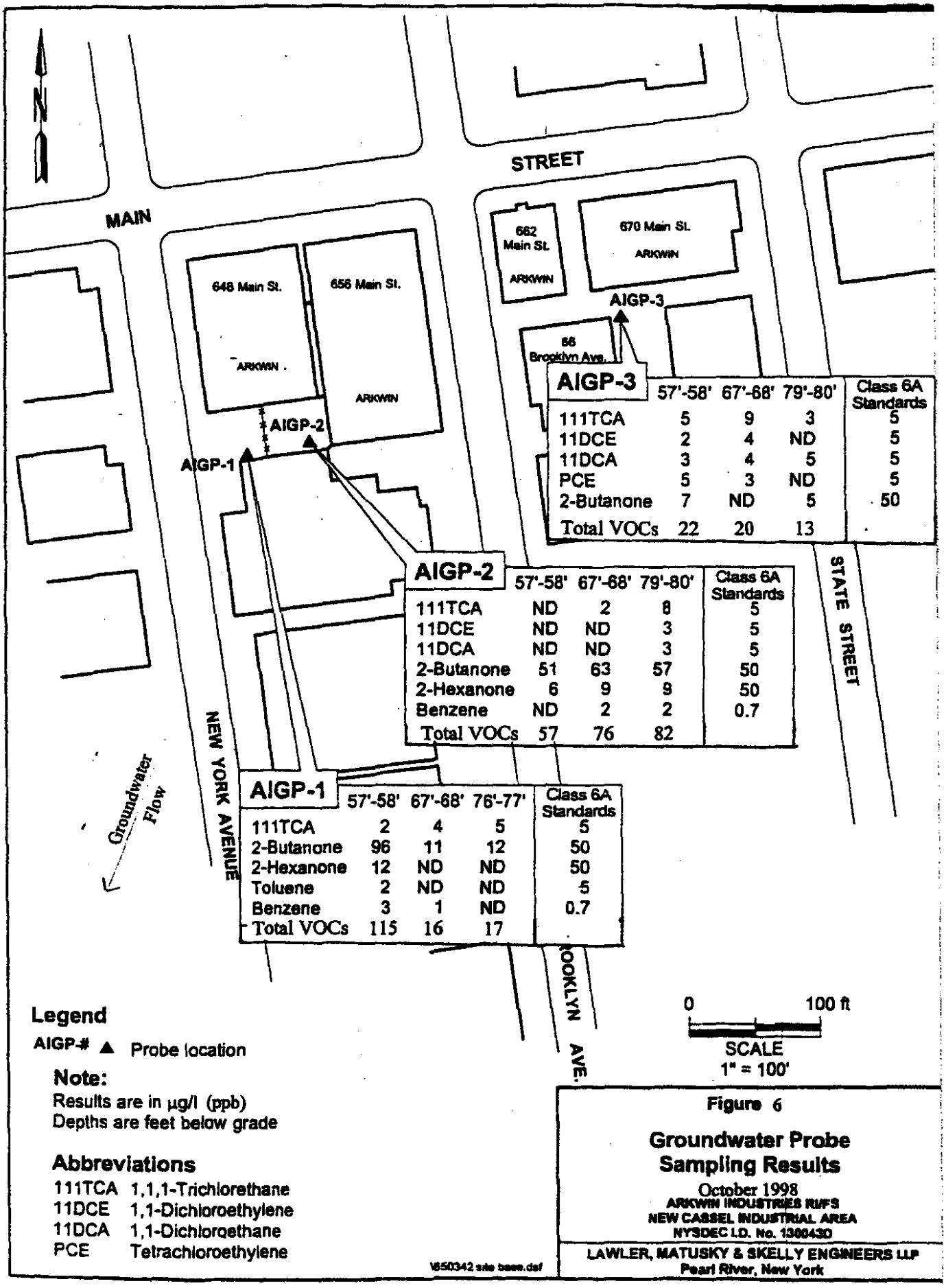
Figure 5

Soil Probe Sampling Results

October 1998

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

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



Legend

AIGP-# ▲ Probe location

Note:

Results are in µg/l (ppb)
Depths are feet below grade

Abbreviations

111TCA	1,1,1-Trichlorethane
11DCE	1,1-Dichloroethylene
11DCA	1,1-Dichloroethane
PCE	Tetrachloroethylene

\650342 site base.dsf

Figure 6

Groundwater Probe Sampling Results

October 1998

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 1300430

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

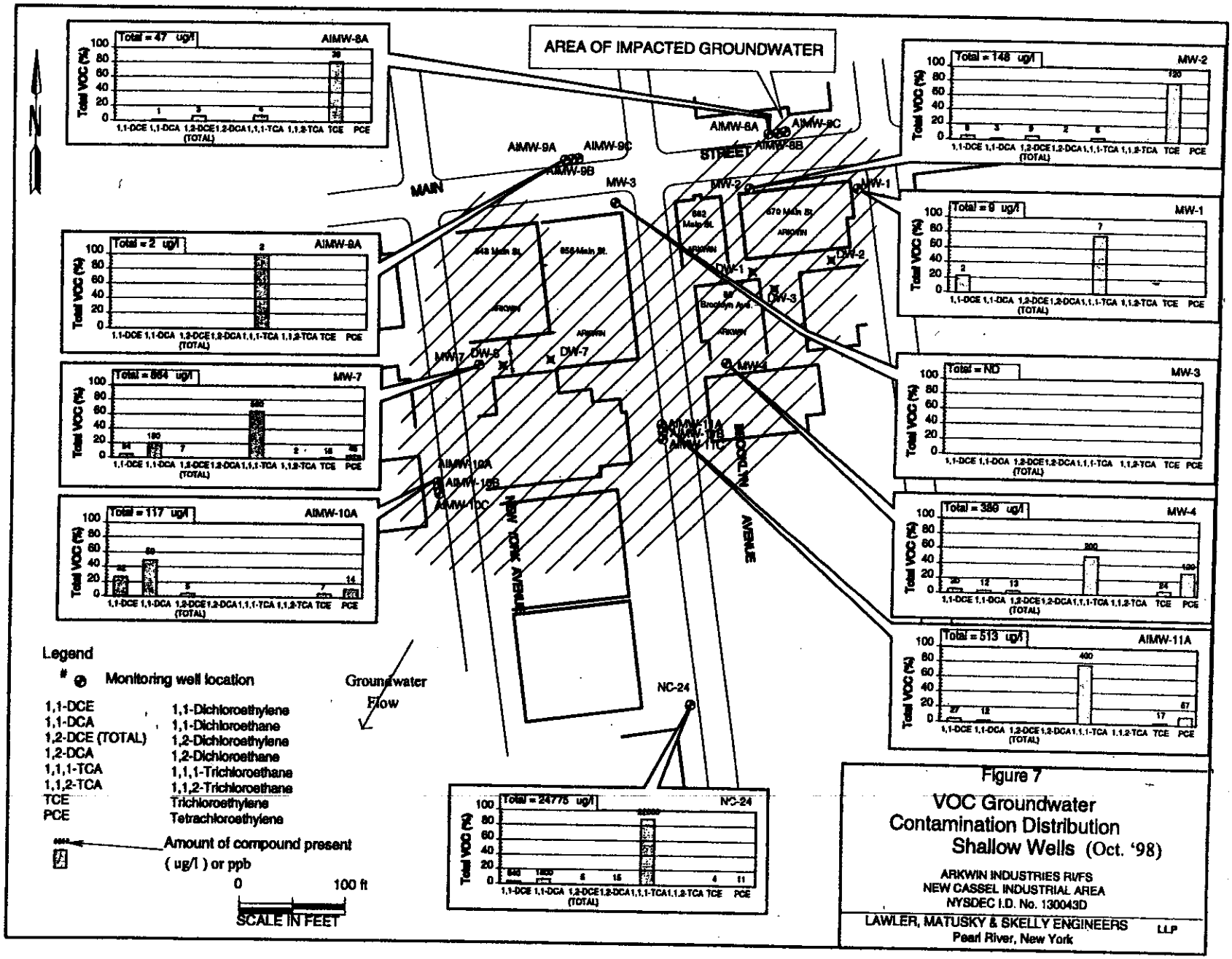


Figure 7

VOC Groundwater Contamination Distribution Shallow Wells (Oct. '98)

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

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

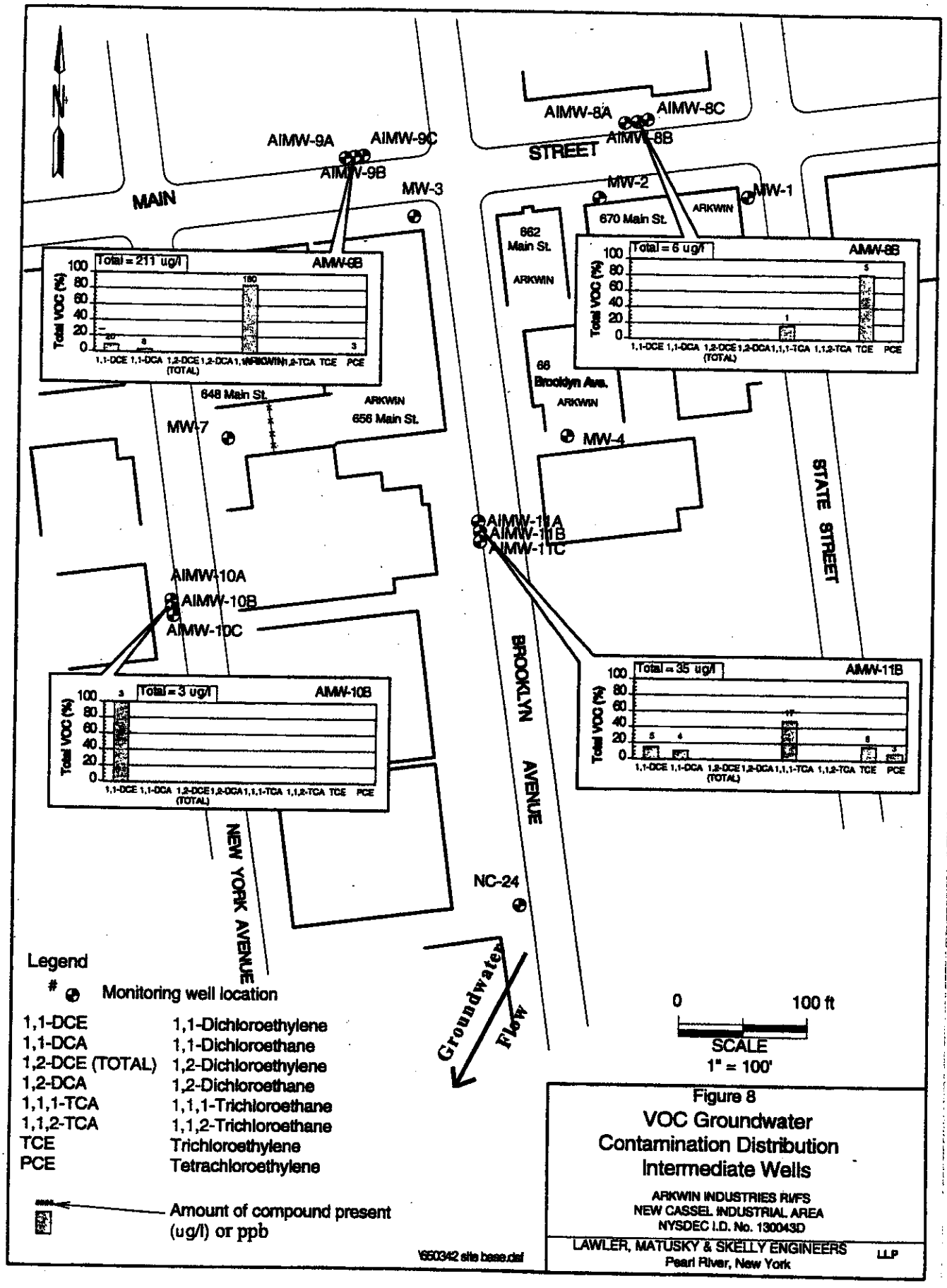


Figure 8

VOC Groundwater Contamination Distribution Intermediate Wells

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

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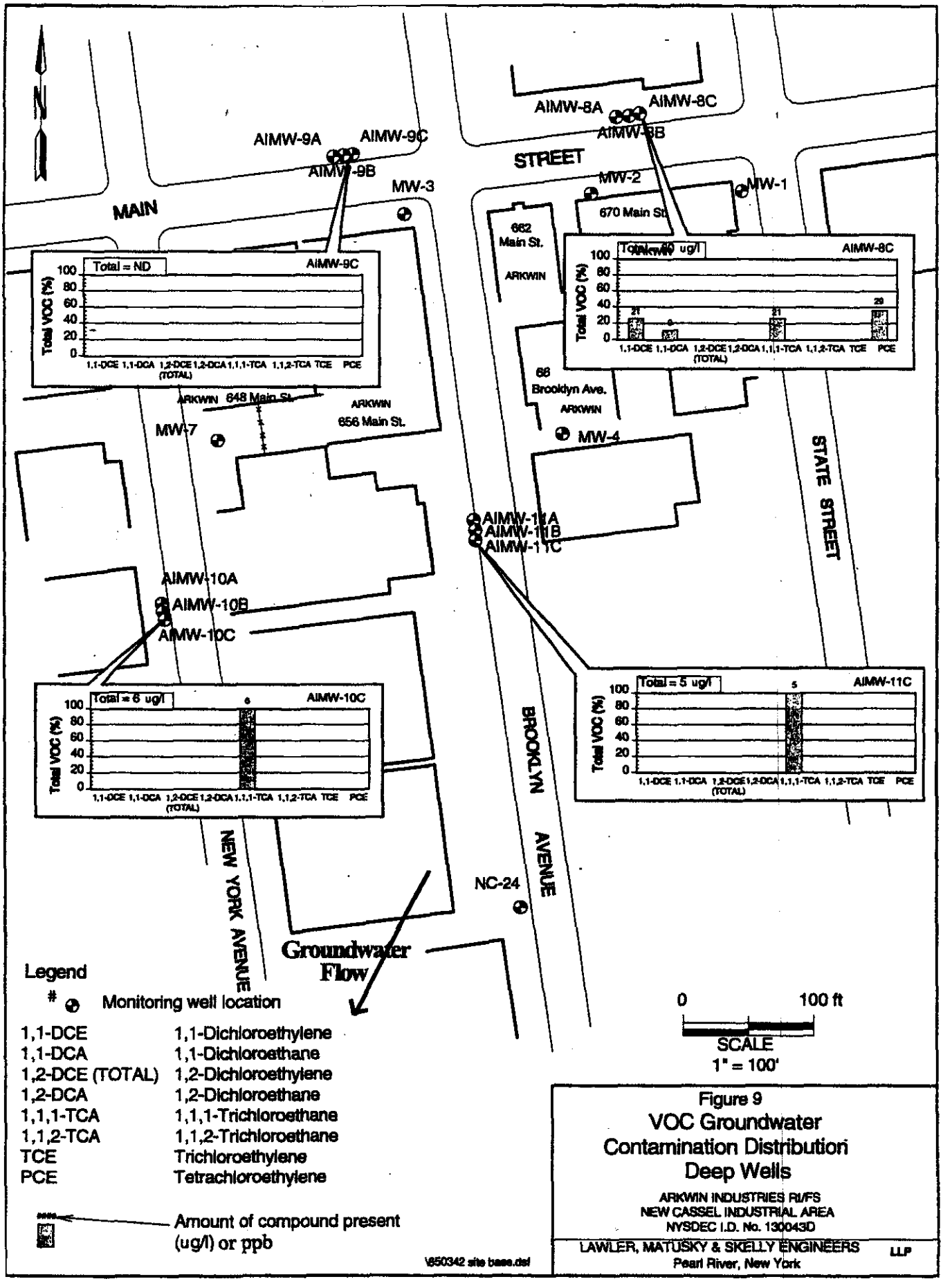

Figure 9
VOC Groundwater Contamination Distribution Deep Wells

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

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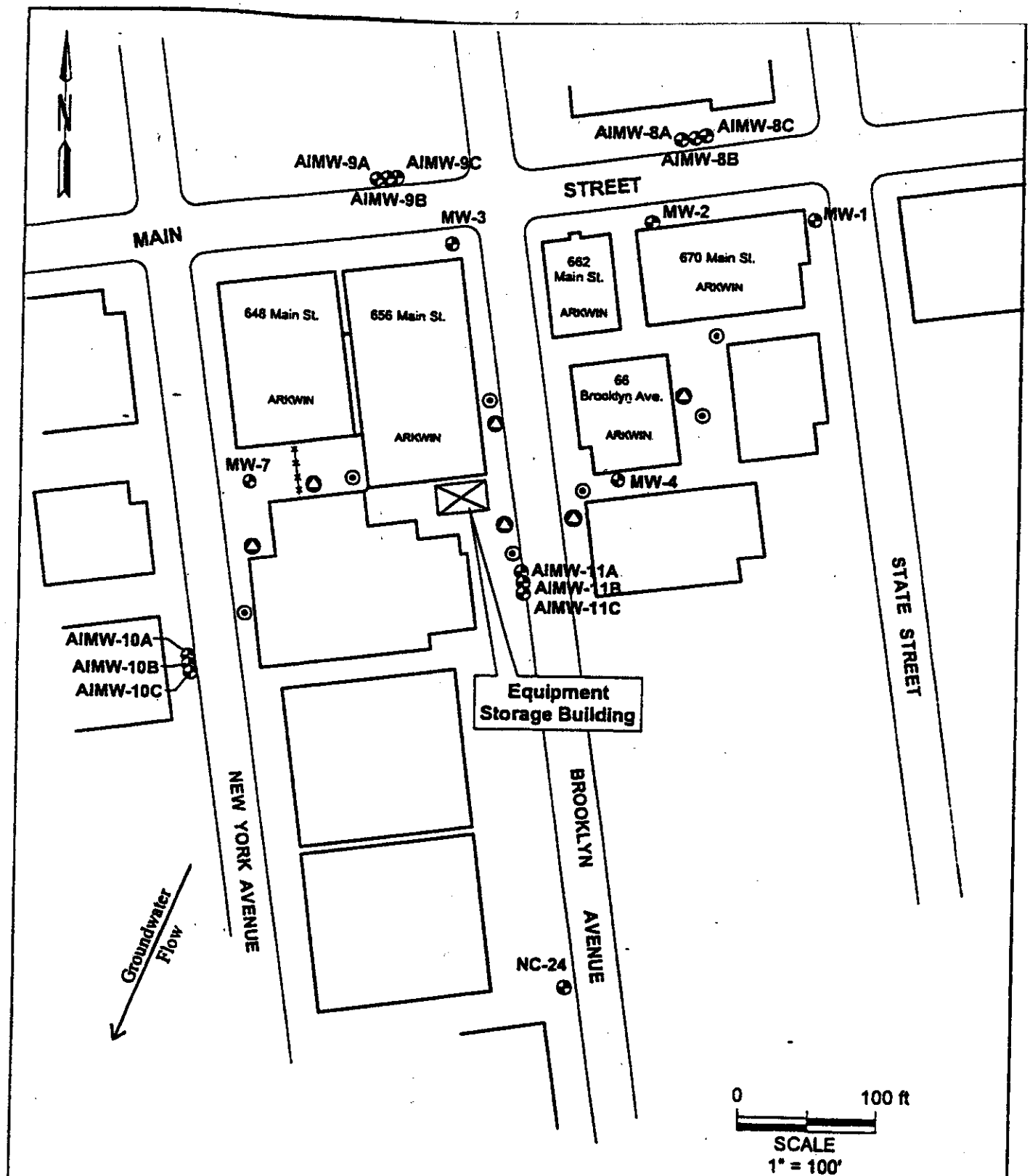
Pearl River, New York



Legend

- Existing monitoring well location
- Proposed air sparging point location
- Proposed vapor extraction point location

\650342 site base.csf

Figure 10

Approximate AS/SVE System Configuration

ARKWIN INDUSTRIES RI/FS
NEW CASSEL INDUSTRIAL AREA
NYSDEC I.D. No. 130043D

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
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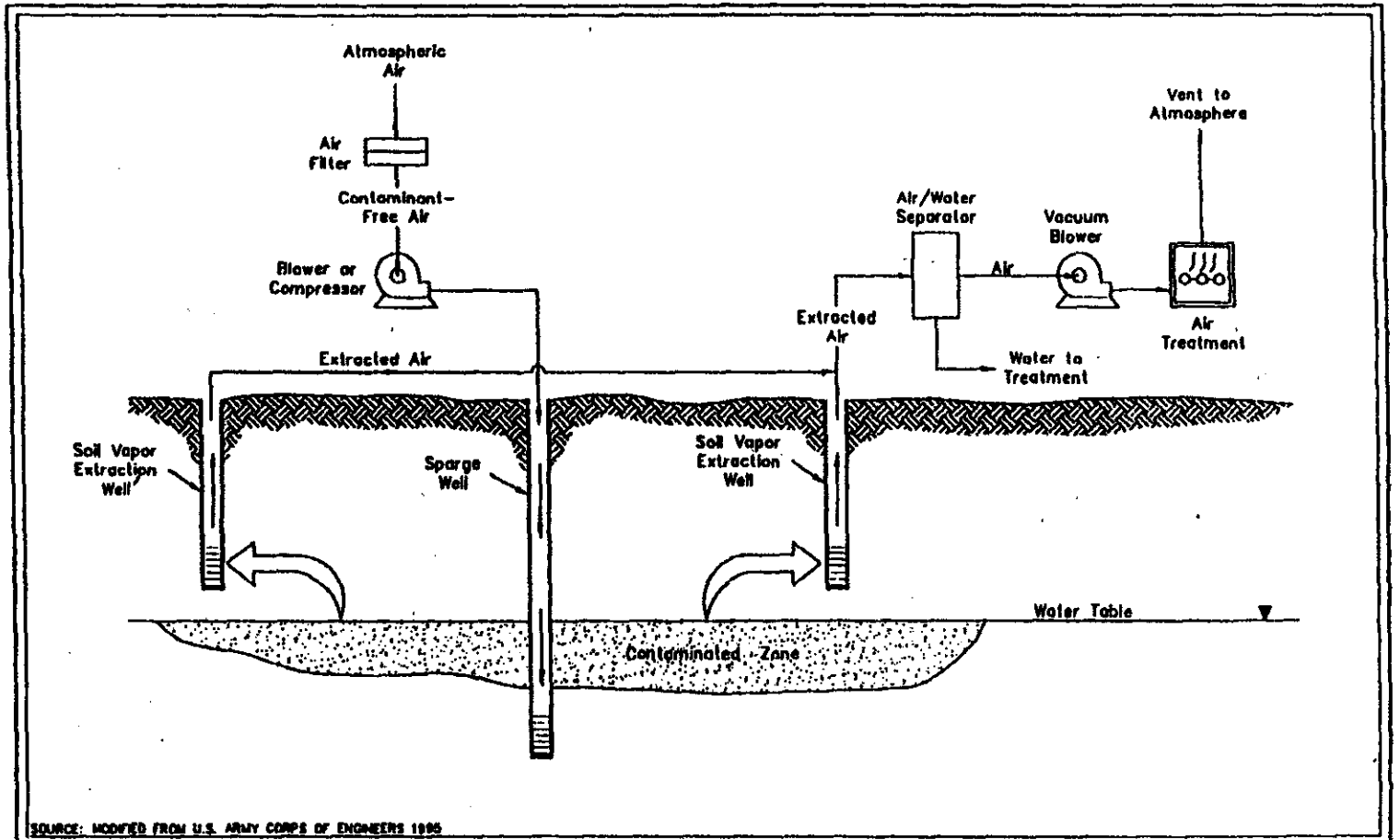
FIGURE 3-1
TYPICAL AIR SPARGING ENHANCEMENT TO SOIL VAPOR EXTRACTION SYSTEM



SOURCE: MODIFIED FROM U.S. ARMY CORPS OF ENGINEERS 1995

TYPICAL AIR SPARGING ENHANCEMENT TO SOIL VAPOR EXTRACTION SYSTEM

FIGURE 11

TABLE 1

Arkwin Industries Site, Site No. 1-30-043 D

Groundwater Probe Data Summary - Sampled in October 1998

:ation:	On-Site									
signation:	AIGP-1	AIGP-1	AIGP-1	AIGP-2	AIGP-2	AIGP-2	AIGP-3	AIGP-3	AIGP-3	
dia:	GW	GW	GW	GW	GW	GW	GW	GW	GW	
ɔth	(51-52')	(61-62')	(71-72')	(50-51')	(61-62')	(72-73')	(52-53')	(68-69')	(76-78')	Standard
'ameters (All concentrations in parts per billion										
ɔtone	ND	ND	ND	ND	240db	ND	ND	ND	ND	50
-Dichloroehylene	ND	ND	ND	ND	ND	3j	2j	4j	ND	5
-Dichlorethane	ND	ND	ND	ND	ND	3j	3j	4j	5j	5
utanone	96	11	12	51	63	57	7j	ND	5j	50
1-Trichloroethane	2j	4j	5j	ND	2j	8j	5j	9j	3j	5
ɪzene	3j	1j	ND	ND	2j	2j	ND	ND	ND	0.7
exanone	12	ND	ND	6j	9j	9j	ND	ND	ND	50
achloroethylene	ND	ND	ND	ND	ND	ND	5j	3j	ND	5
ɪene	2j	ND	ND	ND	ND	ND	ND	ND	ND	5

ɪdard - NYSDEC Class GA Standeards

- Non-Detect

ɜtimated concentration

'ound in associated blanks

TABLE 2

Arkwin Industries Site, Site No. 1-30-043 D

Monitoring Well Data - Sampled in October 1998

Location:	Up-Gradient						Down-Gradient							On-Site					
Designation:	AIMW-8A	AIMW-8B	AIMW-8C	AIMW-9A	AIMW-9B	AIMW-9C	AIMW-10A	AIMW-10B	AIMW-10C	AIMW-11A	AIMW11B	AIMW-11C	NC-24	MW-1	MW-2	MW-3	MW-4	MW-7	
Media:	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	
Depth	(60-70')	(80-90')	(136-146')	(53-63')	(80-90)	(140-150')	(52-62')	(80-90')	(133-143')	(53-63')	(79-89')	(133-143')	(53-63')	(51-61)	(52-62')	(51-61')	(53-63')	(52-62')	Standa
Parameters (All concentrations in parts per billion)																			
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60	ND	ND	ND	ND	ND	5
1,1-Dichloroethylene	ND	ND	21	ND	20	ND	32dj	3j	ND	27	5j	ND	940d	2j	8j	ND	20	54g	5
1,1-Dichloroethane	1j	ND	9j	ND	8j	ND	60d	ND	ND	12	4j	ND	1800d	ND	3j	ND	12	180d	5
1,2-Dichloroethylene	3j	ND	ND	ND	ND	ND	5j	ND	ND	ND	ND	ND	5j	ND	9j	ND	13	7j	5
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3jb	ND	ND	ND	ND	2j	7
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15	ND	2j	ND	ND	ND	0.6
1,1,1-Trichloroethane	4j	1j	21	2j	180	ND	NDg	ND	6j	400	17	5j	22000d	7j	6j	ND	200d	580d	5
Trichloroethylene	39	5j	ND	ND	ND	ND	7j	ND	ND	17	6j	ND	4j	ND	120	ND	24	16	5
1,1,2-Trichlorethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2j	5
Tetrachloroethylene	ND	ND	29	ND	3j	ND	14	ND	ND	57	3j	ND	11	ND	ND	ND	120	45	5
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	3j	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.7
Xylene (total)	ND	ND	ND	4j	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5

Standard - NYSDEC Class GA Standeards
ND - Non-Detect
j - estimated concentration
b - found in associated blanks
d - concentration recovered from diluted sample
g - value estimated based on validator review

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Arkwin Industries Site
Town of North Hempstead, Nassau County
Site No. 1-30-043 D
Operable Unit 02 - Groundwater

The Proposed Remedial Action Plan (PRAP) for the Arkwin Industries Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on August 23, 1999. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil and sediment at the Arkwin Industries. The preferred remedy is air sparging coupled with soil vapor extraction.

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

A public meeting was held on September 30, 1999 which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. No written comments were received.

The public comment period for the PRAP ended on October 13, 1999.

This Responsiveness Summary responds to all questions and comments raised at the September 30, 1999 public meeting.

Several questions were raised regarding odors and dust from Jamaica Ash, a solid waste facility located in the western part of the New Cassel Industrial Area (NCIA). The public was referred to contact Mr. Anthony Cava or Mr. Stanley Farkas of the NYSDEC's Region 1 office in Stony Brook.

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

1. C: Will the Arkwin Industries site remain a Class 2 site?

   R: Yes. Until construction of the remedy is complete, the site will remain a Class 2 site. Upon completion, the site may be reclassified to a Class 4 or Class 5. A Class 4 site is a site that has been properly closed but that requires continued operation, maintenance, and/or monitoring. A Class 5 site is a site that has been properly closed and that does not require continued operation, maintenance, and/or monitoring.

2. C: Has the Department considered using iron filings as an alternative for remediating the groundwater?

R: Iron filings fall under the general remediation technology known as in-situ passive treatment walls. In-situ passive treatment walls were considered in the Feasibility Study Report as a potential technology for the Arkwin site. They were screened and eliminated from consideration primarily because installing treatment walls at depths of 80 feet would prove to be impractical. For further details, see the Feasibility Study Report for this site available at the document repositories.

3. C: Will Air Sparging/Soil Vapor Extraction (AS/SVE) be effective in remediating the groundwater?

R: AS/SVE is a proven technology for the remediation of volatile organic compounds and has been utilized at many sites throughout the state. AS/SVE is best suited for sites with coarse-grained materials (e.g., sand) similar to those found at Arkwin. The Department is confident that AS/SVE will be an effective remedial technology for use at this site.

4. C: You have stated that groundwater in the New Cassel Industrial Area is contaminated. Is my family drinking contaminated groundwater?

R: You are not drinking contaminated groundwater. The water that is delivered to consumers from the Town of Hempstead Department of Water is drawn from a depth in excess of five hundred feet below the ground surface, well below the level at which the highest levels of contamination are found. High levels of groundwater contamination was detected at depths of fifty to one hundred and twenty feet below ground surface. Before groundwater is distributed to users the water is first treated by an air stripper followed by carbon filtration to remove any contaminants. The water is tested at regular intervals to ensure that the water meets drinking water standards before it is distributed to consumers.

5. C: Water from my faucet has at times been turbid and discolored, especially when there have been excavations involving water mains near my house. Is it possible that contaminated groundwater has entered the water delivery system, and that I have consumed contaminated groundwater?

R: The water mains are located approximately four to six feet below the ground surface. The water table in the New Cassel Industrial Area and the surrounding residential areas is a minimum of fifty feet below the ground surface. Even if the water mains were broken, it would not be possible for the contaminated groundwater to enter the water mains. The discoloration that you have observed is more likely to be due to iron oxide originating within the system.

APPENDIX B

Administrative Record

APPENDIX B

ADMINISTRATIVE RECORD

Arkwin Industries, Site Number: 1-30-043 D

Operable Unit No. 02 - Groundwater

1. Record of Decision, Arkwin Industries Site, Operable Unit No. 01 - Soil, January 1998
2. Work Plan, Lawler, Matusky, & Skelly Engineers, August 1998
3. Field Activities Plan, Lawler, Matusky, & Skelly Engineers, August 1998
4. Focused Remedial Investigation Report, Volumes I, II, and III, Lawler, Matusky, & Skelly Engineers, March 1999
5. Feasibility Study Report, Lawler, Matusky, & Skelly Engineers, June 1999
6. Proposed Remedial Action Plan, NYSDEC, August 1999