PROPOSED REMEDIAL ACTION PLAN
Former Diamond Cleaners
Operable Unit No. 02
State Superfund Project
Elmira, Chemung County, New York
Site No. 808030

March 2010

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Former Diamond Cleaners, Operable Unit #2 (OU-2) – Groundwater and Soil Vapor. The presence of hazardous waste has created significant threats to human health and the environment that are addressed by this proposed remedy.

As more fully described in Sections 3 and 5 of this document, improper handling of dry cleaning solvents has resulted in the disposal of hazardous wastes, including volatile organic compounds (VOCs). These wastes have contaminated the soil, groundwater and soil vapor at the site, and have resulted in:

- a significant threat to human health associated with current and potential exposure to volatile organic compounds in soil, groundwater and soil vapor;

- a significant environmental threat associated with the current and potential impacts of contaminants to groundwater and soil vapor.

To eliminate or mitigate the threats to groundwater and soil vapor, the Department proposes Combined In-Situ Chemical Oxidation and Enhanced Biodegradation.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the 12/28/09 "Remedial Investigation (RI) Report", the 12/28/09 "Feasibility Study" (FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Elmira Steele Memorial Library
101 East Church Street
Elmira, New York 14901
(607) 733-9173

Matthew Dunham, PE
NYSDEC – Central Office
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7017
1-888-459-8667 (Toll Free)
By Appointment Only

Lisa LoMaestro Silvestri
Citizen Participation Specialist
NYSDEC – Region 8
6274 E Avon-Lima Road
Avon, New York 14414-9519
(585) 226-5326
By Appointment Only

The Department seeks input from the community on all PRAPs. A public comment period has been set from 03/01/10 to 03/31/10 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for 03/15/10 at the Elmira Steele Memorial Library from 4:00 pm to 6:00 pm.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. During the meeting, questions will be answered and written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Dunham at the above address through 03/31/10.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The site is located at 717 Lake Street, in the City of Elmira, Chemung County, New York. (Figures 1 and 2) The site is situated on a one acre lot in a commercial and residential area and consists of a paved/gravel parking lot, a one story building constructed in the 1950's and a grassy area at the rear of the property. The building is currently unoccupied and is in a state of disrepair. The site is situated in a relatively flat flood plain, formed by the confluence of the Chemung River to the south and the Newtown Creek to the east. It is presumed, based on regional groundwater flow and topography, that the Chemung River and, to a lesser extent Newtown Creek, are local groundwater discharge areas. Groundwater was encountered at 12 to 14 feet beneath ground surface (bgs) at the site. Groundwater

flow direction at the site is estimated to be to the west (Figures 3 and 6). The site is located within a primary aquifer which supplies drinking water to the local population. The closest operational public water supply wells are located along the shore of the Chemung River, approximately 1.2 miles southwest of the site.

Operable Unit (OU) No. 2, which is the subject of this document, consists of groundwater and soil vapor. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

This site was used as a laundry and dry-cleaning operation by multiple operators between 1950 and 2001. PCE was used for the dry-cleaning operations at the site from 1974 until 2001.

3.2: Remedial History

In November 2002, the former owner of the Site submitted an application to enter the Voluntary Cleanup Program. The applicant terminated the agreement before it was signed in August 2003.

In 2004, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

A Record of Decision for OU No. 1 (Source Area) was issued in March 2008. The components of the remedy are the demolition of the Diamond Cleaners building, excavation of tetrachloroethene contaminated soils at concentrations greater than 1.3 ppm, backfilling of the excavation and the transportation of debris and contaminated soils to an off-site treatment and/or disposal facility. As a result of soil vapor intrusion sampling conducted during OU No.1 a vapor mitigation system was offered to the owner of an adjacent property. The owner declined the offer to install the system.

OU No. 1 is currently in the Remedial Design/Remedial Action phase. Implementation of the selected remedy for OU No. 2 will occur concurrently with the OU No. 1 remedy for soil remediation.

SECTION 4: 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, documented to date, include: Daniel S. Hoffman and Earl D. Coleman.

The PRPs declined to implement the RI/FS at the site when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under

the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between July 2008 and April 2009. The field activities and findings of the investigation are described in the RI report.

The OU-2 investigation included a detailed evaluation of the area surrounding the site buildings, as well as the areas upgradient and downgradient from the site. It included:

- Direct-push investigation including groundwater sampling and on-site analysis of 13 microwell locations to further evaluate the physical and chemical conditions downgradient of the Site to allow for better placement of additional wells to augment the existing wells at the Site;

- Installation of six monitoring wells (one upgradient and five downgradient) to provide for additional groundwater analytical data and grounderwater monitoring points;

- Groundwater sampling of new and existing wells to evaluate groundwater conditions.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the groundwater contains contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI report, many groundwater samples were collected to characterize the nature and extent of contamination. As seen in Figures 4 and 5 and summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs). For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water.

Figures 4 and 5 and Table 1 summarizes the degree of contamination for the contaminants of concern in groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Groundwater

Numerous groundwater samples have been collected both on-site and off-site during the investigation for OU-1 and OU-2. An additional six groundwater monitoring wells were installed off-site during OU-2.

On-site and off-site groundwater has been impacted by PCE and its breakdown products related to the former dry cleaner. This groundwater contamination is also contributing to the soil vapor contamination (and indoor air impact) identified in OU-1. The highest concentrations of contamination were found on the west side of the former Diamond Cleaner building near the former cleaning room. On-site PCE was detected at 730 ppb (GW-4), TCE at 120 ppb (GW-4), cis-1,2-DCE at 20,000 ppb (GW-6) and VC at 3,400 (GW-9). Off-site PCE was detected at 3900 ppb (MW-4) to the west and across the street from the Diamond Cleaners Site.

Groundwater has also been impacted by volatile organic compounds at another location downgradient of the Former Diamond Cleaners Site. Contamination at the 714 Baldwin Street Site, Site No. 808041 will be addressed in a separate decision document in the future.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

There were no IRMs performed at this site during the RI/FS.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6.0 of the RI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct

contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

There is a potential for people to come into contact with contaminated surface and subsurface soil if they trespass or conduct ground-intrusive activities on the site. People are not currently being exposed to the contaminated groundwater because groundwater in the vicinity of the site is not used as a source of drinking water and the contamination does not extend to the public water supply wells. Volatile organic compounds in the groundwater have moved into the soil vapor (air between soil particles), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon from the subsurface into buildings, is referred to as soil vapor intrusion. Exposures related to soil vapor intrusion are likely to be occurring in a nearby building and may occur in new buildings constructed on-site.

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands. The site is located in a residential/commercial area in the City of Elmira. There are no fish or wildlife receptors present. Site contamination has impacted the Elmira-Horseheads-Big Flats Primary Water Supply Aquifer beneath and downgradient of the site. Contaminant concentrations exceed groundwater quality standards.

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. At a minimum, the remedy selected must 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 remediation goals for this site are to eliminate or reduce to the extent practicable:

- Current and potential exposures of persons at or around the site to volatile organic compounds in groundwater and soil vapor.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Former Diamond Cleaners were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated groundwater and soil vapor at the site.

Alternative 1: No Action

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.

Alternative 2: Site Management

The Site Management Alternative requires only institutional controls for the site. This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$767,000*
Capital Cost: *$0*
Annual Costs:
(Years 1-30): *$23,000*

Alternative 3: In-Situ Enhanced Biodegradation

Present Worth: *$1,259,000*
Capital Cost: *$492,000*
Annual Costs:
(Years 1-30): *$23,000*

This approach is designed to enhance the natural biodegradation process for a more rapid and complete degradation of the organic contaminants to non-toxic compounds. In-situ enhanced biodegradation involves inoculation of micro-organisms (i.e., fungi or bacteria, and other microbes) and/or the addition of carbon sources (reagents) to the subsurface for use by indigenous micro-organisms capable of degrading organic contaminants found in the soil and/or groundwater. The process injects a reagent into the subsurface via injection wells or an infiltration gallery. The method of injection and depth of injection is determined by the location of the contamination. Several reagents are commercially available. Implementation of in-situ enhanced biodegradation would consist of both adding the chosen reagent into the open excavation during the implementation of the OU-1 soil remedy and injecting the chosen reagent into the groundwater in the remaining treatment area. Prior to the full implementation of this technology, laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters. Long-term monitoring would be conducted to evaluate the effectiveness of the enhanced biodegradation remedy as well as the effects of natural attenuation in untreated areas. Long-term monitoring would begin following the first injection and would occur on a periodic basis. The need for additional injections would be evaluated during periodic reviews of the Site. This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment.

Alternative 4: In-Situ Chemical Oxidation

Present Worth: *$2,527,000*
Capital Cost: *$1,760,000*
Annual Costs:
(Years 1-30): *$23,000*

In-situ chemical oxidation is a technology used to treat chlorinated compounds in soil and groundwater. The process injects a chemical oxidant into the subsurface via injection wells or an infiltration gallery. The method of injection and depth of injection is determined by location of the contamination. As the chemical oxidant comes into contact with the contaminant, an oxidation reaction occurs that breaks down the contaminant into relatively benign compounds such as carbon dioxide and water. Several chemical oxidants are commercially available. Implementation of in-situ chemical oxidation would consist of both adding the chosen oxidant to the open excavation during the implementation of the OU-1 soil remedy and injecting the chosen oxidant into the groundwater in the remaining treatment area. Prior to the full implementation of this technology, laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters. Long- term monitoring would begin following the first injection and would occur on a periodic basis. The need for additional injections would be evaluated during periodic reviews of the Site. This alternative includes institutional controls, in the

form of an environmental easement and a site management plan, necessary to protect public health and the environment.

Alternative 5: Combined In-Situ Chemical Oxidation and Enhanced Biodegration

Present Worth: *$1,407,000*
Capital Cost: *$640,000*
Annual Costs:
(Years 1-30): *$23,000*

This alternative includes a combination of in-situ chemical oxidation and in-situ enhanced biodegradation. Implementation of this alternative would consist of treating the source area with the chemical oxidant only and treat the remaining area with the enhanced biodegration reagent. This would be accomplished by adding the chosen chemical oxidant to the open excavation during the implementation of OU-1 (source removal). Once the source removal is completed the enhanced biodegration reagent would be introduced into the remaining remedial area to treat any contamination outside the source area and to promote natural attenuation. Prior to the full implementation of this alternative, laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters. Long- term monitoring would begin following the injection of the enhanced biodegration reagent and would occur on a periodic basis. The need for additional injections of a biodegration reagent would be evaluated during periodic reviews of the Site. This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment.

Alternative 6: Groundwater Extraction and Treatment

Present Worth: *$3,746,000*
Capital Cost: *$628,000*
Annual Costs:
(Years 1-30): *$66,000*

This ex-situ remedy creates a depression of the water table so that contaminated groundwater is directed toward pumping wells within the plume area. The groundwater extraction system is designed so that the capture zone is sufficient to cover the lateral extent of the area of concern. The total number of extraction wells would be determined during the pilot test and the design. Both free product (if present) and groundwater are collected during recovery operations. A variety of methods may be used to treat the extracted groundwater which includes, but is not limited to air stripping, granular activated carbon and chemical/UV oxidation. Long-term monitoring would begin following start up of the groundwater extraction system and would occur on a periodic basis. This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

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

1. 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.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

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. 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 engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

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.

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

7. Cost-Effectivness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table #2.

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

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative #5, Combined In-Situ Chemical Oxidation and In-Situ Enhanced Biodegradation as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative 5 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by creating the conditions needed to attain ambient groundwater standards.

Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Because Alternatives 2, 3, 4, 5 and 6 do satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

Alternatives 2 through 6 all have short-term impacts which can easily be controlled, however Alternative 2 would have the smallest impact. The time needed to achieve the remediation goals would be shortest for Alternative 2 and longest for Alternative 6. Alternative 6 would require long term operation maintenance and monitoring of the treatment system.

Achieving the best long-term effectiveness and permanence is accomplished by treating the contaminated groundwater at the source area. Alternatives 3, 4 and 5 would introduce chemical oxidants and/or biological reagents to the open excavation during the source removal under OU-1. Alternative 6 would take the most time to implement, and would rely upon long-term operation, maintenance and monitoring to achieve contaminant reduction.

Alternative 6 is favorable in that it relies upon technology and construction methods that are well developed and accepted and are relatively easy to implement. The technologies used for implementation of Alternatives 3, 4 and 5 are becoming more widely used and accepted, and would not be difficult to implement after on-site pilot studies are conducted to more clearly define design parameters.

Alternatives 3, 4 and 5 include treatment to reduce the toxicity, mobility, and volume of groundwater contamination. Chemical oxidation destroys contaminants upon contact, but site-specific conditions may limit the ability to achieve adequate distribution of chemical-oxidants. Enhanced biodegradation involves the enhancement of natural biological processes to destroy the target contaminants. Alternative

6 would greatly reduce the mobility of contaminants but this reduction is dependent upon the long-term operation, maintenance and monitoring of the treatment system.

Among Alternatives 3, 4 and 5, Alternative 3 is the least expensive, but due to the nature of the treatment process this alternative would result in a longer time frame to achieve remedial action objectives. Alternative 4 is cost restrictive due to the amount of chemical oxidants required to treat the entire remediation area. Combining Alternatives 3 and 4 (Alternative 5) would limit the use of the more aggressive chemical oxidant to the source area. Then once the source area treatment is completed, any residual groundwater contamination will be treated using enhanced biodegradation reagents. This is expected to result in a shorter time frame to achieve remedial action objectives and provide long-term protection of human health and the environment.

The estimated present worth cost to implement the remedy is $1,407,000. The cost to construct the remedy is estimated to be $640,000 and the estimated average annual costs for 30 years is $23,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. The addition of the chosen oxidant to the source area and the chosen biodegradation reagent to the remaining remedial area. The addition of the oxidant in the source area would be conducted concurrently with the OU-1 soil removal and would include allowing the open excavation to fill with groundwater, adding and mixing the oxidant with the groundwater in the open excavation prior to backfilling.

3. The source area groundwater would be allowed to equilibrate and when monitoring indicates that contaminate concentrations have stabilized, the chosen enhanced biodegration reagent then would be injected into the groundwater with in the remaining remedial area to treat residual contamination outside the source area.

4. Monitoring wells would be installed within the treatment area to provide the means for long-term groundwater monitoring. Long-term groundwater monitoring would begin following the injection of the enhanced biodegration reagent and would occur on a periodic basis. The need for additional injections of a biodegration reagent would be determined during periodic reviews of the Site.

5. Imposition of an institutional control in the form of an environmental easement for the controlled property that:

   (a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3).
   (b) restricts the use of groundwater as a source of potable water, until groundwater standards are achieved, without the necessary water quality treatment as determined by the Department, NYSDOH or County DOH. .
   (c) requires compliance with Department approved Site Management Plan;

6. Since the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan is required, which includes the following:

(a) Institutional and Engineer Control Plan that identifies all the use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to assure the following institutional controls remain in place

Institutional Controls: The Environmental Easements discussed in Paragraph 5 above.

This plan includes, but may not be limited to:

(i) Descriptions of the provisions of the environmental easement including any groundwater use restrictions;
(ii) maintaining site access controls and Department notification; and
(iii) steps necessary for the periodic reviews and certification of the institutional controls;

(b) Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but not be limited to:

(i) monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy and to evaluate the need for additional sampling to assess exposures related to soil vapor intrusion in adjacent and on-site buildings;
(ii) a schedule of monitoring and frequency of submittals to the Department;
(iii) a provision to complete a soil vapor intrusion evaluation and to implement action necessary to address exposures should any building be developed on the site.

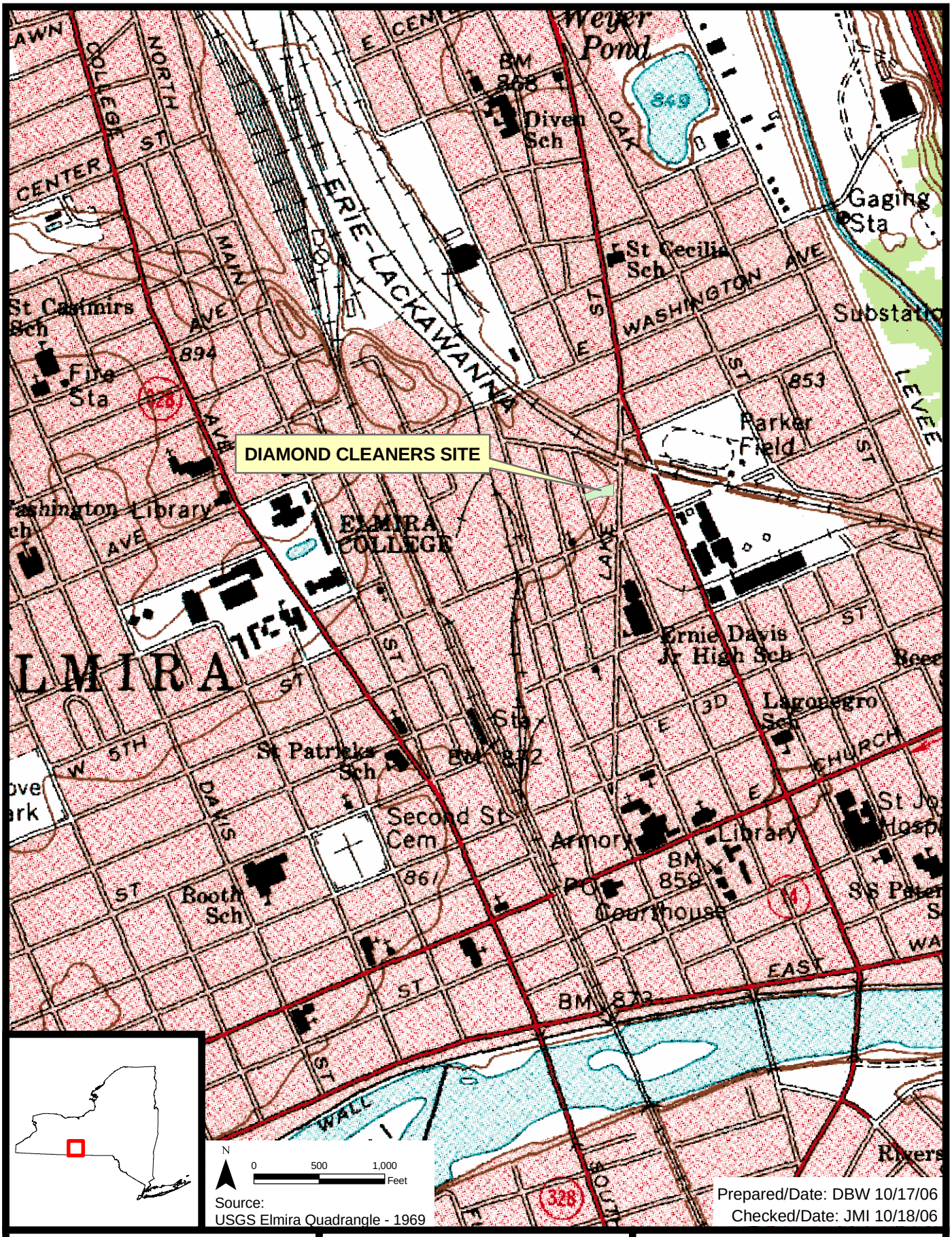
TABLE 1
Nature and Extent of Contamination

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Tetrachloroethene	0.72 - 3900	5.0	61/94
	Trichloroethene	0.66 - 120	5.0	46/94
	cis-1,2 Dichloroethene	0.58-20000	5.0	66/94
	trans-1,2 Dichloroethene	1.0-22	5.0	4/94
	Vinyl Chloride	0.88 -3400	2.0	26/94

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
[b] SCG = standards, criteria, and guidance values; Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code
ND = Non Detect

Table # 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	$0	$0	$0
Site Management	$0	$23,000	$767,000
In-Situ Enhanced Biodegradation	$492,000	$23,000	$1,259,000
In-Situ Chemical Oxidation	$1,760,000	$23,000	$2,527,000
Combined In-Situ Enhanced Biodegradation & Chemical Oxidation	$640,000	$23,000	$1,407,000
Groundwater Extraction & Treatment	$628,000	$66,000	$3,746,000



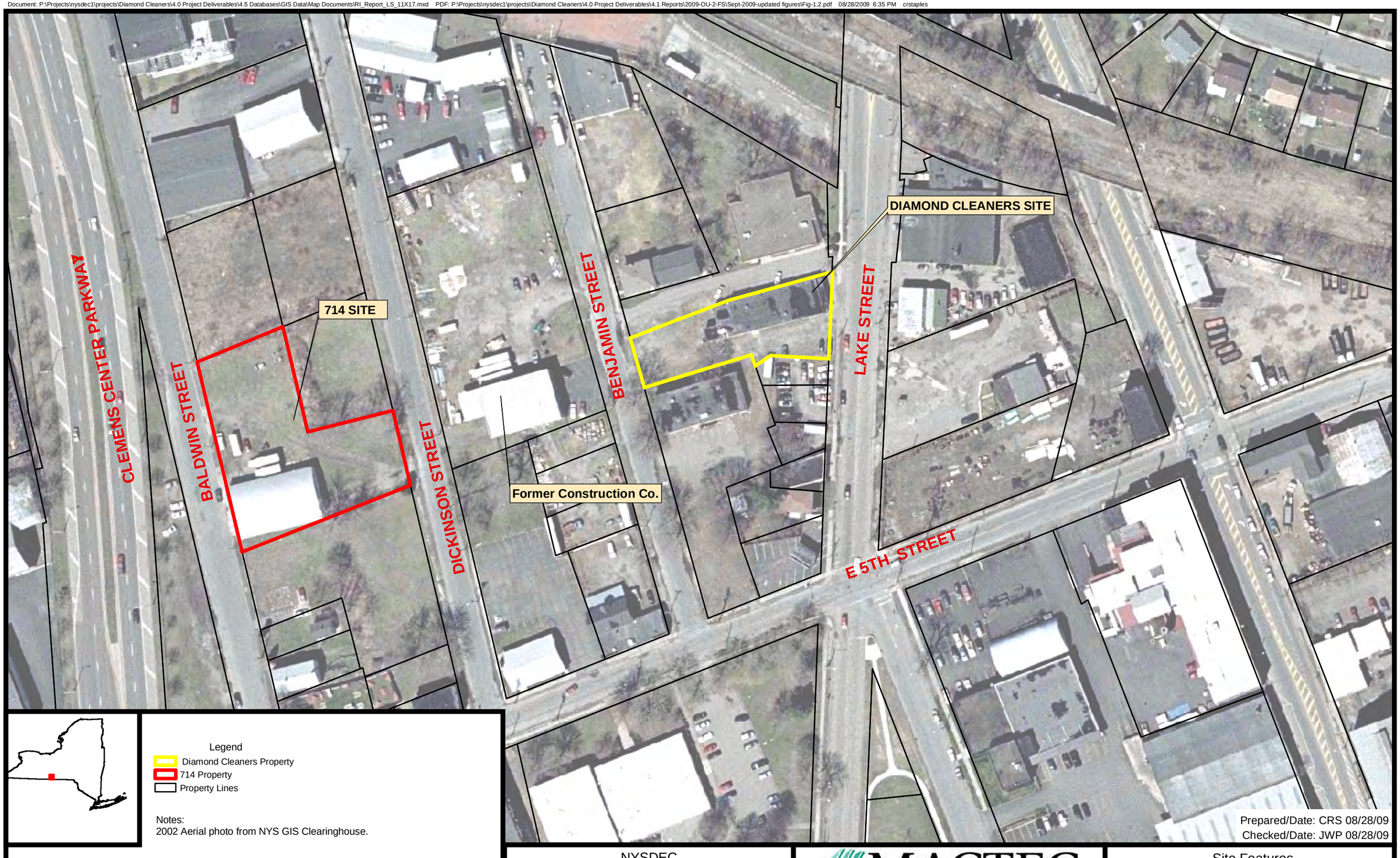
Prepared/Date: DBW 10/17/06
Checked/Date: JMI 10/18/06

NYSDEC
DIAMOND CLEANERS
Elmira, New York

MACTEC

Site Location

Figure 1



Legend
- Diamond Cleaners Property
- 714 Property
- Property Lines

Notes:
2002 Aerial photo from NYS GIS Clearinghouse.

N
0 50 100 Feet

Prepared/Date: CRS 08/28/09
Checked/Date: JWP 08/28/09

NYSDEC
OU-2 RI/FS REPORT DIAMOND CLEANERS
Elmira, New York

MACTEC

Site Features

Project 3612-06-2070 Figure 2

GW-19 843.02
GW-13 842.77
MW-7 843.68
MW-1 843.61
MW-6 844.05
MW-2 843.46
GW-2 844.01
Diamond Cleaners Site
MW-5 843.76
GW-10 843.59
MW-8 843.81
GW-13 844.09
MW-4 843.64
MW-3 843.60
GW-14 844.24
MW-10 842.90
MW-8 842.84
MW-3 843.00
MW-9 842.84
MW-4 842.85
MW-7 842.86
714 Baldwin Site
MW-2 843.11
MW-5 842.72
MW-1R 842.73
MW-6 842.67
MW-9 842.80
MW-1 842.81
MW-11 842.24
GW-4 842.27
GW-15 842.75
Dickinson Street
Benjamin Street
Lake Street
Baldwin St
Clemens Center Parkway
E. 5th Street
844.0
843.5
843.0
842.5
842.0

Legend
- Micro Well
- Monitoring Well
- Interpreted Groundwater Countours (8/2008)
- 714 Site
- Diamond Cleaners Site

N
0 75 150 Feet

2002 Aerial photograph from NYS GIS Clearinghouse.
Wells surveyed by Joseph Lu Engineers.
Groundwater measurements collected by MACTEC on 8/11/2008.
Elevations in Feet above mean see level, NAVD 1983.

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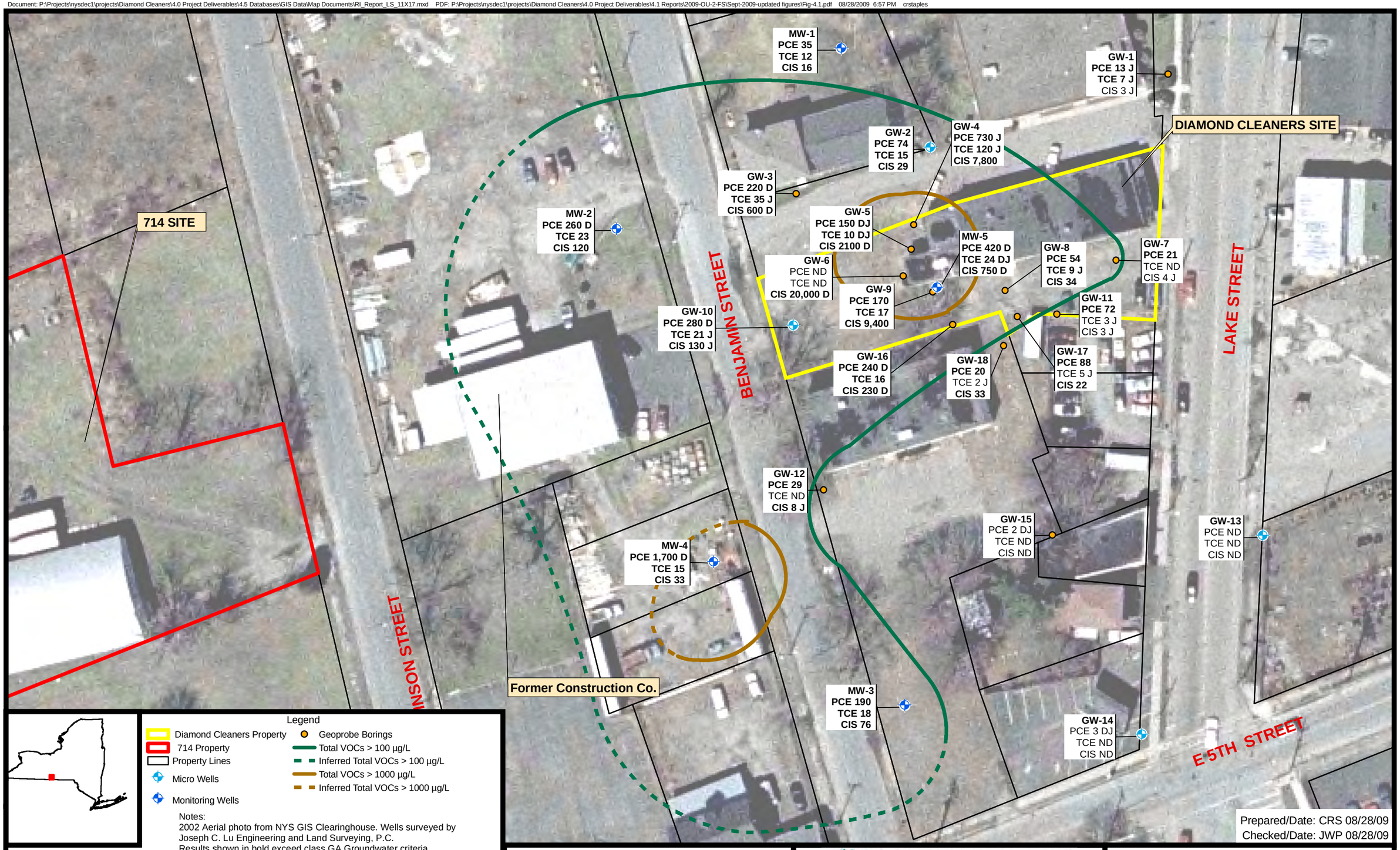
Elmira, New York

MACTEC

Interpreted Groundwater Contours
August 2008
Figure 3

Prepared/Date: BJS 05/12/09
Checked/Date: CRS 05/12/09



Legend

- Diamond Cleaners Property
- 714 Property
- Property Lines
- Micro Wells
- Monitoring Wells
- Geoprobe Borings
- Total VOCs > 100 µg/L
- Inferred Total VOCs > 100 µg/L
- Total VOCs > 1000 µg/L
- Inferred Total VOCs > 1000 µg/L

Notes:
2002 Aerial photo from NYS GIS Clearinghouse. Wells surveyed by Joseph C. Lu Engineering and Land Surveying, P.C.
Results shown in bold exceed class GA Groundwater criteria.
(results in µg/L; ND = Not Detected)
CIS= Cis-1,2-Dichloroethene PCE= Tetrachloroethene TCE= Trichloroethene
Samples collected by MACTEC in June and November - 2005.
Only results for PCE, TCE and CIS are shown.

N
0 25 50 Feet

Prepared/Date: CRS 08/28/09
Checked/Date: JWP 08/28/09

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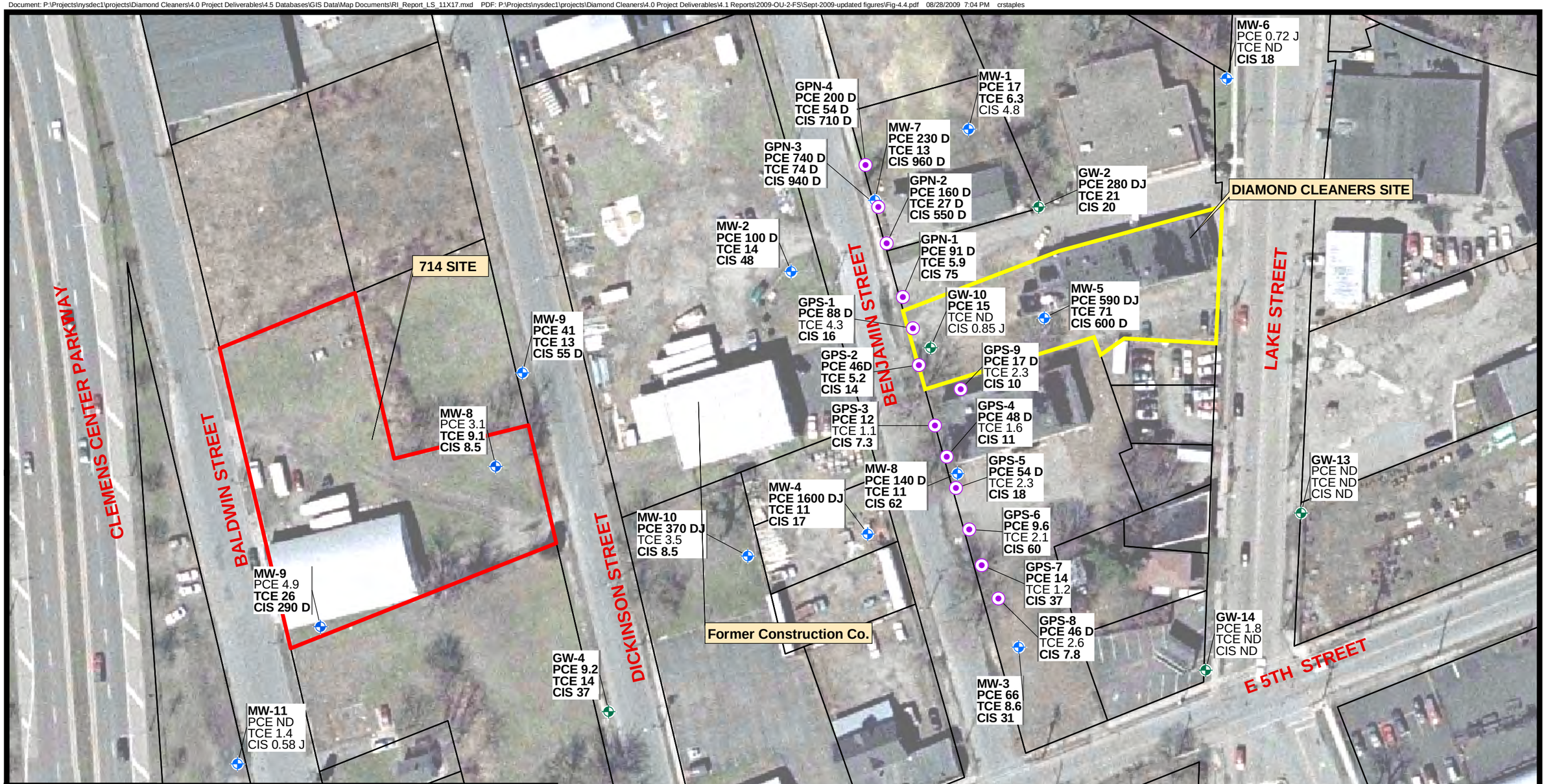
PCE, TCE, and Cis-1,2-DCE Detections in Groundwater - June and November 2005
Figure 4

Document: P:\Projects\nysdec1\projects\Diamond Cleaners\4.0 Project Deliverables\4.5 Databases\GIS Data\Map Documents\RI_Report_LS_11X17.mxd PDF: P:\Projects\nysdec1\projects\Diamond Cleaners\4.0 Project Deliverables\4.1 Reports\2009-OU-2-FS\Sept-2009-updated figures\Fig-4.4.pdf 08/28/2009 7:04 PM crstaples



Legend

- Direct Push Points
- Micro Wells
- Monitoring Wells
- Diamond Cleaners Property
- 714 Property
- Property Lines

Notes:
2002 Aerial photo from NYS GIS Clearinghouse.
Wells surveyed by Joseph C. Lu Engineering and Land Surveying, P.C.
Results shown in bold exceed class GA Groundwater criteria.
(Results in µg/L; ND = Not Detected)
CIS = Cis-1,2-Dichloroethene; PCE = Tetrachloroethene; TCE = Trichloroethene
Only results for PCE, TCE and CIS are shown.
Groundwater exceedances for PCE, TCE, CIS-1,2-DCE are in bold.
Samples collected by MACTEC in July (direct push) and August (wells) 2008.

N

0 35 70 Feet

Prepared/Date: CRS 08/28/09
Checked/Date: JWP 08/28/09

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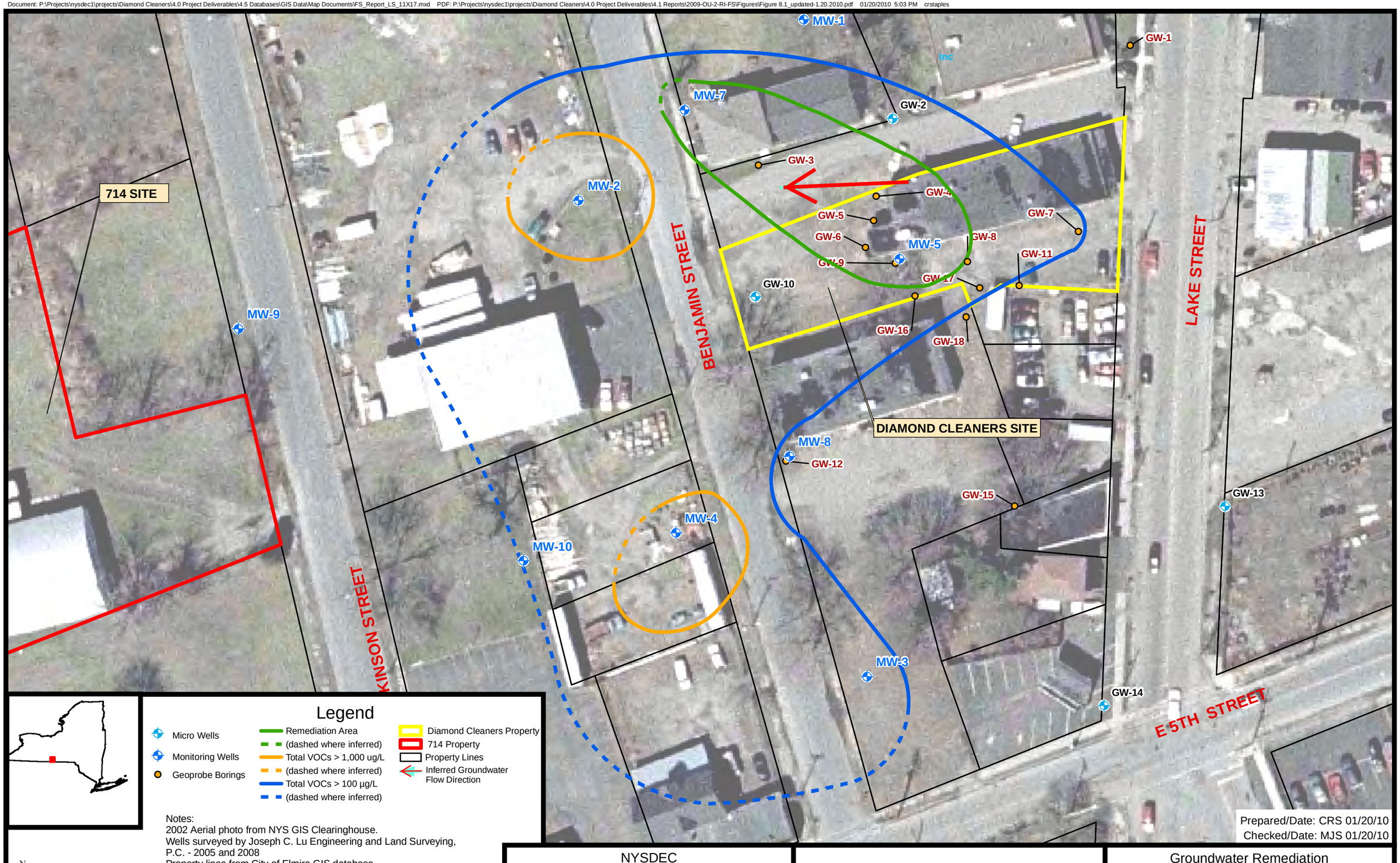
Elmira, New York

MACTEC

PCE, TCE, and Cis-1,2-DCE Detections in Groundwater - July and August 2008
Figure 5

Document: P:\Projects\nysdec1\projects\Diamond Cleaners\4.0 Project Deliverables\4.5 Databases\GIS Data\Map Documents\FS_Report_LS_11X17.mxd PDF: P:\Projects\nysdec1\projects\Diamond Cleaners\4.0 Project Deliverables\4.1 Reports\2009-OU-2-RI-FS\Figures\Figure 8.1_updated-1.20.2010.pdf 01/20/2010 5:03 PM crstaples



Legend

- Micro Wells
- Monitoring Wells
- Geoprobe Borings
- Remediation Area
- (dashed where inferred)
- Total VOCs > 1,000 ug/L
- (dashed where inferred)
- Total VOCs > 100 µg/L
- (dashed where inferred)
- Diamond Cleaners Property
- 714 Property
- Property Lines
- Inferred Groundwater Flow Direction

Notes:
2002 Aerial photo from NYS GIS Clearinghouse.
Wells surveyed by Joseph C. Lu Engineering and Land Surveying, P.C. - 2005 and 2008
Property lines from City of Elmira GIS database.
Direct Push Points are Approximate

N
0 25 50 Feet

Prepared/Date: CRS 01/20/10
Checked/Date: MJS 01/20/10

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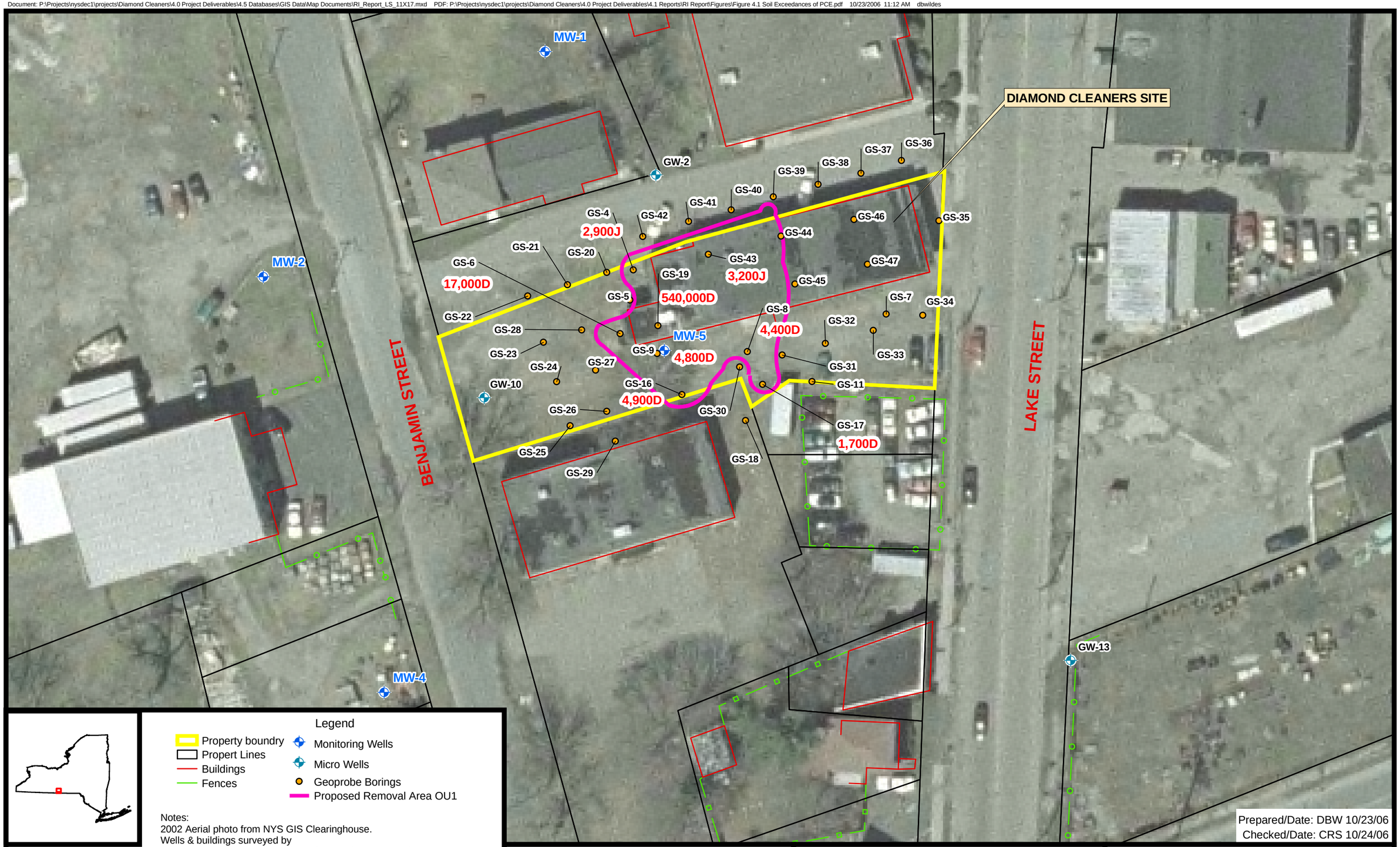
Elmira, New York

Groundwater Remediation Area

Figure 6

Document: P:\Projects\nysdec1\projects\Diamond Cleaners\4.0 Project Deliverables\4.5 Databases\GIS Data\Map Documents\RI_Report_LS_11X17.mxd PDF: P:\Projects\nysdec1\projects\Diamond Cleaners\4.0 Project Deliverables\4.1 Reports\RI Report\Figures\Figure 4.1 Soil Exceedances of PCE.pdf 10/23/2006 11:12 AM dbwildes



Legend

- Property boundry
- Propert Lines
- Buildings
- Fences
- Monitoring Wells
- Micro Wells
- Geoprobe Borings
- Proposed Removal Area OU1

Notes:
2002 Aerial photo from NYS GIS Clearinghouse.
Wells & buildings surveyed by
Joseph C. Lu Engineering and Land Surveying, P.C. - July 2005
Results shown in bold exceed soil cleanup objectives.
All results shown in µg/Kg. (Only PCE Shown)
Soil samples collected by Mactec in June, October and December - 2005.

N
0 20 40 Feet

Prepared/Date: DBW 10/23/06
Checked/Date: CRS 10/24/06

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Proposed Removal Area - OU1

Project 3612-05-2028 Figure 7