PROPOSED REMEDIAL ACTION PLAN

Bianchi/Weiss Greenhouses
State Superfund Project
East Patchogue, Suffolk County
Site No. 152209
October 2011

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

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 above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of 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 the site-related reports and documents in the document repository identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repository:

Patchogue-Medford Library
54-60 East Main Street
Patchogue, NY 11772
Phone: 631-654-4700

A public comment period has been set from:

11/1/2011 to 12/1/2011

A public meeting is scheduled for the following date:

11/14/2011 at 7:00 PM

Public meeting location:

South Country Library, 22 Station Road, Bellport, NY

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through 12/1/2011 to:

Brian Jankauskas
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
bfjankau@gw.dec.state.ny.us

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 the proposed remedy identified herein. 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.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Bianchi/Weiss Greenhouses site is located at 25 Orchard Road in East Patchogue,

Suffolk County. The site is approximately 300 feet north of the intersection of Orchard Road and South Country Road in a suburban area.

Site Features: The site is flat and undeveloped. The main features on the site are the fence that is located along the perimeter of the site and portions of building foundations that were not removed during demolition activities. Woods are located in the northern portion of the site.

Current Zoning/Use(s): The site covers approximately 14 acres and is presently zoned for residential use. Residential properties border each side of the site.

Historic Use(s): The property was used as a nursery for commercial growing purposes from 1929 to 2005. Site operations were initially performed by the Bianchi family and Bianchi Orchards until 1992 when the property was purchased by several members of the Weiss family and Kirk Weiss Greenhouses. The current owner demolished the buildings on the site as part of the redevelopment of the property.

During the site demolition, concerned neighbors contacted local officials about potential health concerns. In March 2005, the current owner conducted initial soil sampling activities at the site and in April 2006, the Suffolk County Department of Health Services (SCDHS) collected groundwater samples in the vicinity of the site. In December 2006, the site was included on the Registry of Inactive Hazardous Waste Disposal Sites. Remedial investigation and feasibility study activities have been performed under the State Superfund Program.

Site Geology and Hydrogeology: Site geology consists primarily of fine to coarse sand with some silt and gravel. Groundwater ranges from 1 to 13 feet below ground surface and flows to the south-southwest.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to residential use (which allows for restricted-residential use, commercial use and industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

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

The PRPs for the site, documented to date, include:

Henron Development Corporation

Bianchi Family and Bianchi Orchards

Weiss Family and Kirk Weiss Greenhouses

The potential responsible parties (PRPs) for the site declined to implement a remedial program 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 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to 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.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has

developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Information

The analytical data collected on this site includes data for:

- groundwater
- surface water
- drinking water
- soil
- sediment

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

chlordane lead

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: 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 issuance of the Record of Decision.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

Secure the Site and Limit Migration of Site Contamination

Interim Remedial Measures (IRMs) were conducted at the site to limit off-site exposures and impacts to the environment. The IRM activities consisted of:
- Inspection and upgrades to fencing along perimeter of the site to prevent access to the site.
- Inspection and upgrades to silt fencing placed along the perimeter of the site.
- Placement of mulch on the site to limit surface runoff of soils and dust migration.
- Removal of stockpiles that consisted of contaminated soils and debris.
- Removal of contaminated soil from impacted dry wells.

6.3: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

Since the site is fenced and covered by mulch, asphalt, concrete or vegetation, people will not come into contact with site-related soil contamination unless they dig below the surface. Access to contaminated soils off-site is unrestricted, however contact with contaminated soil is unlikely unless people dig below the grass surface. For areas above the shallow groundwater plume, people may come into contact with contaminated groundwater if the groundwater infiltrates into their basements or if they encounter temporary ponds created by either the upwelling of groundwater or from surface discharge of sump water. People served by a public water supply are not drinking the contaminated groundwater because the supply is not affected by this contamination. Homes southwest of the site that are serviced by a private water well have been tested and while site-related contamination has been detected, the levels are below drinking water standards.

6.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU 01.

Nature and Extent of Contamination: Based upon investigation conducted to date, the primary contaminants of concern include total chlordane, alpha-chlordane, gamma-chlordane, and lead.

Soil: Chlordane was primarily detected in the soils within the former greenhouse footprints and within the wooded area on the northern part of the site. Alpha and gamma chlordane were detected up to 31 and 26 parts per million (ppm), respectively, in the on-site surface soils. Alpha- and gamma-chlordane were also detected up to 3.3 and 1.3 ppm, respectively, in off-site surface soils. These concentrations are above the unrestricted soil cleanup objective of 0.094 ppm for alpha-chlordane and residential soil cleanup objectives of 0.91 ppm and 0.54 ppm for alpha-chlordane and gamma-chlordane, respectively. Soil contamination extends to the groundwater table on-site. Lead was detected on-site in the surface soils up to 2,350 ppm and up to 5 ppm in subsurface soils. Surface soil concentrations exceeded the unrestricted and residential soil cleanup objectives of 63 ppm and 400 ppm, respectively. Lead was detected off-site up to 397 ppm.

Groundwater: Chlordane was detected within the shallow groundwater on-site and extends 2,900 feet downgradient of the site at a depth of 80 feet below ground surface. Concentrations of

chlordane were detected up to 12.1 parts per billion (ppb) on-site and up to 25.1 ppb in off-site locations; these levels are above the groundwater standard of 0.05 ppb and drinking water standard of 2 ppb. Lead was not detected in monitoring wells above groundwater standards.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected, the 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. The remedy must also attain the remedial action objectives identified for the site, which are presented in Exhibit B. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit C. Cost information is presented in the form of present worth, which 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. A summary of the Remedial Alternatives Costs is included as Exhibit D.

The basis for the Department's proposed remedy is set forth at Exhibit E.

The estimated present worth cost to implement the remedy is $7,890,000. The cost to construct the remedy is estimated to be $7,200,000 and the estimated average annual cost is $55,600.

The elements of the proposed remedy are as follows:

Based on the results of the investigations at the site, the IRMs that have been performed, and the evaluation presented here, the Department is proposing Excavation and Off-site Disposal to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps and Groundwater Monitoring. This remedy also includes the implementation of Institutional and Engineering Controls (ICs/ECs). The Department believes that this remedy is protective of human health and the environment and satisfies the remediation objectives described in Exhibit B.

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:
- Conserving and efficiently managing resources and materials;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and

- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. On-site soils which exceed the residential Soil Cleanup Objectives (SCOs) for alpha-chlordane gamma-chlordane and lead and off-site soils which exceed the unrestricted use SCOs for alpha-chlordane and gamma-chlordane will be excavated to a depth to achieve the SCO. Excavated soil will be transported off-site for disposal at an approved facility. Approximately 46,000 tons of soil will be removed. Clean fill that complies with 6 NYCRR Part 375-6.7(d) will then be brought in to replace the excavated soil and establish the designed grades.

3. Properties with potable wells located within or near the chlordane groundwater plume and impacted by chlordane that exceeds 1 ppb will be offered connection to public water.

4. Occupied residential and commercial structures located within the shallow portion of the chlordane contaminated groundwater will be evaluated and where appropriate, property owners will be offered the option of having foundation cracks sealed and filters placed on the sump pump discharges to remove chlordane to acceptable discharge levels.

5. The irrigation wells located on-site will be abandon.

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

- 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);
- Allows the use and development of the controlled property for residential, restricted residential, commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- Prohibits the installation of basement beneath on-site structures;
- Prohibits raising live stock or producing animal products for human consumption; and
- Requires compliance with the Department approved Site Management Plan.

7. A Site Management Plan is required, which includes the following:

an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

Engineering Controls: The sump pumps and filters discussed in Paragraph 3 above.

This plan includes, but may not be limited to:

- Descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification; and
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

- Monitoring of groundwater to assess the performance and effectiveness of the remedy;
- Monitoring of potable and private wells; and
- A schedule of monitoring and frequency of submittals to the Department.

An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- Compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- Maintaining site access controls and Department notification; and
- Providing the Department access to the site and O&M records.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1.2, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into pesticides, inorganics (metals), and semi-volatile organic compounds (SVOCs). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 6.1.1 are also presented.

Soil

Surface and subsurface soil samples were collected at the site during the RI. Surface soil samples were collected from a depth of 0-2 inches to assess direct human exposure. Subsurface soil samples were collected from a depth of 1 – 8 feet below ground surface to assess soil contamination impacts to groundwater. The on-site results indicate that soil exceeds Soil Cleanup Objectives (SCOs) for pesticides, metals and SVOCs for unrestricted and/or residential use SCO. The off-site results indicate that soil exceeds the unrestricted SCOs for pesticides and metals and residential SCGs for pesticides. Table 1 presents a summary of the analytical data for on-site soil and Table 2 presents a summary of the analytical data for off-site soil.

Table 1 - On-site Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCO[b] (ppm)	Frequency Exceeding Unrestricted SCO	Residential Use SCO[c] (ppm)	Frequency Exceeding Restricted SCO
Pesticides					
4,4-DDE	ND - 1	0.0033	30/47	1.8	0/47
4,4-DDT	ND – 0.85	0.0033	23/47	1.7	0/47
alpha-chlordane	ND - 31	0.094	80/279	0.91	41/279
gamma-chlordane	ND - 26	0.54	46/279	0.54	46/279
alpha-chlordane[e]	ND – 16.8	0.094	13/47	0.91	10/47
alpha-chlordane[f]	ND - >0.6	0.094	419/778	0.91	214/778
Metals					
arsenic	ND – 24.4	13	1/47	16	1/47
lead	2.08 – 2,350	63	21/47	400	7/47
mercury	ND – 0.343	0.18	4/45	0.81	0/45
zinc	7.38 - 422	109	16/47	2,200	0/47

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCO[b] (ppm)	Frequency Exceeding Unrestricted SCO	Residential Use SCO[c] (ppm)	Frequency Exceeding Restricted SCO
Semi-Volatile Organics					
benzo(a)anthracene	ND – 6.7	1	3/38	1	3/38
benzo(a)pyrene	ND - 7	1	3/38	1	3/38
benzo(b)fluoranthene	ND - 11	1	4/38	1	4/38
benzo(k)fluoranthene	ND – 4.1	0.8	2/38	1	1/38
chrysene	ND – 9.2	1	3/38	1	3/38
dibenz(a,h)anthracene	ND - 1	0.33	1/38	0.33	1/38
indeno(1,2,3-cd)pyrene	ND – 4.8	0.5	4/38	0.5	4/38

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCO: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCO: Part 375-6.8(b), Commissioner Policy 51, Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Residential Use, unless otherwise noted.
d – ND: not detected.
e – The alpha chlordane concentrations presented are based on laboratory total chlordane concentrations that were adjusted by applying a site percentage for alpha-chlordane (20 percent of total chlordane).
f – The alpha chlordane concentrations presented are based on field test total chlordane concentrations that were adjusted by applying a site percentage for alpha-chlordane (20 percent of total chlordane).

Table 2 - Off-site Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCO[b] (ppm)	Frequency Exceeding Unrestricted SCO	Residential Use SCO[c] (ppm)	Frequency Exceeding Restricted SCO
Pesticides					
dieldrin	ND – 0.29	0.005	6/19	0.039	3/19
4,4-DDE	ND – 1.7	0.0033	16/19	1.8	0/19
4,4-DDD	ND – 0.063	0.0033	3/19	2.6	0/19
4,4-DDT	ND – 3.2	0.0033	15/19	1.7	1/19
alpha-chlordane	ND – 3.3	0.094	8/19	0.91	2/19
gamma-chlordane	ND – 1.3	0.54	1/19	0.54	1/19
heptachlor epoxide	ND – 1.1	0.077	4/19	0.077	4/19
Metals					
lead	25 – 397	63	6/13	400	0/13
zinc	29.1 - 228	109	5/13	2,200	0/13

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

b - SCO: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCO: Part 375-6.8(b), Commissioner Policy 51, Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Residential Use, unless otherwise noted.
d – ND: not detected.

The primary site related soil contaminants are pesticides, identified as alpha-chlordane and gamma-chlordane, which were located within the wooded area and the greenhouse footprints. Concentrations of alpha-chlordane and gamma-chlordane were significantly above SCOs within the surface soils and decreased with depth. In general the chlordane contamination extended to 6 feet below ground surface. Typically the alpha-chlordane contamination was greater than the gamma-chlordane contamination. An extensive surface soil and subsurface soil sampling program was conducted, which consisted of 345 laboratory analyses and 778 field analyses, to determine the extent of alpha-chlordane above unrestricted SCG and residential use SCG as illustrated on Figures 2 and 3, respectively. Site related chlordane contamination was detected above SCOs within surface soils at an adjacent property to the south and were slightly above unrestricted use SCOs at 8 inches below ground surface.

Lead was detected above unrestricted SCGs, but is not considered a primary contaminant as lead was mostly located within the extent of chlordane contamination with the highest detections located within the greenhouse footprint (see Figure 4). Lead likely originated from paint applied to the buildings that were demolished. The remaining pesticides, metals and SVOCs identified in Tables 1 and 2 are not site specific contaminants of concern. 4,4-DDT was a common insecticide used to control mosquitoes and breaks down to 4,4-DDE and 4,4-DDD and the highest concentrations of these contaminants were detected off-site. Dieldrin and heptachlor epoxide were insecticides that were not detected on-site. The remaining metals detected above unrestricted SCGs, are not primary contaminants as they were sporadically detected and/or not significantly above the SCGs. The detections of SVOCs are attributable to the paved areas located near the sampling locations.

Based on the findings of the Remedial Investigation, the presence of pesticides and lead have resulted in the contamination of soil. Lead contamination is primarily located within the extents of the alpha-chlordane and gamma-chlordane contamination above SCOs. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are, alpha-chlordane and gamma-chlordane.

Groundwater

Groundwater samples were collected from overburden monitoring wells. The samples were collected to assess groundwater conditions on and off-site. The results indicate that contamination in shallow groundwater at the site exceeds the SCGs for pesticides. The results indicate that contamination in the groundwater off-site exceeds the SCGs for pesticides and metals. Table 3 presents a summary of the analytical data for groundwater.

A well survey and a well search have been completed to identify potable wells in the vicinity of the site. Four private wells in the vicinity of the site were sampled. Chlordane was not detected above Part 5 of the New York State Sanitary Code (2 ppb). The Suffolk County Department of Health Services (SCDHS) collected water samples from five private wells in the vicinity of the site. SCDHS results have not detected chlordane above 2 ppb.

Table 3 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Pesticides			
chlordane	ND – 25.1	0.05	31/70
dieldrin	ND – 0.015	0.004	4/70
Metals			
chromium	ND – 53.8	50	1/22
iron	ND – 26,800	300	13/22
lead	ND – 146	25	1/22
magnesium	1,530 – 167,000	35,000	6/22
manganese	5.34 -2,800	300	11/22
sodium	3,870 – 1,800,000	20,000	9/22
zinc	13.5 – 2,470	2,000	1/22

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).
c – ND: not detected.

During the remedial investigation severe weather conditions (i.e. periods of heavy rain) occurred and resulted in groundwater upwelling/temporary ponding and infiltrating into basements downgradient of the site. Table 4 presents a summary of additional samples that were collected from the temporary ponding on-site where groundwater daylighted and within basements of adjacent properties where groundwater infiltrated through the foundation. The Part 5 of the New York Sanitary Code value was included in Table 4 for comparison of temporary ponding and basement water results.

Table 4 - Temporary Ponding and Basement Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Pesticides/PCBs			
Chlordane (temporary ponding)	ND – 2.7	2	1/2
Chlordane (basement water)	1.9 – 6.1	2	1/2

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Part 5 of the New York State Sanitary Code (10 NYCRR Part 5)
c – ND: not detected.

The primary groundwater contaminant is chlordane. As noted on Figure 5, the primary groundwater contamination originates from the site and migrates south approximately 2,900 feet. Contamination was detected in the shallow groundwater near the site and in the plume area, to a depth of 80 feet below ground surface near Abets Creek, see Figure 6. The shallow water table is influenced by inclement weather (i.e. heavy rains and snow melt), resulting in

groundwater rising into basements and low-lying lands. Chlordane was detected in water collected from two basements located adjacent to the site, as well as from an on-site temporary pond. During inclement weather chlordane contaminated groundwater may infiltrate additional basements or daylight downgradient of the site. The use of chlordane within residential homes for termite control is well documented and likely to have occurred in this area as the upgradient monitoring well (MW-41) also detected chlordane above SCGs, but below site concentrations. Chlordane was also detected above SCGs within the shallow groundwater near Abets Creek (MW-33S), but this is not believed to be from the site as the hydrogeology in this area has a downward vertical gradient, which would not permit the upward movement of contaminants, and the chlordane concentration at MW-33S is higher than chlordane concentrations found at four monitoring wells (WO-27, WO-28, WO-30, and WO-31) located upgradient of MW-33S, but downgradient of the site. An upward vertical gradient is present further downgradient (MW-39 cluster), which indicates that groundwater discharges to Abets Creek or Patchogue Bay. Dieldrin was detected above SCGs at select locations off-site; however, the origin of the contamination is from another source since dieldrin was not detected on-site. The iron, magnesium, manganese, and sodium are not considered primary contaminants of concern as they are naturally occurring elements and the highest concentrations were located off-site. Chromium, lead, and zinc were detected above SCGs at locations off-site near Abets Creek; therefore, not site related.

Based on the findings of the RI, the presence of elevated concentrations of pesticides in site soils has resulted in the contamination of groundwater. The site contaminant that is considered to be the primary contaminant of concern which will drive the remediation of groundwater to be addressed by the remedy selection process is chlordane.

Surface Water

Surface water samples were collected during the RI from Abets and Moss Creeks. The samples were collected to assess the surface water conditions off-site. No exceedances were noted in surface water as summarized in Table 5.

Table 5 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Pesticides/PCBs			
chlordane	ND	0.00002	0/6

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.
c – ND: not detected.

No site-related surface water contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for surface water at Abets and Moss Creeks.

Sediment

Sediment samples were collected during the RI from Abets and Moss Creeks. The samples were collected to assess the potential for impacts to wetland and river sediment from the site. Table 6 presents a summary of the analytical data for off-site sediment samples.

Table 6 - Sediment

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] Human Health Bioaccumulation (ppb)	Frequency Exceeding SCG	SCG[b] Wildlife Bioaccumulation (ppb)	Frequency Exceeding SCG
Pesticides					
4,4-DDD	ND – 6.8	0.5489	1/5	54.89	0/5
4,4-DDE	ND - 3	0.5489	1/5	54.89	0/5

a - ppb: parts per billion, which is equivalent to micrograms per kilogram, ug/kg, in sediment;
b - SCG: The Department's "Technical Guidance for Screening Contaminated Sediments."
c – ND: not detected.

No site-related sediment contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for sediment.

The 4,4-DDD and 4,4-DDE detected in sediments is not site related and is likely a result of insecticide application as previously discussed. Therefore, 4,4-DDD and 4,4-DDE in sediment is not considered a site specific contaminant of concern.

Exhibit B

SUMMARY OF THE REMEDIATION OBJECTIVES

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial objectives for this site are:

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of contaminated dust.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.

RAOs for Environmental Protection

- Remove the source of groundwater or surface water contamination.
- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.

Exhibit C

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Exhibit B) to address the contaminated media identified at the site as described in Exhibit A:

Alternative 1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRMs described in Section 6.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

Alternative 2: No Further Action with Site Management

The No Further Action with Site Management Alternative recognizes the remediation of the site completed by the IRMs described in Section 6.2 and requires site management, groundwater monitoring, engineering controls (i.e. fencing, mulch cover, hay bales), and institutional controls (i.e. environmental easement restricting land use and groundwater use) to provide minimal protection to public health and the environment.

Present Worth: *$552,000*
Capital Cost: *$25,000*
Annual Costs: *$34,300*

Alternative 3: Excavation and Off-site Disposal to Unrestricted Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Install a Groundwater Extraction and Treatment System

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil cleanup objectives (SCOs) listed in Part 375-6.8 (a). This alternative includes: excavation and off-site disposal of 74,000 tons of chlordane contaminated soil above unrestricted use SCOs from on-site as well as off-site (see Figure 2) to be hauled to a permitted facility, connection of properties with private wells located within or near the chlordane contaminated groundwater to public water would be offered where chlordane levels exceed 1 ppb, upgrading sump pumps in basements would be offered to properties located within the chlordane contaminated shallow groundwater, construction of an on-site groundwater extraction and treatment system to capture contaminated groundwater at extraction wells installed downgradient of the site, and placement of institutional controls (i.e. environmental easement restricting groundwater use) and engineering controls to require continued operation of the systems and compliance with periodic certifications and a Site Management Plan. Excavation of chlordane contaminated soils and source material to achieve unrestricted SCO. Clean fill material would be imported to backfill excavations. This alternative would require 12 months to design, 10 months to implement the remedies, and 15 years to restore groundwater to drinking water standards.

Present Worth: *$13,800,000*
Capital Cost: *$12,100,000*
Annual Costs: *$167,000*

Alternative 4: Excavation and Off-site Disposal to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring

This alternative includes, excavation of approximately 46,000 tons of chlordane contaminated soil to be hauled to a permitted facility, removal of soils above residential use SCOs from on-site, removal of soils above unrestricted use SCOs from off-site (see Figure 7), connection of properties with private wells located within or near the chlordane contaminated groundwater to public water would be offered where chlordane levels exceed 1 ppb, upgrading sump pumps in basements would be offered to properties located within the chlordane contaminated shallow groundwater, placement of institutional controls that restrict use of the site (i.e. environmental easement restricting land use and groundwater use) and engineering controls that maintains the upgraded basement sump pumps and treatment systems, and requires compliance with periodic certifications and a Site Management Plan. Groundwater is expected to improve naturally as the source of groundwater contamination (i.e. chlordane contaminated soils) would be removed to achieve residential SCOs. Clean fill material would be imported to backfill excavations. This alternative would require 12 months to design, 10 months to implement the remedies, and 20 years to restore groundwater to drinking water standards.

Present Worth:.....*$7,890,000*
Capital Cost:.....*$7,200,000*
Annual Costs:.....*$55,600*

Alternative 5: In-situ Bioremediation to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring

This alternative includes, an in-situ bioremediation technology (e.g., Daramend) applied to approximately 45,000 tons of chlordane contaminated soil above residential use SCOs from on-site as well as off-site (see Figure 7), connection of properties with private wells located within or near the groundwater plume to public water would be offered where chlordane levels exceed 1 ppb, upgrading sump pumps in basements would be offered to properties located within the chlordane contaminated shallow groundwater, placement of institutional controls that restrict use of the site (i.e. environmental easement restricting land use and groundwater use) and engineering controls that maintains the upgraded basement sump pumps and treatment systems, and requires compliance with periodic certifications and a Site Management Plan. Daramend is a technology consisting of organic amendments that are mixed with contaminated soil in 2 ft lifts and at a specified moisture content with tilling equipment, which triggers microbiological activity and reduction in contaminant concentrations. Three lifts are required to treat down to 6 feet below ground surface and the number of treatment cycles per lift is based on the soil concentrations. Restore site conditions using treated material. Groundwater is expected to improve naturally as the source of groundwater contamination (i.e. chlordane contaminated soils) would be removed to achieve residential SCOs. This alternative would require 12 months to design, 18 months to implement the remedies, and 20 years to restore groundwater to drinking water standards.

Present Worth:.....*$10,400,000*
Capital Cost:.....*$9,710,000*
Annual Costs:.....*$55,600*

Alternative 6: On-site Incineration to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring

This alternative includes, on-site incineration of approximately 45,000 tons of chlordane contaminated soil above residential use SCOs from on-site as well as off-site (see Figure 7), connection of properties with private wells located within or near the groundwater plume to public water would be offered where chlordane levels exceed 1 ppb, upgrading sump pumps in basements would be offered to properties located within the chlordane contaminated shallow groundwater, placement of institutional controls that restrict use of the site (i.e. environmental easement restricting land use and groundwater use) and engineering controls that maintains the upgraded basement sump pumps and treatment systems, and requires compliance with periodic certifications and a Site Management Plan. Restore site conditions using treated material. Groundwater is expected to improve naturally as the source of groundwater contamination (i.e. chlordane contaminated soils) would be removed to achieve residential SCOs. This alternative would require 12 months to design, 17 months to implement the remedies, and 20 years to restore groundwater to drinking water standards.

Present Worth:.....*$10,800,000*
Capital Cost:.....*$10,100,000*
Annual Costs:.....*$55,600*

Exhibit D

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. No Action	0	0	0
2. No Further Action with Site Management	25,000	34,300	552,000
3. Excavation and Off-site Disposal to Unrestricted Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Install a Groundwater Extraction and Treatment System	12,100,000	167,000	13,800,000
4. Excavation and Off-site Disposal to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring	7,200,000	55,600	7,890,000
5. In-situ Bioremediation to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring	9,710,000	55,600	10,400,000
6. On-site Incineration to Residential Soil Cleanup Objectives, Connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring	10,100,000	55,600	10,800,000

Exhibit E

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4, Excavation and Off-site Disposal to Residential Soil Cleanup Objectives, Off-site connection to Public Water, Upgrade Basement Sumps, and Groundwater Monitoring as the remedy for this site. The elements of this remedy are described in Section 7.2.

Basis for Selection

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

Alternative 4 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the balancing criterion described in Exhibit C. Alternative 4 achieves the remediation goals for the site by removing chlordane and lead contaminated soils above anticipated land use soil cleanup objectives (residential) from on-site and off-site locations, which is the most significant threat to public health and the environment. This alternative removes the source of groundwater contamination (i.e. chlordane contaminated soils on-site) and creates the conditions necessary to restore groundwater quality to the extent practicable. This alternative protects public health from contaminated groundwater off-site by monitoring of potable wells/connection to public water when necessary and upgrades to sump pumps/foundations to prevent chlordane contaminated groundwater intrusion near the site until groundwater conditions improve. This alternative is as effective as restoration to pre-disposal conditions, yet will be implemented at a considerably lower cost.

Protection of Human Health and the Environment

Alternative 1 does not provide any protection to public health and the environment and will not be evaluated further. Alternative 2 provides minimum protection to public health and the environment. Alternatives 3, 4, 5, 6 obtain the remedial action objectives presented in Exhibit B and are all protective of public health and the environment.

Alternatives 3, 4, 5, and 6 eliminates contact with contaminated soils above residential SCOs, prevents ingestion and contact with site impacted groundwater by connecting properties with contaminated potable wells to public water and upgrading foundations and sump pumps for buildings located within the shallow portion of the chlordane plume where groundwater infiltrates into the basements. Alternatives 3 and 4 further protect public health by removing off-site soils contaminated with chlordane above unrestricted use. Monitoring groundwater trends will be performed to evaluate the effectiveness of the remedial action and to determine if future actions are warranted to protect public health and the environment.

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

Alternative 2 does not attain the SCGs for alpha-chlordane in soil and will not be evaluated further. Alternative 3 meets the threshold criteria as this alternative includes removal of site related contamination (alpha-chlordane and gamma-chlordane) above the unrestricted SCOs and actively removes chlordane from groundwater. Alternatives 4, 5 and 6 also comply with this criteria but to a lesser degree or with lower certainty as these alternatives include removal of site contamination above the residential SCOs and rely on source removal to permit groundwater to naturally attenuate. Because Alternatives 4, 5, and 6 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

Alternatives 3 and 4 would remove elevated lead contamination within the surface soils on-site. The on-site treatment techniques applied for Alternatives 5 and 6 are unable to remove lead from the soil.

Short-term Effectiveness

Alternatives 3 through 6 have short-term impacts to the community and the workers, which need to be considered during the design of the remedy. These risks include the generation of dust when the contaminated soil is excavated. Workers may be protected by careful planning and personal protective equipment. Engineering controls would be needed to protect the community. The engineering controls could include maintaining the fencing, air monitoring, and water trucks equipped with sprayers to limit generation of dust. Alternative 5 is the most likely to cause dust as multiple applications using a cultivator are required for each lift to reduce chlordane concentrations.

Alternatives 3 through 6 require access to private land as each alternative includes connection of potable wells to public water and basement and sump pump upgrades. Alternative 3 has significant impact to the residences located south of the site as construction of the groundwater extraction system requires installation of extraction wells along Roosevelt Boulevard and Summit Street. Alternatives 3 and 4 involve hauling material in trucks along Orchard Road and South Country Road. Trucks hauling materials will be covered. Minimal construction activities will be performed at night and on weekends. Alternatives 5 and 6 would have the least impact due to trucking as limited truck traffic would be required.

The time needed to conduct the initial remediation activities is the shortest for Alternatives 4 and 6. Alternatives 3 and 5 would take the longest to achieve the remediation goals. Alternative 3 requires additional soils be removed and installation of a groundwater extraction system. Alternative 5 requires multiple applications and time for each lift of treatment. Each alternative requires access to private properties to switch from potable wells to public water when necessary and upgrade basement sumps near the site where contaminated groundwater intrusion occurs.

Long-term Effectiveness and Permanence

Alternatives 3 through 6 present permanent remedies that address significant threats to public health and the environment by removing contaminated soil and preventing contact with contaminated groundwater. Long-term effectiveness is best accomplished by Alternative 3, which removes additional contaminated soils to achieve unrestricted use and actively removes contaminated groundwater. Alternatives 4 through 6 have similar effectiveness as Alternative 3, but do not incorporate an active groundwater remedy to reduce groundwater contamination. Groundwater conditions will improve for Alternatives 4 through 6 as the source of groundwater contamination (contaminated soils) will be removed, which will permit groundwater conditions to improve naturally. Post treatment testing is required for Alternatives 5 and 6 to verify success of the treatment systems. Each alternative requires an environmental easement and long-term groundwater monitoring to assess long term success of the remedial action.

Reduction of Toxicity, Mobility or Volume

Alternatives 5 and 6 reduce the toxicity, mobility and volume of soil contamination by on-site incineration or biological degradation, respectively. Alternatives 3 and 4 reduce the toxicity and mobility of soil contaminants by transferring the material to an approved off-site location, but the volume of material would not be reduced unless the disposal facility had an active treatment system capable of reducing chlordane. Only Alternative 3 actively reduces the toxicity, mobility and volume of groundwater contamination, whereas Alternatives 4 through 6 depend on contaminated soil removal and natural attenuation to reduce groundwater concentrations.

Implementability

Alternative 4 is readily implementable. Although Alternative 3 is implementable a pilot study is necessary for the design of the treatment system, permits are necessary for work conducted in the roadways and operation of the groundwater treatment system. Alternatives 5 and 6 require pilot studies prior to implementation to confirm that the alternative is capable of obtaining the remediation goals and Alternative 6 requires an air permit.

Cost-Effectiveness

Alternative 3 has the highest present work cost, but removes the most chlordane contamination from the environment. Alternative 4 has the lowest present work cost, and is capable of meeting the remediation goals. Alternatives 5 and 6 are more expensive than Alternative 4.

Land Use

Alternatives 3 through 6 meet the current residential zoning designation for the site.

Community Acceptance

To be determined based on the public meeting and public comments on the Proposed Remedial Action Plan.

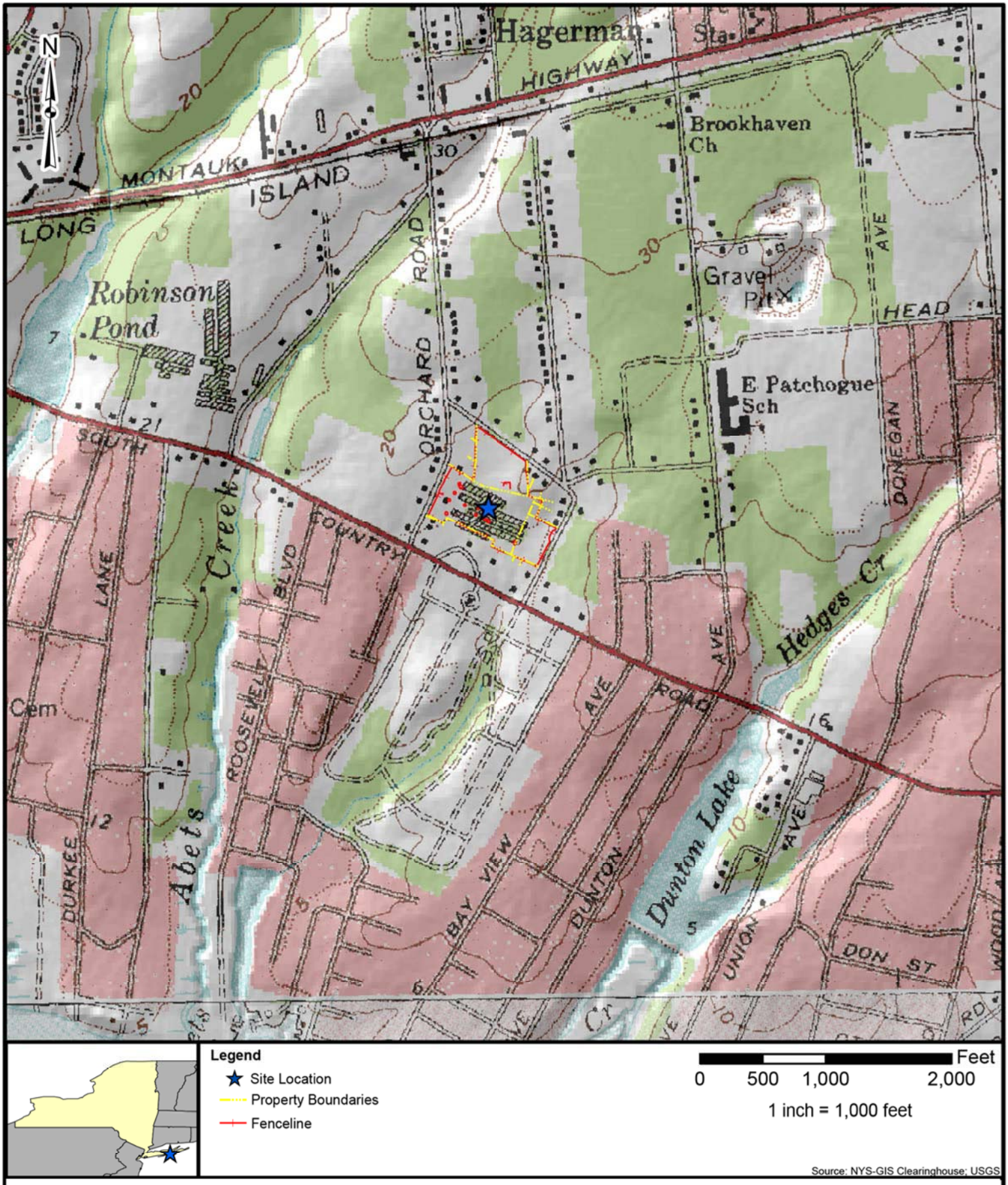


FIGURE 1
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
SITE LOCATION MAP

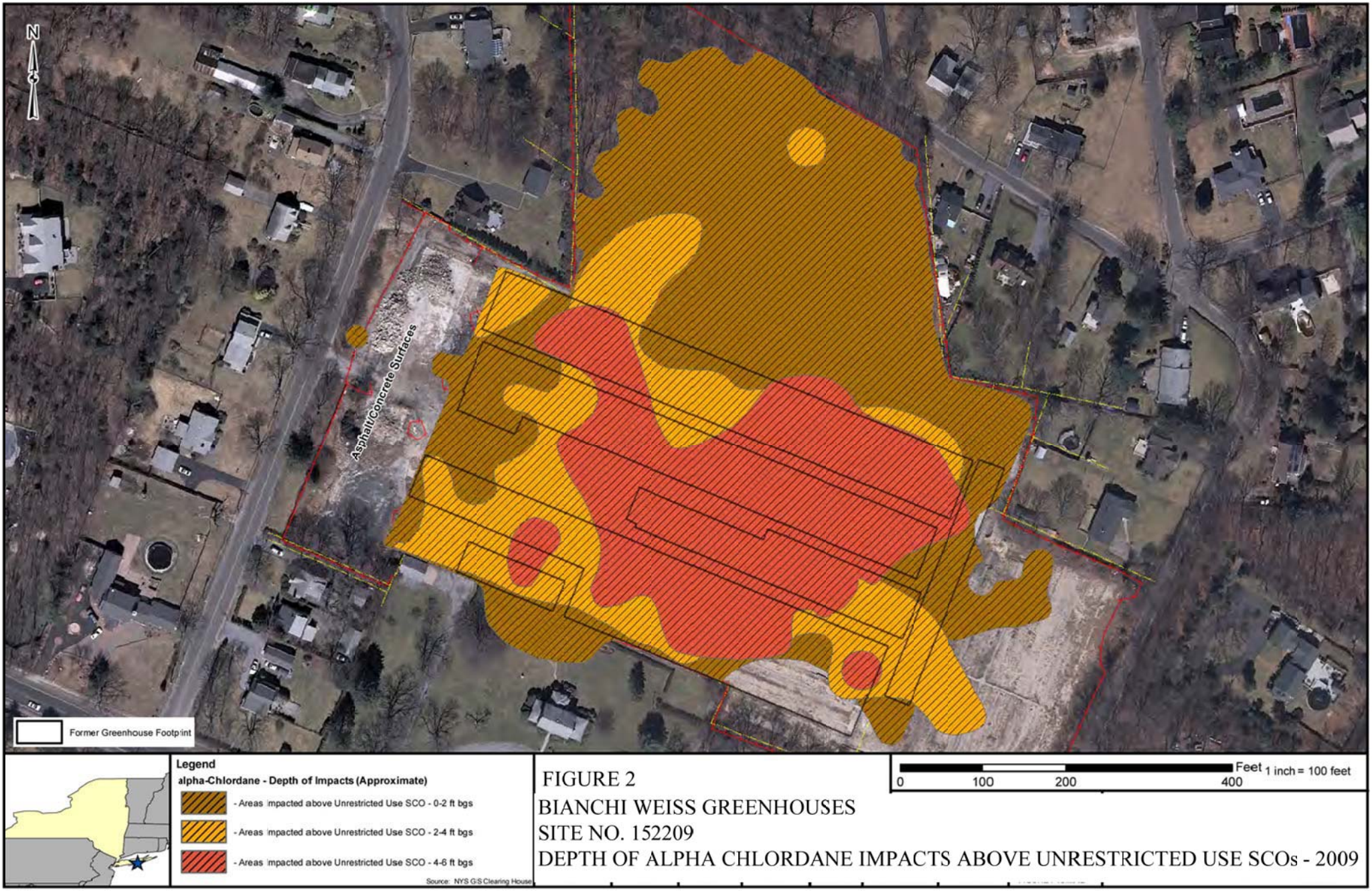


FIGURE 2
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
DEPTH OF ALPHA CHLORDANE IMPACTS ABOVE UNRESTRICTED USE SCOs - 2009

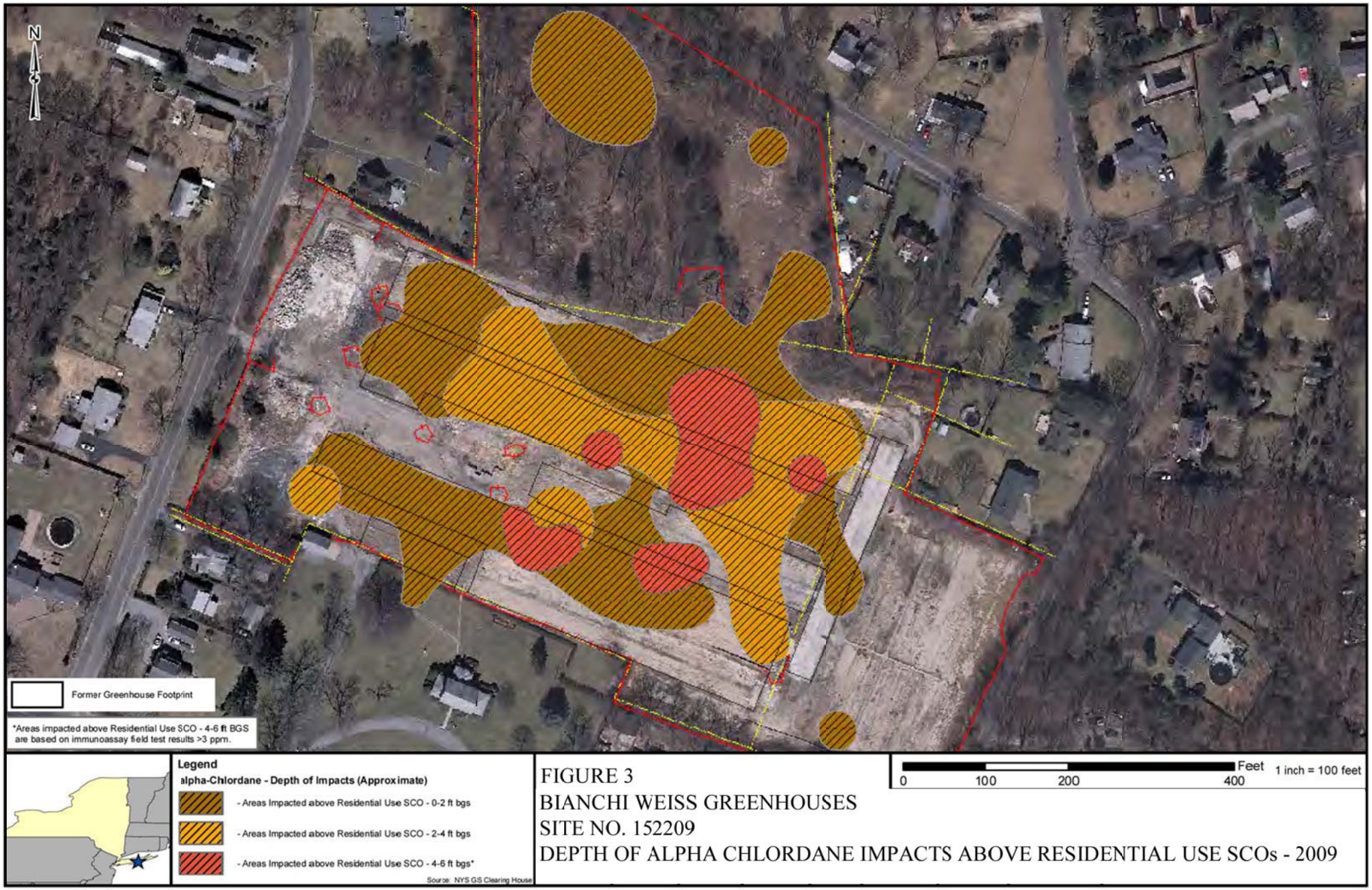


FIGURE 3
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
DEPTH OF ALPHA CHLORDANE IMPACTS ABOVE RESIDENTIAL USE SCOs - 2009

Sample ID	Lead	Mercury	Zinc
	(mg/kg)		
SS-01	25.9	0.06 J	53.6
SS-02	**868**	0.096 J	**422 J**
SS-03	**123**	0.015 J	62.2 J
SS-04	**192**	0.062 J	**162 J**
SS-05	**398**	0.043 J	**157 J**
SS-06	**184**	0.033 J	88.2 J
SS-07	21.4	0.071 J	30.3
SS-08	20	0.086 J	10.4
SS-09	**891**	**0.302 J**	**227 J**
SS-10	**2,350**	0.082 J	**245 J**
SS-11	**1,930**	**0.328 J**	**410 J**
SS-12	**161**	0.095 J	**271 J**
SS-13	**191**	0.13 J	**276 J**
SS-14	**669**	**0.343 J**	**232 J**
SS-15	**584**	0.043 J	**133 J**
SS-16	**160**	0.024 J	75.7 J
SS-17	30.7	0.082 J	20.6
SS-18	17.8	0.072 J	17.3
SS-19	**146**	0.011 J	109 J
SS-20	**134**	0.011 J	**118 J**
SS-21	**162**	0.112	**178**
SS-22	8.09	(<0.013)	14.2
SS-23	**247**	0.03	**135**
SS-24	61.7	0.047	72.1
SS-25	**102**	0.05	**314**
SS-26	4.5	(<0.004)	8.77
SS-27	2.08	(<0.002)	7.38
SS-28	17.7	0.076	28.2
SS-29	22.9	0.066	17.1
SS-30	25.7	0.039	61.2
SS-31	**89.7**	0.052	59.3
SS-32	48	0.073	92.1
SS-33	**143**	0.13	**163**
SS-34	56.5	0.048	69.9
SS-35	24.3	0.035	40.2
SS-36	50.2	0.086	87.1
SS-37	12.3	(<0.014)	15.9
SS-38	**78.5**	**0.191**	56.1
BSS-01	51.1	NA	80
BSS-02	20.9	NA	**121**

6 NYCRR Part 375 SCOs - Unrestricted Use

Lead =	63 mg/Kg
Mercury =	0.18 mg/Kg
Zinc =	109 mg/Kg

Legend

- Non-detect or below Part 375 Unrestricted Use SCO
- Zinc > Part 375 Unrestricted Use SCO
- Lead > Part 375 Unrestricted Use SCO
- Lead & Zinc > Part 375 Unrestricted Use SCO
- Lead & Mercury > Part 375 Unrestricted Use SCO
- Lead & Zinc & Mercury > Part 375 Unrestricted Use SCO

Property Boundaries

Fenceline

Feet

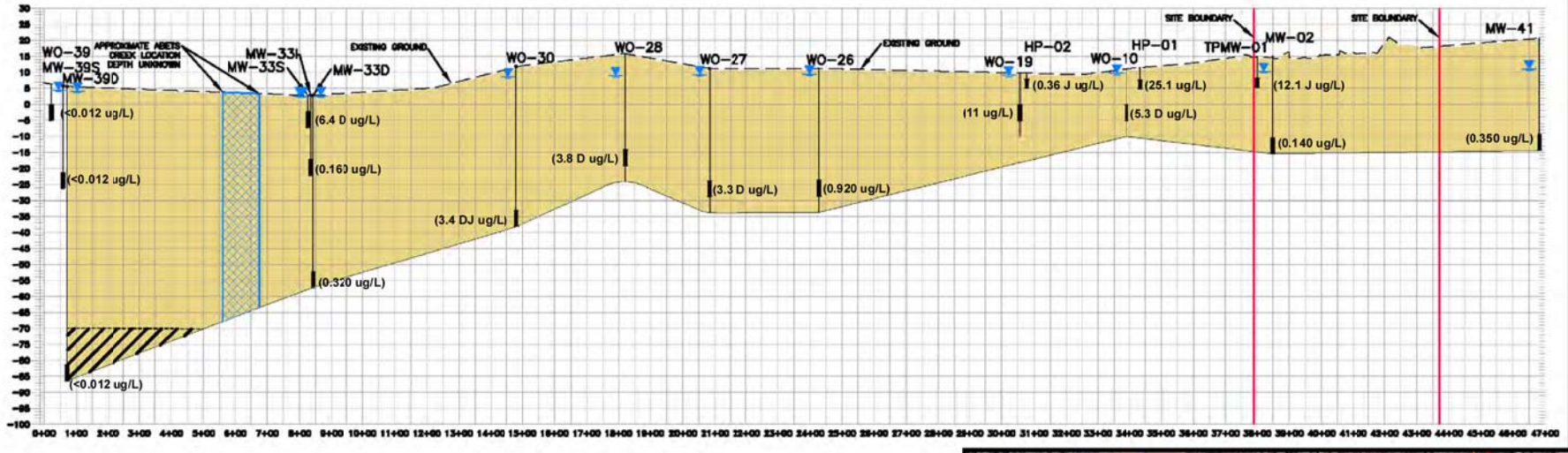
0 75 150 300

1 inch = 150 feet

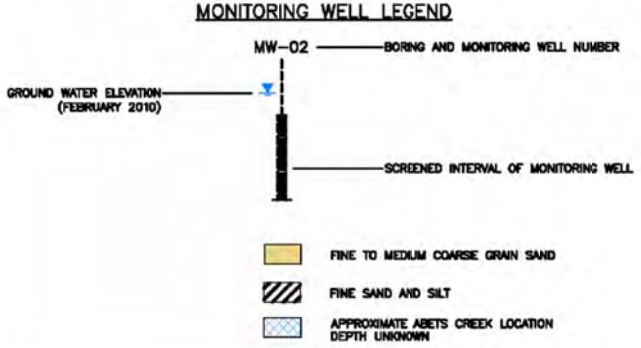
Source: NYS-GIS Clearinghouse

FIGURE 4
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
SURFACE SOIL SAMPLING METAL RESULTS - DECEMBER 2009

FIGURE 5
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
INTERPRETED CHLORDANE ISOPLETH MAP - 2009



MONITORING WELL LEGEND



SECTION A – A'

SCALE: HORIZONTAL

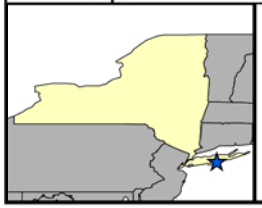
350 175 0 350

GRAPHIC SCALE IN FEET

SCALE: VERTICAL

35 17.5 0 35

GRAPHIC SCALE IN FEET



Legend

- Monitoring Well Locations
- Piezometer Locations
- Fenceline
- Property Boundaries

Source: NYS GIS Clearing House

0 750 1,500 3,000 Feet

1 inch = 750 feet

FIGURE 6
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
VERTICAL CHLORDANE GROUNDWATER CONCENTRATIONS - 2009

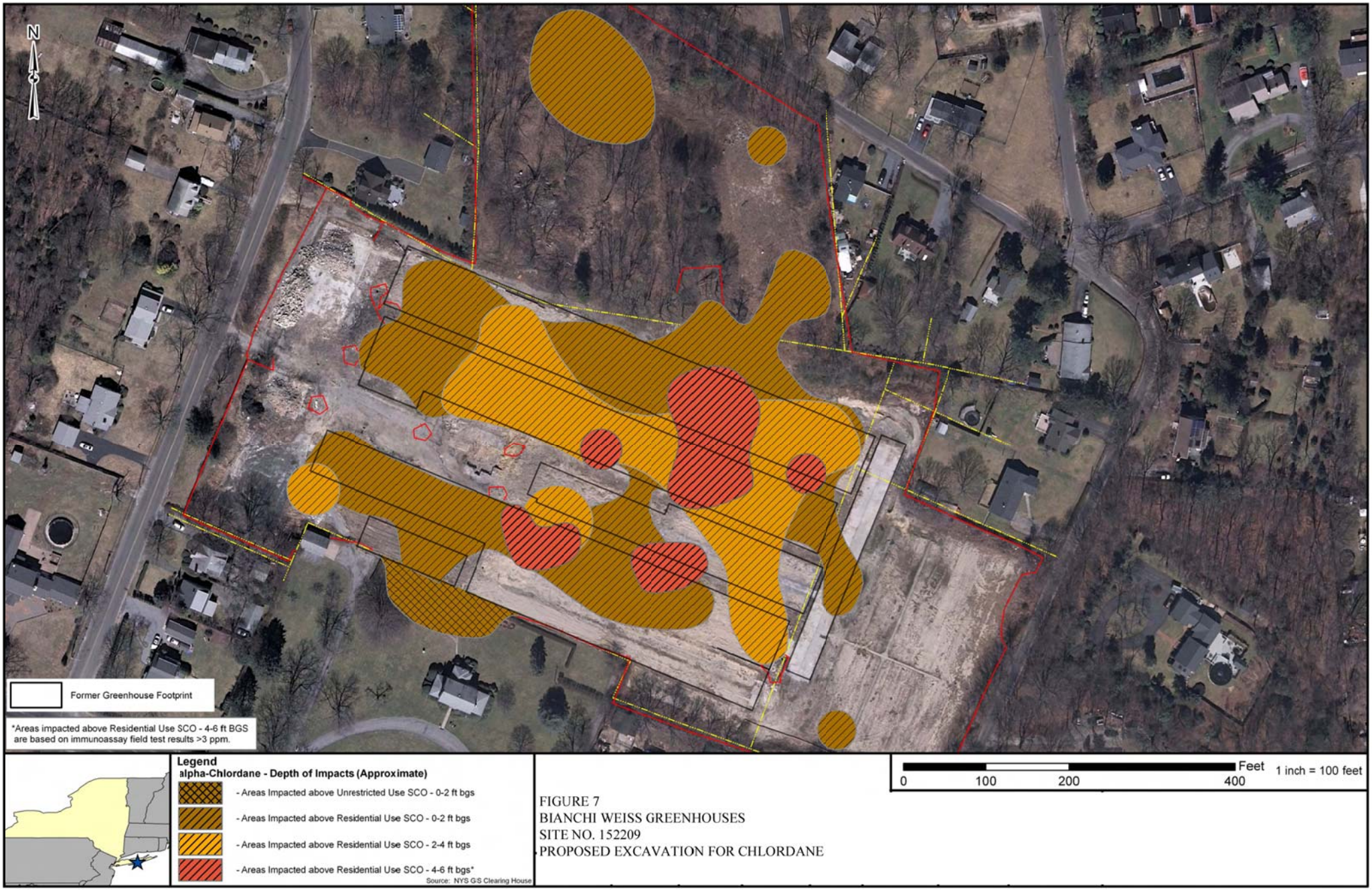


FIGURE 7
BIANCHI WEISS GREENHOUSES
SITE NO. 152209
PROPOSED EXCAVATION FOR CHLORDANE