RECORD OF DECISION

Revere Smelting and Refining
Operable Unit Number: 01
State Superfund Project
Town of Wallkill, Orange County
Site No. 336053
September 2011

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

DECLARATION STATEMENT - RECORD OF DECISION

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Operable Unit Number: 01
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Statement of Purpose and Basis

This document presents the remedy for Operable Unit Number: 01 of the Revere Smelting and Refining site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with 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, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Number: 01 of the Revere Smelting and Refining site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1) A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. The remedial design program will include:

- a treatability study to develop the appropriate stabilization additive and the specific design criteria for either in-situ or ex-situ stabilization. The treatability study will build on the previous treatability studies completed by Revere and the Department. Stabilization will be designed to reduce the leachability of the stabilized soil/waste, with the goal of achieving the groundwater standard. At a minimum, the soil/wastes must be treated to non-hazardous levels (less than 5 mg/L TCLP for lead) to remain on site;

- a Department approved jurisdictional wetland delineation of all areas to the east of Ballard Road which are impacted by Revere operations, excluding the Eastern Fill Area, so that the Department may determine the extent of the ecological area and wetland restoration required. All wetlands delineated within commercial or industrial areas of the site, excluding the Eastern

Fill Area, will be considered ecological areas and be subject to the site specific remedial objective;

- a pre-design investigation to complete delineation of site contaminants to Department Standards, Criteria, and Guidelines (SCGs). The pre-design investigation will focus on the front lawn area and ecological areas and will include subsurface investigation to identify all source areas;

- a determination of the extent of the railroad area remediation and the potential for wetland mitigation, based on a structural and geotechnical evaluation of the railroad and the extent of the ecological area remediation in relation to the railroad. Any ecological and sediment areas which cannot be fully remediated because of structural requirements of the railroad will be determined, and appropriate areas for necessary wetland/stream mitigation identified and designed; and

- Green remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials; and
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste.

The Eastern Fill Area

2) The Eastern Fill Area (EFA) is an area of historic waste disposal containing source material. All soil and/or waste material for which TCLP levels for lead exceed 5 mg/l is considered source material. The EFA includes source material located in the existing previously treated waste piles [Corrective Action Management Units (CAMUs) 1, 2, 3, 4, 5, and 6, soil piles SP-2 and SP-3, and the rock piles], as well as at the surface or in the subsurface. This source material will be treated using a stabilization methodology established by the treatability study. Stabilization will occur by either in-situ or ex-situ methods with the introduction of the appropriate additive determined by the treatability study. Post-stabilization samples will be collected to verify the effectiveness of the stabilization and ensure the design criteria have been achieved. Stabilization of the soil/waste will continue to a depth where the soil no longer exceeds 5 mg/l TCLP for lead. The depth of excavation is anticipated to vary from approximately two feet to twenty four feet below grade. Confirmation and documentation sampling will be conducted as appropriate. Soil with TCLP lead levels less than 5 mg/l are considered non-source soil and will not require stabilization.

3) Stabilized material will be placed within the designated consolidation area (Consolidation Area or CA see Number 7 below) within a containment cell meeting the substantive

requirements of 6 NYCRR Part 360. The stabilized material will meet Department specifications for compressive strength and permeability. The containment cell will have a bottom liner overlain by a protective layer, a leachate collection and management system, and a multilayer cap. Non-source material and any material from CAMUs 1, 2, 3, 4, 5, and 6, soil piles SP-2 and SP-3, and the rock pile not requiring stabilization can be either placed within the CA or used as EFA backfill (see Number 4).

4) The EFA excavation will be backfilled to the groundwater table with clean soil meeting the protection of groundwater SCOs. Non-source soil (does not fail TCLP) from the site excavations which are free of visible contamination may be placed as backfill in this area above the groundwater table. A site cover will be installed to allow for the industrial use of the site, consisting either of the structures such as buildings, pavement, and sidewalks comprising any site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the industrial use soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer. The areas to be excavated or covered will be determined in the design, which will include a storm water management plan as appropriate.

5) The water removed to allow for excavation and stabilization may be transferred to the existing on-site non-potable water recycling system or managed in a manner acceptable to the Department.

6) Oversize rock, concrete, lead buttons and other recyclable lead scrap materials will be segregated during excavation. Oversize materials will be decontaminated to remove any soil residuals from the surface and either placed in a designated area of the site or properly disposed of off-site. Lead buttons and other recyclable scrap materials will be recycled.

Consolidation Area (CA)

7) A CA will be created at a location to be determined in the remedial design. It is proposed to be located in the northeast corner of the area within the registry site boundary. The CA will consist of a containment cell meeting the substantive requirements of 6 NYCRR Part 360 with a minimum 100 foot buffer maintained between the CA and any designated wetland edge based on the Department approved wetland delineation. The designated area will be cleared and grubbed as needed and the appropriate erosion control measures will be installed. All source material which is excavated and treated via stabilization to be rendered non-hazardous will be transferred to the containment cell for disposal. Soil or sediment not requiring stabilization, other than that found suitable for backfill in the EFA, will also be placed in this area. The size and configuration of the CA will be determined in the remedial design and will be sufficient so that the containment cell meets all applicable regulations. A storm water management plan will be incorporated into the design of the disposal cell.

8) A groundwater monitoring well network will be placed around the CA to monitor the effectiveness of the stabilization. A monitoring program will be established.

Industrial Areas

9) Industrial Areas are those areas of the site that will be remediated to industrial use SCOs, which does not include the commercial areas (the front lawn area), sediment areas, ecological areas and ecological buffers. Source soils in these areas will be addressed by excavation, stabilization and on-site consolidation in the containment cell in the CA. Non-source soils in these areas, where the industrial SCOs for lead of 3,900 ppm and/or arsenic of 16 ppm are exceeded in the upper 1 foot below grade, will be addressed by either:

- excavation of up to one foot of any exposed surface soil exceeding the lead and arsenic industrial SCOs and backfilling of 1 foot of clean soil meeting the backfill requirements for commercial use as set forth in 375-6.7(d), with a demarcation layer over any area which still exceeds the industrial SCOs at a depth of one foot; or

- a site cover will be installed to allow for the industrial use of the site. The cover will consist either of the structures such as buildings, pavement, and sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the industrial use SCOs. Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer.

The final delineation of areas to be excavated or covered will be determined in the design. Confirmation and documentation sampling will be conducted as appropriate for the system employed.

Commercial Areas

10) Commercial Areas are areas of the site that will be remediated to commercial use SCOs and are defined as the portions of the front lawn area which are located west of the western stream that are not identified as ecological areas or ecological buffers. Source soils in the front lawn area will be addressed by excavation, stabilization and on-site consolidation in the containment cell in the CA. Non-source soil, where the commercial SCOs for lead of 1,000 ppm and/or arsenic of 16 ppm are exceeded in the upper one foot of the exposed surface soils, will be addressed in this area by either:

- excavation to achieve commercial SCOs in the upper one foot, placement of a demarcation layer and backfilling of 1 foot of clean soil meeting the backfill requirements set forth in 375-6.7(d), with a demarcation layer over any area which still exceeds the commercial SCOs at a depth of one foot; or

- a site cover will be installed to allow for the commercial use of the site. The cover will consist either of the structures such as buildings, pavement, and sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the commercial use SCOs. Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer.

The final delineation of the areas to be excavated or covered will be determined in the design. Confirmation and documentation sampling will be conducted as appropriate for the system employed.

Sediment Areas

11) Sediment Areas are areas of the site defined as permanent or nearly permanent water bodies and streams (for example: western stream, railroad pond) which are impacted by Revere operations to the east of Ballard Road. Soils underlying sediment areas to a depth of two feet are considered sediments. Sediment areas will be addressed as follows:

- sediments will be excavated to depths determined during the remedial design to a depth of two feet in all areas where sediment SCGs are exceeded;

- soil underlying sediment areas will be excavated from a depth of two to three feet which exceed the site specific remedial objective for ecological areas;

- soil underlying sediment areas greater than three feet in depth will be excavated if it meets the definition of source material (exceeds the hazardous waste threshold for lead of 5 mg/L TCLP). The excavated soil will be stabilized if necessary and placed in the containment cell in the CA;

- soil underlying sediment areas greater than three feet in depth which are not source material but exceed the site specific remedial objective for ecological areas will be capped with soil meeting the site specific remedial objective for ecological areas prior to restoration;

- confirmation and documentation sampling will be conducted as appropriate;

- sediment areas will be backfilled with soil that meets Department SCGs for sediment and approximates the physical properties of the sediment removed (i.e., organic carbon, grain size, etc.);

- sediment areas will be restored and revegetated consistent with 6 NYCRR Parts 663 and 608; and

- a stream, stream bank, and wetland restoration plan acceptable to the Department will be developed in the design.

Ecological Areas & Ecological Buffers

12) Ecological Areas shall include areas of the site which are delineated as wetlands in the proximity of the western stream and railroad pond, northern areas that are indicated on Figure 5, and all off-site areas of OU-1 east of Ballard Road. Any wetlands delineated within commercial or industrial areas, excluding the EFA, will be considered ecological areas as well. The final extent of ecological areas will be determined by the Department during the design. Ecological

areas will be subjected to a site specific remedial objective for soil of 400 ppm for lead and 13 ppm for arsenic. The site specific remedial objective for lead is derived from soil analytical data and biota tissue sampling as protective of ecological resources. The remedial objective for arsenic is based on Part 375-6.8(b). Ecological areas will be addressed as follows:

- soil exceeding the site specific remedial objective of 400 ppm for lead and 13 ppm for arsenic will be excavated to depths determined during the remedial design of up to a maximum depth of two feet;

- soil greater than two feet in depth will be excavated if it meets the definition of source material (exceeds the hazardous waste threshold for lead of 5 mg/L TCLP). The excavated soil will be stabilized if necessary and placed in the containment cell in the CA;

- the final delineation of the areas to be excavated or covered will be determined in the design, however the anticipated Ecological Areas to be addressed with the site specific remedial objective are shown on Figure 5;

- a demarcation layer will be placed in excavated areas where deeper soils exceed the site specific remedial objective;

- confirmation and documentation sampling will be conducted as appropriate;

- excavated ecological areas will be backfilled with soil that meets unrestricted SCOs and approximates the physical properties of the soil removed (i.e., organic carbon, grain size, etc.); and

- ecological areas will be restored and revegetated. A restoration plan will be developed in the design consistent with 6 NYCRR Parts 663 and 608 and will include restoration monitoring and control of invasive species.

13) Ecological Buffers will be established within the commercial/industrial areas on the boundary between commercial/industrial areas and ecological areas. Ecological buffers will extend a minimum of 25 feet into commercial/industrial areas. Ecological buffers are considered ecological areas and will be remediated (excavated and backfilled) and restored in the same manner as ecological areas as described in Number 12. The ecological buffers will be designed to prevent migration of soil from commercial and industrial areas into remediated ecological and sediment areas.

Railroad Structural Area

14) Remediation of portions of the Railroad Pond, Railroad Pond Stream and adjacent wetland to the northeast in accordance with Numbers 11-13 above (sediment areas, ecological areas, ecological buffers) may be difficult due to structural concerns arising from their proximity to the active railway. The Department will determine during the design how the ecological areas within the railroad structural area can meet the requirements of Numbers 11-13 above. Remediation in these areas will include removal of waste material to the extent structurally

feasible, with backfill using stone or structural fill material in a manner consistent with railroad land use with grades to be determined after and will be completed in consultation with the railroad property owner. Structural fill will meet the unrestricted use SCOs. The acreage of sediment and ecological areas which cannot be remediated in accordance with Numbers 11-12 above will be mitigated.

Site-Wide

15) 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);
- land use is subject to local zoning laws, the remedy allows the use and development of the controlled property for industrial use in designated industrial areas and commercial use in all other areas;
- prohibits agriculture or vegetable gardens on the controlled property;
- requires compliance with the Department approved Site Management Plan; and
- restricts the use of groundwater

16) A Site Management Plan will be required, which includes the following:

(a) 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 assure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls:

Land use restrictions: An environmental easement will be implemented at the site and include the following:

- Restrict the use of the on-site industrial areas of OU-1 and the CA to industrial use.
- Restrict the use of all other on-site areas of OU-1 to industrial or commercial use.

Engineering Controls:

- The containment cell described in Number 7 above.
- The Industrial Areas of OU-1 and the commercial areas of OU-1 cover systems described in Number 4, 9, and 10.
- The ecological restoration cover systems described in Number 11 and 12 and the ecological buffers described in Number 13.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in

areas of remaining contamination;

- descriptions of the provisions of the environmental easement including any land use, groundwater, and surface water use restrictions;
- provisions for the management and inspection of the identified engineering controls;
- a leachate management plan which will outline the collection, treatment and disposal of leachate from the containment cell in accordance with all state and local laws and regulations;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls; and

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

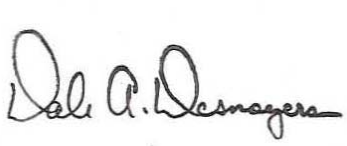
- monitoring of groundwater, surface water, biota, and sediment to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring of restoration success.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

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



September 19, 2011

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

RECORD OF DECISION

Revere Smelting and Refining
Town of Wallkill, Orange County
Site No. 336053
September 2011

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected 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. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Record of Decision (ROD) identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for selecting the 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 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: SITE DESCRIPTION AND HISTORY

Location: The Revere Smelting and Refining (Revere) site is located at 65 Ballard Road in the Town of Wallkill, Orange County. The site consists of 60.6 acres of land in a mixed commercial and industrial area. The Revere property includes 154.9 acres.

Current Zoning/Use: Approximately one quarter of the site is actively used by Revere, which operates a secondary lead smelter to recycle batteries at the site. This active facility consists of two large buildings, the Main Plant where lead is smelted and poured into molds, and the Containment Building, which stores the various parts of batteries and other hazardous waste. A small office complex adjacent to the Main Plant houses most of the staff at the site. Beyond the buildings are several parking lots for cars and the trailers which bring in the batteries. A railroad spur is located adjacent to the Main Plant and Containment Building. The spur is used by Revere for transporting product.

The site is zoned as Light Enterprise by the Town of Wallkill.

Site Features: Beyond the active facility to the north and east are several acres of overgrown fields, mature woodlands, wetlands, and a pond. The pond empties into an unnamed stream. To the west of the active facility are a mowed front lawn and an unnamed stream. The two unnamed streams which run through the site converge off the site to the south of the railroad tracks, on property still owned by Revere.

Operable Units: In 2000, a Consent Order with Revere established four operable units (OUs) for the site. These operable units were redefined based on a 2011 Consent Order, as follows:

OU-1 consists of all environmental media other than groundwater on the 60.6-acre Class 2 site, excluding the active facility (OU-4), as well as all environmental media other than groundwater within six off-site properties (four of which are owned by Revere) where impacts from the site have been documented;
OU-2 is all groundwater in the area of OUs 1, 3 and 4;
OU-3 is off-site areas which are not a part of OU-1; and
OU-4 is the area defined as the active facility.

Historical Uses: Prior to the construction of the facility in 1970, the site was unimproved but may have been used for farm land. During the late 1970s and early 1980s large quantities of process waste/fill consisting of lead slag, battery parts and other wastes were disposed at the site. This fill material was buried immediately to the east of the active plant in OU-1, beneath the active plant in OU-4, and to the west of the active plant in a front lawn area also part of OU-1. The surface soils and wetland/streams extending beyond the filled areas of OU-1 have also been impacted by windblown particles and surface water runoff from the disposal areas, as well as stack emissions.

In the late 1990s, Revere started a source removal action to address former waste disposal areas outside of the active plant site. Revere terminated the removal action before it was completed in 1999.

A State Superfund (SSF) Remedial Investigation (RI) was initiated by the Department to address OU-1 and OU-2. The field work for this RI was conducted in 2001 and 2005. The RI report was completed in June 2007. In June 2008, a Consent Order for a Feasibility Study/Remedial Design/Remedial Action (FS/RD/RA) was signed by Revere and the Department to address OU-1 and OU-2. A draft Feasibility Study was prepared by Revere for OU-1 in 2009. A separate Consent Order for an RI/FS for OU-3 was signed by Revere and the Department in June 2007. Field work for this RI began in 2008.

Site Geology and Hydrogeology: Soils beneath and around the active plant consist of fill, reworked glacial till, and glacial till. Overburden soils generally extend ten to twenty feet below ground surface (bgs) and are underlain by bedrock composed of shale and limestone. Groundwater is encountered in both overburden soil and bedrock and generally flows to the south across the site. Overburden groundwater is generally encountered at a depth of ten feet bgs.

Operable Unit (OU) Number 01 is the subject of this document.

A Record of Decision has yet to be issued for OU 02,03,04.

A site location map is attached as Figure 1.

SECTION 3: 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 industrial use as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) 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 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:

Eco-Bat New York LLC

RSR Corporation

Revere Smelting & Refining Corporation (Revere)

In 2010 the Department served Revere with a Notice of Hearing which outlined several significant violations of the Revere Part 373 Permit. The NYSDEC entered in a Consent Order with Revere and Eco-Bat New York LLC on February 1, 2011. The order obligates the responsible parties to install a new containment liner system beneath the active facility Containment Building, construct a new trailer storage parking area, develop a spill response protocol, implement a remedial program selected by a Department issued Record of Decision in OU-1, and conduct a RCRA facility investigation in OU-4.

SECTION 5: SITE CONTAMINATION

5.1: 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.

5.1.1: 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

5.1.2: RI Information

The analytical data collected on this site includes data for:

- groundwater
- surface 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 for this Operable Unit at this site is/are:

lead arsenic

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

- groundwater
- surface water
- soil
- sediment

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 issuance of the Record of Decision.

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

RCRA Corrective Action

In the late 1990s, Revere started a source removal action to address former waste disposal areas outside of the active plant site. Revere terminated the removal action before it was completed in 1999.

5.3: 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*.

Persons who enter the site (OU-1 and OU-4) could contact contaminants in soil by walking on soil, digging soil, or otherwise disturbing the soil. There is the potential for incidental inhalation or ingestion of dust containing site-related contaminants as well. Dust may be generated in any number of ways including from wind blowing across the site, through the operation of motor vehicles over exposed areas of contamination, or through digging into soil either by hand or with equipment. People may come in contact with contaminants present in on-site and off-site shallow creek sediments and wetlands (OU-1 and OU-3) while entering or exiting during recreational activities. People are not coming into contact with the contaminated groundwater (OU-2) because the area is served by a public water supply that is not affected by this contamination.

5.4: 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.

The Fish and Wildlife Resources Impact Analysis (FWRIA) for OU 01, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination: The primary contaminants of concern for OU-1 are lead and arsenic. Lead and arsenic are found in surface soils, subsurface soils, and sediment throughout OU-1. Lead is also found in surface water in OU-1.

The primary source area of contamination in OU-1 is the Eastern Fill Area which is located to the east of the active facility. Approximately 50,000 cubic yards of subsurface soil and fill/waste in this area contain lead at concentrations that exceed the hazardous waste threshold for TCLP lead of 5 mg/L and the protection of groundwater soil cleanup objective (SCO) for total lead of 450 parts per million (ppm). Subsurface soil contamination has also been documented to the west of the active plant in the front lawn area with lead concentrations exceeding the hazardous waste threshold and SCOs.

On-site surface soils in OU-1 generally exceed the industrial SCO for lead of 3,900 ppm in source areas and areas of historic use of the site in support of the active facility. The horizontal extent of contamination in surface soils in OU-1 extends beyond the site boundary through several acres of wetlands mostly to the east and south of the Eastern Fill Area. The vertical extent of contamination in off-site areas of OU-1 is generally limited to less than one foot except in source areas.

Sediment in OU-1 generally exceeds the Department's SCG for lead of 31 ppm in an on-site pond and adjacent to and downgradient of the active facility in two unnamed streams which run through the site and converge off the site to the south of the railroad tracks.

Based upon the investigations conducted to date, the primary contaminants of concern for OU-2 (groundwater) are lead, arsenic, antimony, cadmium, and chromium. Exceedence of groundwater standards for all contaminants of concern have been documented in monitoring wells in the vicinity of the active plant.

Based upon the investigations conducted to date, the primary contaminant of concern for OU-3 is lead. Lead is found in sediment in OU-3. Elevated levels of lead have been documented in the combined stream downgradient of the site and OU-1. Further investigation is necessary to determine the horizontal extent of sediment impacts in OU-3.

Special Resources Impacted/Threatened: Fish and Wildlife Impact Analyses (FWIAs) were performed for OU-1. Biota samples collected during these studies indicated that lead releases from the site have adversely impacted terrestrial biota and wetland areas in OU-1. Based on the FWIA for OU-1 a site specific cleanup objective of 400 ppm was developed for off-site areas of OU-1.

SECTION 6: 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 feasibility study (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.

6.1: Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. 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 six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. 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.

4. 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.

5. Short-term Impacts and 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.

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-Effectiveness. 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.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

The final criterion, Community Acceptance, 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.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, 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.

6.2: Elements of the Remedy

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

The estimated present worth cost to implement the remedy is $18,773,000. The cost to construct the remedy is estimated to be $17,928,000 and the estimated average annual cost is $55,000.

In Exhibit A the nature and extent of contamination is presented in four Areas of Concern (AOCs) established in OU-1. The AOCs have been associated with cleanup objectives based on land use which have been incorporated in the selected remedy. Therefore the AOCs are not references in the remedy; rather areas of the remedy requiring specific action associated with the AOCs are identified as follows:

AOC 1 – Commercial Areas

AOC 2 – Eastern Fill Area, Industrial Areas and Consolidation Area

AOC 3 – Ecological Areas & Ecological Buffers

AOC 4 – Sediment Areas and Railroad Structural Area

The elements of the selected remedy are as follows:

1) A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. The remedial design program will include:

• a treatability study to develop the appropriate stabilization additive and the specific design criteria for either in-situ or ex-situ stabilization. The treatability study will build on the previous treatability studies completed by Revere and the Department. Stabilization will be designed to reduce the leachability of the stabilized soil/waste, with the goal of achieving the groundwater standard. At a minimum, the soil/wastes must be treated to non-hazardous levels (less than 5 mg/L TCLP for lead) to remain on site;

• a Department approved jurisdictional wetland delineation of all areas to the east of Ballard Road which are impacted by Revere operations, excluding the Eastern Fill Area, so that the Department may determine the extent of the ecological area and wetland restoration required. All wetlands delineated within commercial or industrial areas of the site, excluding the Eastern Fill Area, will be considered ecological areas and be subject to the site specific remedial objective;

• a pre-design investigation to complete delineation of site contaminants to Department Standards, Criteria, and Guidelines (SCGs). The pre-design investigation will focus on the front lawn area and ecological areas and will include subsurface investigation to identify all source areas;

• a determination of the extent of the railroad area remediation and the potential for wetland mitigation, based on a structural and geotechnical evaluation of the railroad and the extent of the ecological area remediation in relation to the railroad. Any ecological and sediment areas which cannot be fully remediated because of structural requirements of the railroad will be determined, and appropriate areas for necessary wetland/stream mitigation identified and designed; and

• Green remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows:

• Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
• Reducing direct and indirect greenhouse gas and other emissions;
• Increasing energy efficiency and minimizing use of non-renewable energy;
• Conserving and efficiently managing resources and materials; and
• Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste.

The Eastern Fill Area

2) The Eastern Fill Area (EFA) is an area of historic waste disposal containing source material. All soil and/or waste material for which TCLP levels for lead exceed 5 mg/l is considered source material. The EFA includes source material located in the existing previously treated waste piles [Corrective Action Management Units (CAMUs) 1, 2, 3, 4, 5, and 6, soil piles SP-2 and SP-3, and the rock piles], as well as at the surface or in the subsurface. This source material will be treated using a stabilization methodology established by the treatability study. Stabilization will occur by either in-situ or ex-situ methods with the introduction of the appropriate additive determined by the treatability study. Post-stabilization samples will be collected to verify the effectiveness of the stabilization and ensure the design criteria have been achieved. Stabilization of the soil/waste will continue to a depth where the soil no longer exceeds 5 mg/l TCLP for lead. The depth of excavation is anticipated to vary from approximately two feet to twenty four feet below grade. Confirmation and documentation sampling will be conducted as appropriate. Soil with TCLP lead levels less than 5 mg/l are considered non-source soil and will not require stabilization.

3) Stabilized material will be placed within the designated consolidation area (Consolidation Area or CA see Number 7 below) within a containment cell meeting the substantive requirements of 6 NYCRR Part 360. The stabilized material will meet Department specifications for compressive strength and permeability. The containment cell will have a bottom liner overlain by a protective layer, a leachate collection and management system, and a multilayer cap. Non-source material and any material from CAMUs 1, 2, 3, 4, 5, and 6, soil piles SP-2 and SP-3, and the rock pile not requiring stabilization can be either placed within the CA or used as EFA backfill (see Number 4).

4) The EFA excavation will be backfilled to the groundwater table with clean soil meeting the protection of groundwater SCOs. Non-source soil (does not fail TCLP) from the site excavations which are free of visible contamination may be placed as backfill in this area above the groundwater table. A site cover will be installed to allow for the industrial use of the site, consisting either of the structures such as buildings, pavement, and sidewalks comprising any site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the industrial use soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer. The areas to be excavated or covered will be determined in the design, which will include a storm water management plan as appropriate.

5) The water removed to allow for excavation and stabilization may be transferred to the existing on-site non-potable water recycling system or managed in a manner acceptable to the Department.

6) Oversize rock, concrete, lead buttons and other recyclable lead scrap materials will be segregated during excavation. Oversize materials will be decontaminated to remove any soil residuals from the surface and either placed in a designated area of the site or properly disposed of off-site. Lead buttons and other recyclable scrap materials will be recycled.

Consolidation Area (CA)

7) A CA will be created at a location to be determined in the remedial design. It is proposed to be located in the northeast corner of the area within the registry site boundary. The CA will consist of a containment cell meeting the substantive requirements of 6 NYCRR Part 360 with a minimum 100 foot buffer maintained between the CA and any designated wetland edge based on the Department approved wetland delineation. The designated area will be cleared and grubbed as needed and the appropriate erosion control measures will be installed. All source material which is excavated and treated via stabilization to be rendered non-hazardous will be transferred to the containment cell for disposal. Soil or sediment not requiring stabilization, other than that found suitable for backfill in the EFA, will also be placed in this area. The size and configuration of the CA will be determined in the remedial design and will be sufficient so that the containment cell meets all applicable regulations. A storm water management plan will be incorporated into the design of the disposal cell.

8) A groundwater monitoring well network will be placed around the CA to monitor the effectiveness of the stabilization. A monitoring program will be established.

Industrial Areas

9) Industrial Areas are those areas of the site that will be remediated to industrial use SCOs, which does not include the commercial areas (the front lawn area), sediment areas, ecological areas and ecological buffers. Source soils in these areas will be addressed by excavation, stabilization and on-site consolidation in the containment cell in the CA. Non-source soils in these areas, where the industrial SCOs for lead of 3,900 ppm and/or arsenic of 16 ppm are exceeded in the upper 1 foot below grade, will be addressed by either:

- excavation of up to one foot of any exposed surface soil exceeding the lead and arsenic industrial SCOs and backfilling of 1 foot of clean soil meeting the backfill requirements for commercial use as set forth in 375-6.7(d), with a demarcation layer over any area which still exceeds the industrial SCOs at a depth of one foot; or

- a site cover will be installed to allow for the industrial use of the site. The cover will consist either of the structures such as buildings, pavement, and sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the industrial use SCOs. Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer.

The final delineation of areas to be excavated or covered will be determined in the design. Confirmation and documentation sampling will be conducted as appropriate for the system employed.

Commercial Areas

10) Commercial Areas are areas of the site that will be remediated to commercial use SCOs and are defined as the portions of the front lawn area which are located west of the western stream that are not identified as ecological areas or ecological buffers. Source soils in the front lawn area will be addressed by excavation, stabilization and on-site consolidation in the containment cell in the CA. Non-source soil, where the commercial SCOs for lead of 1,000 ppm and/or arsenic of 16 ppm are exceeded in the upper one foot of the exposed surface soils, will be addressed in this area by either:

- excavation to achieve commercial SCOs in the upper one foot, placement of a demarcation layer and backfilling of 1 foot of clean soil meeting the backfill requirements set forth in 375-6.7(d), with a demarcation layer over any area which still exceeds the commercial SCOs at a depth of one foot; or

- a site cover will be installed to allow for the commercial use of the site. The cover will consist either of the structures such as buildings, pavement, and sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the commercial use SCOs. Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer.

The final delineation of the areas to be excavated or covered will be determined in the design. Confirmation and documentation sampling will be conducted as appropriate for the system employed.

Sediment Areas

11) Sediment Areas are areas of the site defined as permanent or nearly permanent water bodies and streams (for example: western stream, railroad pond) which are impacted by Revere operations to the east of Ballard Road. Soils underlying sediment areas to a depth of two feet are considered sediments. Sediment areas will be addressed as follows:

- sediments will be excavated to depths determined during the remedial design to a depth of two feet in all areas where sediment SCGs are exceeded;

- soil underlying sediment areas will be excavated from a depth of two to three feet which exceed the site specific remedial objective for ecological areas;

- soil underlying sediment areas greater than three feet in depth will be excavated if it meets the definition of source material (exceeds the hazardous waste threshold for lead of 5 mg/L TCLP). The excavated soil will be stabilized if necessary and placed in the containment cell in the CA;

- soil underlying sediment areas greater than three feet in depth which are not source material but exceed the site specific remedial objective for ecological areas will be capped with soil meeting the site specific remedial objective for ecological areas prior to restoration;

- confirmation and documentation sampling will be conducted as appropriate;

- sediment areas will be backfilled with soil that meets Department SCGs for sediment and approximates the physical properties of the sediment removed (i.e., organic carbon, grain size, etc.);

- sediment areas will be restored and revegetated consistent with 6 NYCRR Parts 663 and 608; and

- a stream, stream bank, and wetland restoration plan acceptable to the Department will be developed in the design.

Ecological Areas & Ecological Buffers

12) Ecological Areas shall include areas of the site which are delineated as wetlands in the proximity of the western stream and railroad pond, northern areas that are indicated on Figure 5, and all off-site areas of OU-1 east of Ballard Road. Any wetlands delineated within commercial or industrial areas, excluding the EFA, will be considered ecological areas as well. The final extent of ecological areas will be determined by the Department during the design. Ecological areas will be subjected to a site specific remedial objective for soil of 400 ppm for lead and 13 ppm for arsenic. The site specific remedial objective for lead is derived from soil analytical data and biota tissue sampling as protective of ecological resources. The remedial objective for arsenic is based on Part 375-6.8(b). Ecological areas will be addressed as follows:

- soil exceeding the site specific remedial objective of 400 ppm for lead and 13 ppm for arsenic will be excavated to depths determined during the remedial design of up to a maximum depth of two feet;

- soil greater than two feet in depth will be excavated if it meets the definition of source material (exceeds the hazardous waste threshold for lead of 5 mg/L TCLP). The excavated soil will be stabilized if necessary and placed in the containment cell in the CA;

- the final delineation of the areas to be excavated or covered will be determined in the design, however the anticipated Ecological Areas to be addressed with the site specific remedial objective are shown on Figure 5;

- a demarcation layer will be placed in excavated areas where deeper soils exceed the site specific remedial objective;

- confirmation and documentation sampling will be conducted as appropriate;

- excavated ecological areas will be backfilled with soil that meets unrestricted SCOs and approximates the physical properties of the soil removed (i.e., organic carbon, grain size, etc.); and

- ecological areas will be restored and revegetated. A restoration plan will be developed in the design consistent with 6 NYCRR Parts 663 and 608 and will include restoration monitoring and control of invasive species.

13) Ecological Buffers will be established within the commercial/industrial areas on the boundary between commercial/industrial areas and ecological areas. Ecological buffers will extend a minimum of 25 feet into commercial/industrial areas. Ecological buffers are considered ecological areas and will be remediated (excavated and backfilled) and restored in the same manner as ecological areas as described in Number 12. The ecological buffers will be designed to prevent migration of soil from commercial and industrial areas into remediated ecological and sediment areas.

Railroad Structural Area

14) Remediation of portions of the Railroad Pond, Railroad Pond Stream and adjacent wetland to the northeast in accordance with Numbers 11-13 above (sediment areas, ecological areas, ecological buffers) may be difficult due to structural concerns arising from their proximity to the active railway. The Department will determine during the design how the ecological areas within the railroad structural area can meet the requirements of Numbers 11-13 above. Remediation in these areas will include removal of waste material to the extent structurally feasible, with backfill using stone or structural fill material in a manner consistent with railroad land use with grades to be determined after and will be completed in consultation with the railroad property owner. Structural fill will meet the unrestricted use SCOs. The acreage of sediment and ecological areas which cannot be remediated in accordance with Numbers 11-12 above will be mitigated.

Site-Wide

15) 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);
- land use is subject to local zoning laws, the remedy allows the use and development of the controlled property for industrial use in designated industrial areas and commercial use in all other areas;
- prohibits agriculture or vegetable gardens on the controlled property;
- requires compliance with the Department approved Site Management Plan; and
- restricts the use of groundwater

16) A Site Management Plan will be required, which includes the following:

(a) 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 assure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls:

Land use restrictions: An environmental easement will be implemented at the site and include the following:

- Restrict the use of the on-site industrial areas of OU-1 and the CA to industrial use.
- Restrict the use of all other on-site areas of OU-1 to industrial or commercial use.

Engineering Controls:

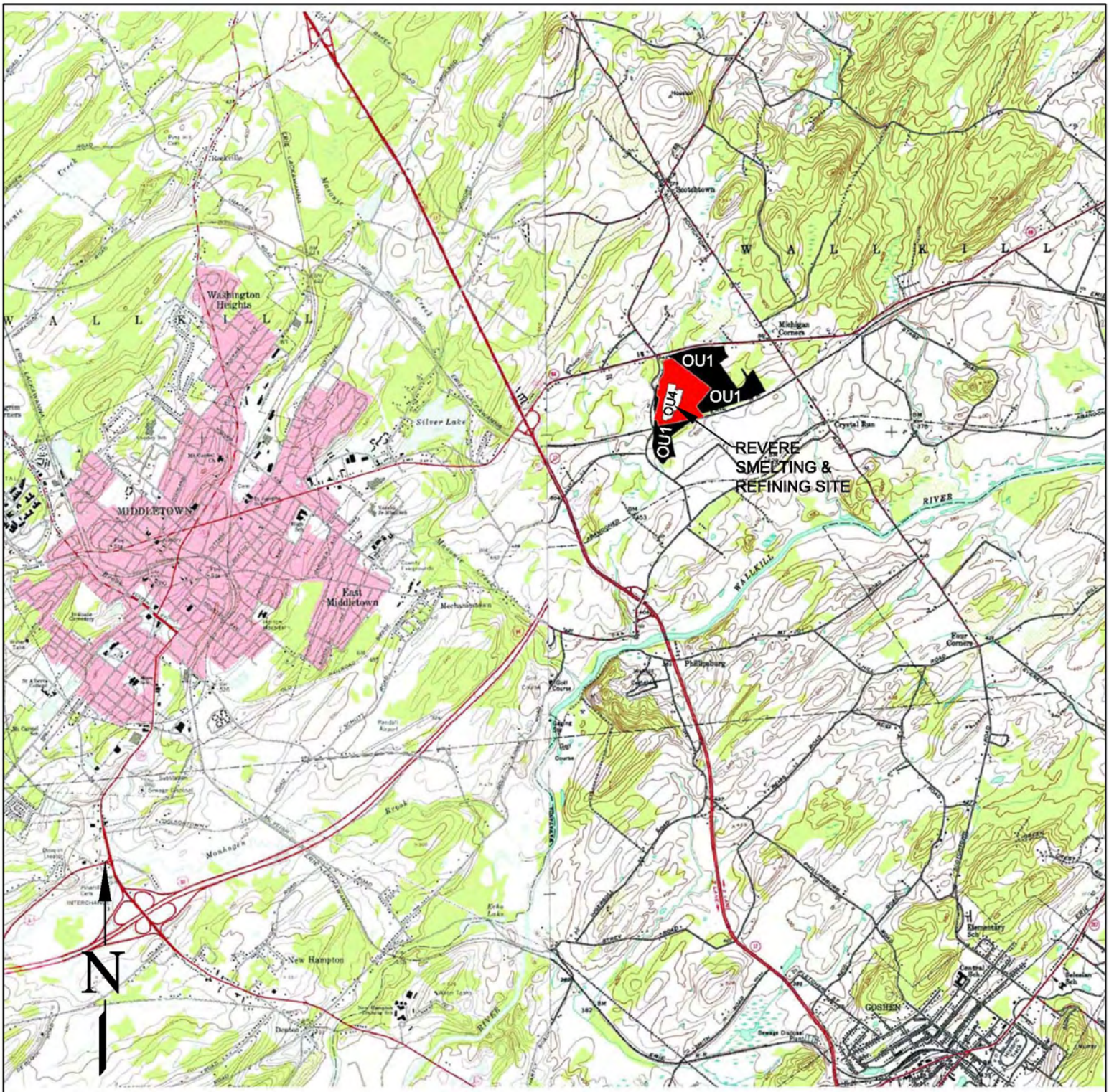
- The containment cell described in Number 7 above.
- The Industrial Areas of OU-1 and the commercial areas of OU-1 cover systems described in Number 4, 9, and 10.
- The ecological restoration cover systems described in Number 11 and 12 and the ecological buffers described in Number 13.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use, groundwater, and surface water use restrictions;
- provisions for the management and inspection of the identified engineering controls;
- a leachate management plan which will outline the collection, treatment and disposal of leachate from the containment cell in accordance with all state and local laws and regulations.
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls; and

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

- monitoring of groundwater, surface water, biota, and sediment to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring of restoration success.



After U.S.G.S. 7.5 Minute Topographic Quadrangles, Goshen and Middletown, New York, 1983.

N

Scale in Miles

0 ½

LEGEND

OU1 BOUNDARY

REGISTRY SITE BOUNDARY 3-36-053

NOTE: ALL LOCATIONS ARE APPROXIMATE.
OU2 INCLUDES ALL ON-SITE GROUNDWATER.
OU3 INCLUDES ALL OFF-SITE MEDIA IMPACTED BY REVERE'S ACTIVITIES.
OU4 INCLUDES THE FACILITY.

QUADRANGLE LOCATION

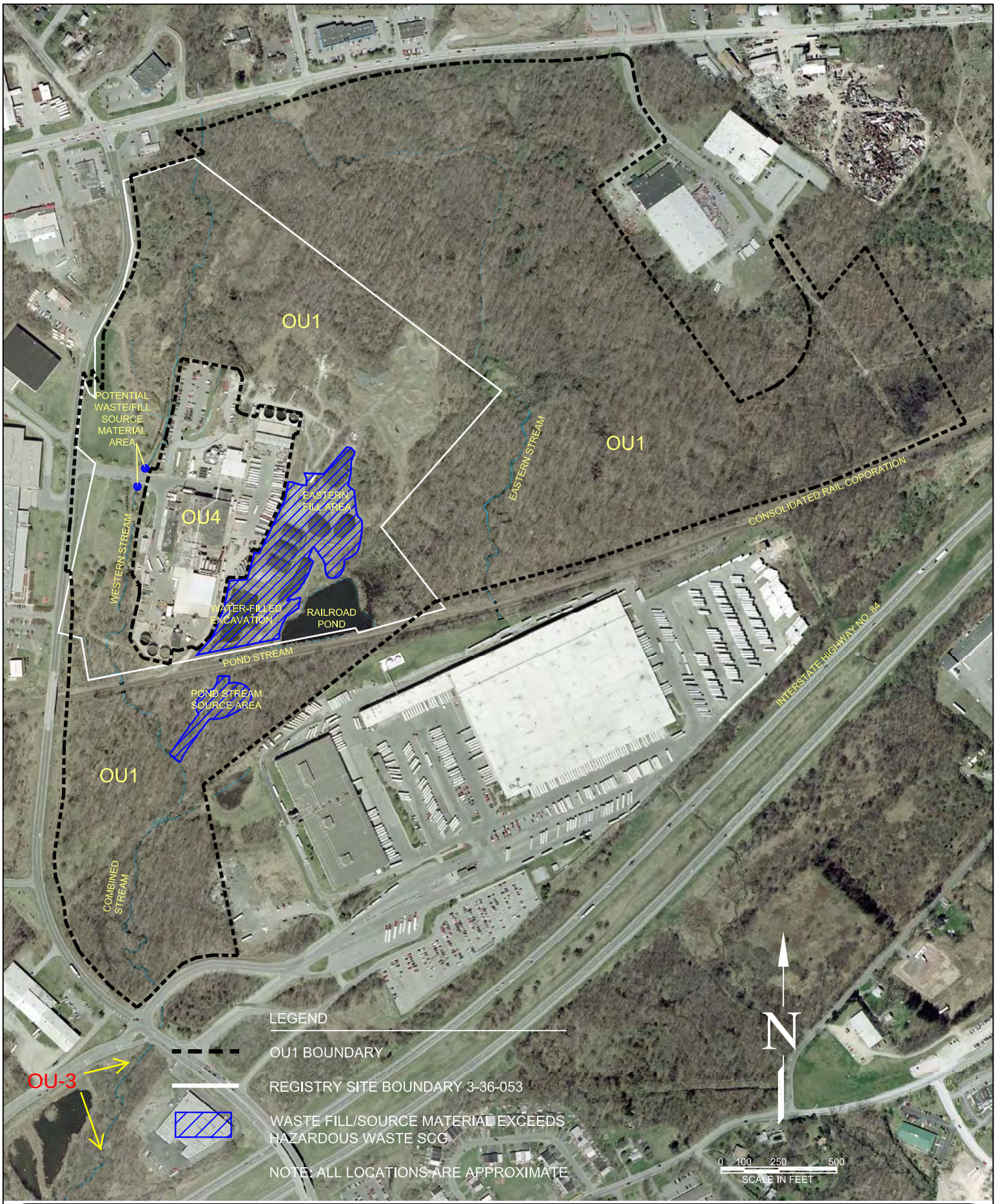
SITE LOCATION FIGURE

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 1

NO.	DATE	REVISION	APP.

Scale: SEE_DWG | Drawn By: MA | Checked By: JS | Date: 04/2011



EXTENT OF WASTE FILL / SOURCE MATERIAL CONTAMINATION

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 2

NO.	DATE	REVISION	APP.

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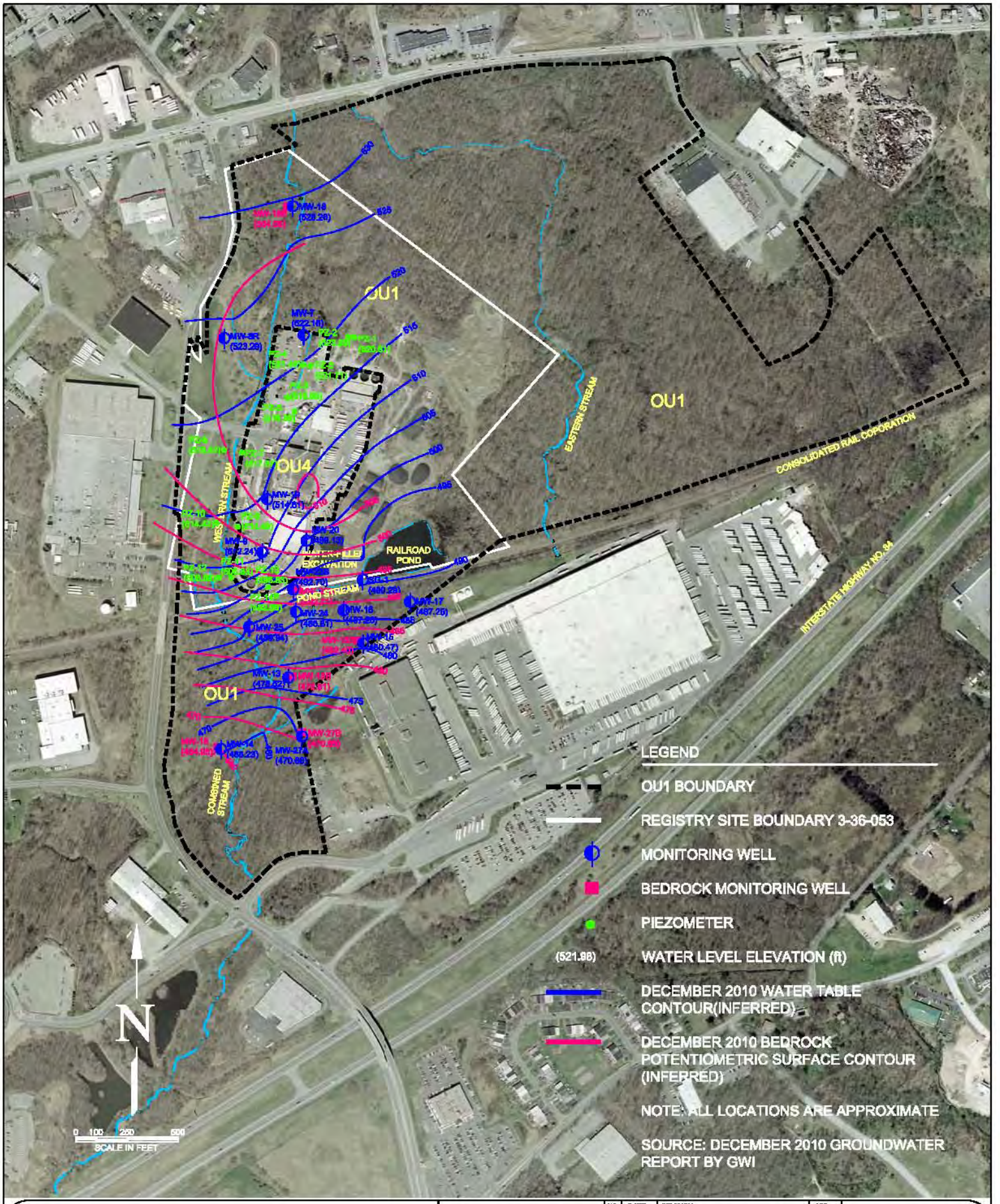

GROUNDWATER CONTOUR MAP

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 3

NO.	DATE	REVISION	APP.

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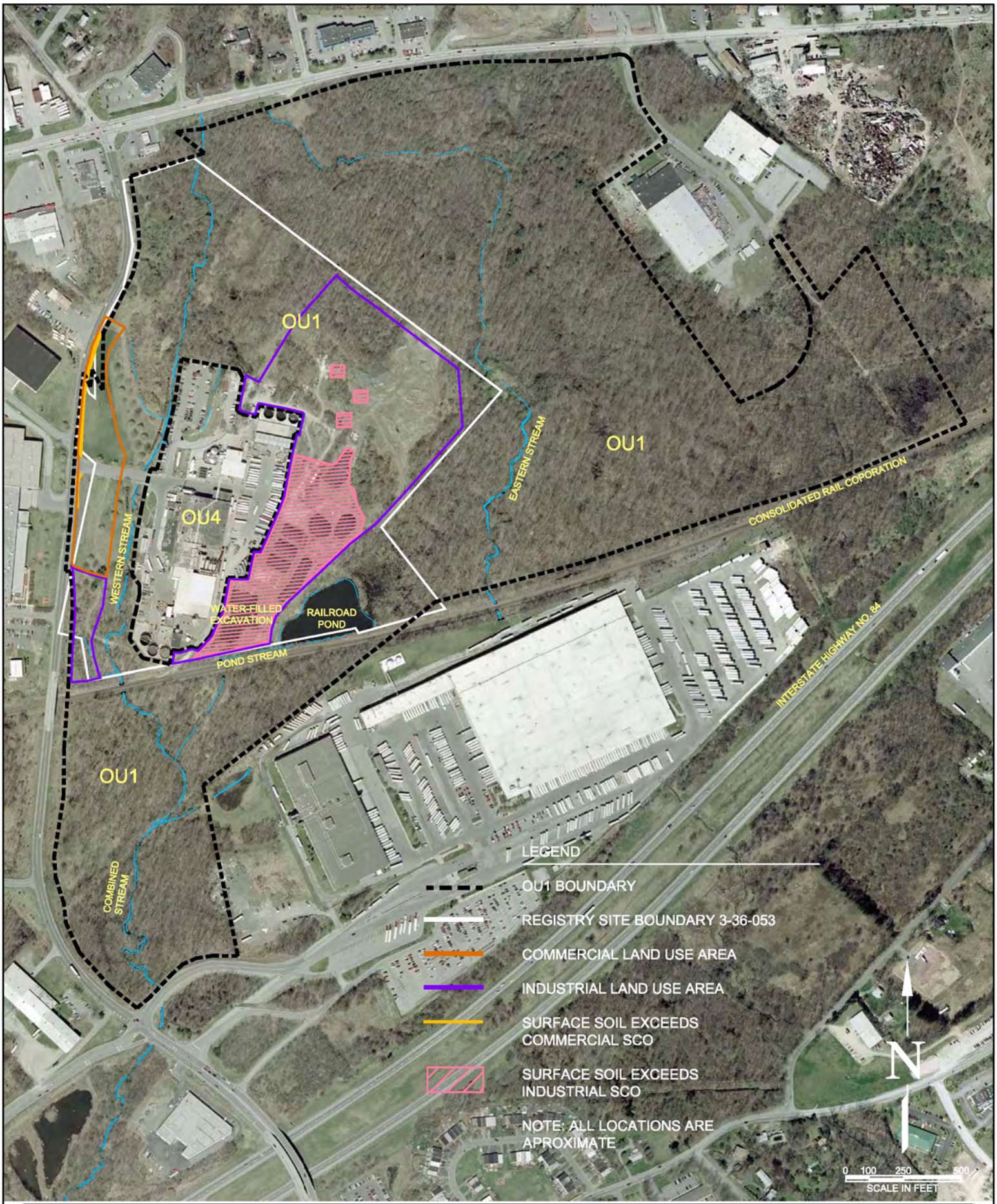

EXTENT OF SURFACE SOIL CONTAMINATION (COMMERCIAL / INDUSTRIAL LAND USE)

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 4

NO.	DATE	REVISION	APP.

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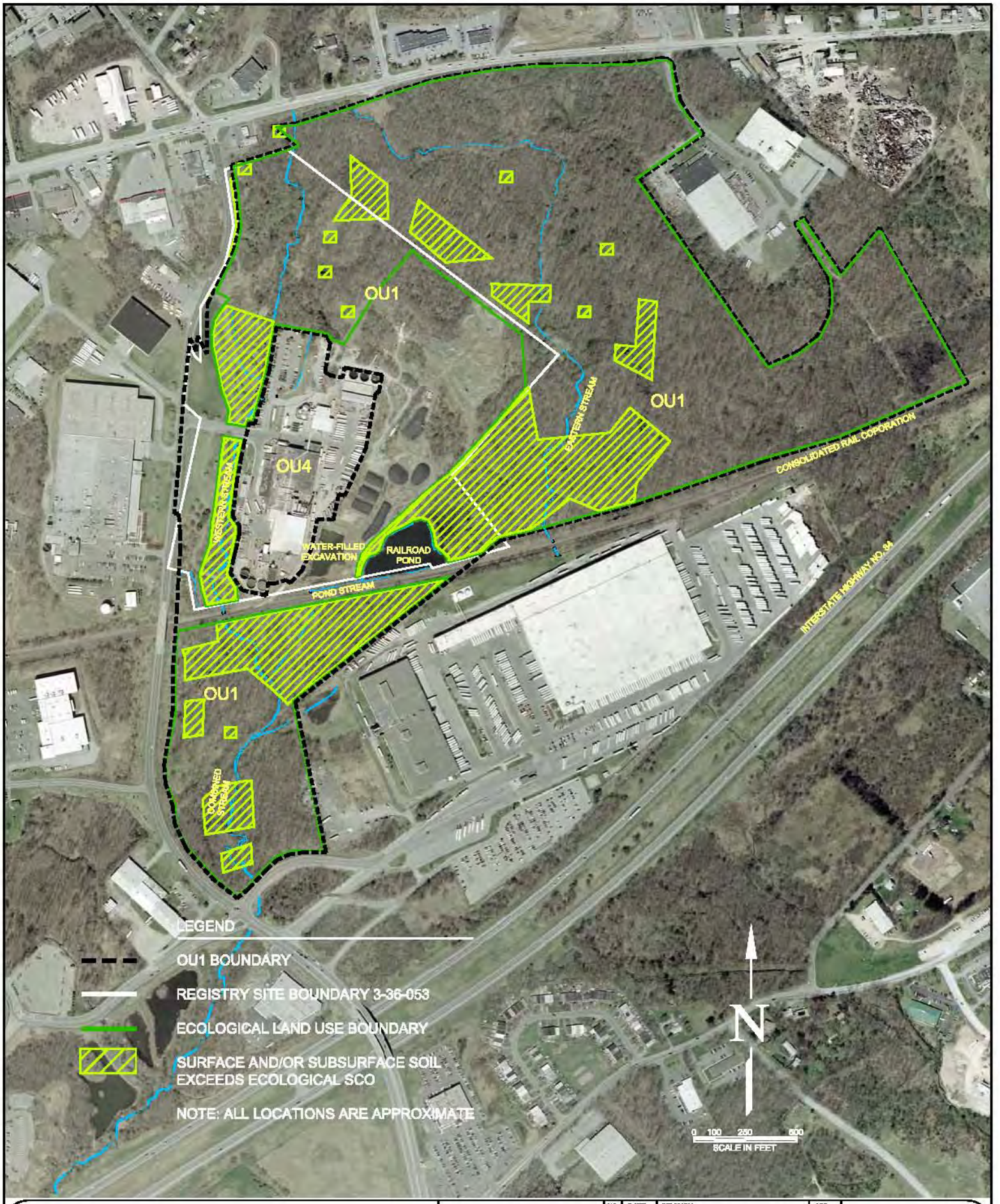

EXTENT OF SURFACE AND SUBSURFACE SOIL CONTAMINATION (ECOLOGICAL LAND USE)

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 5

NO.	DATE	REVISION	APP.

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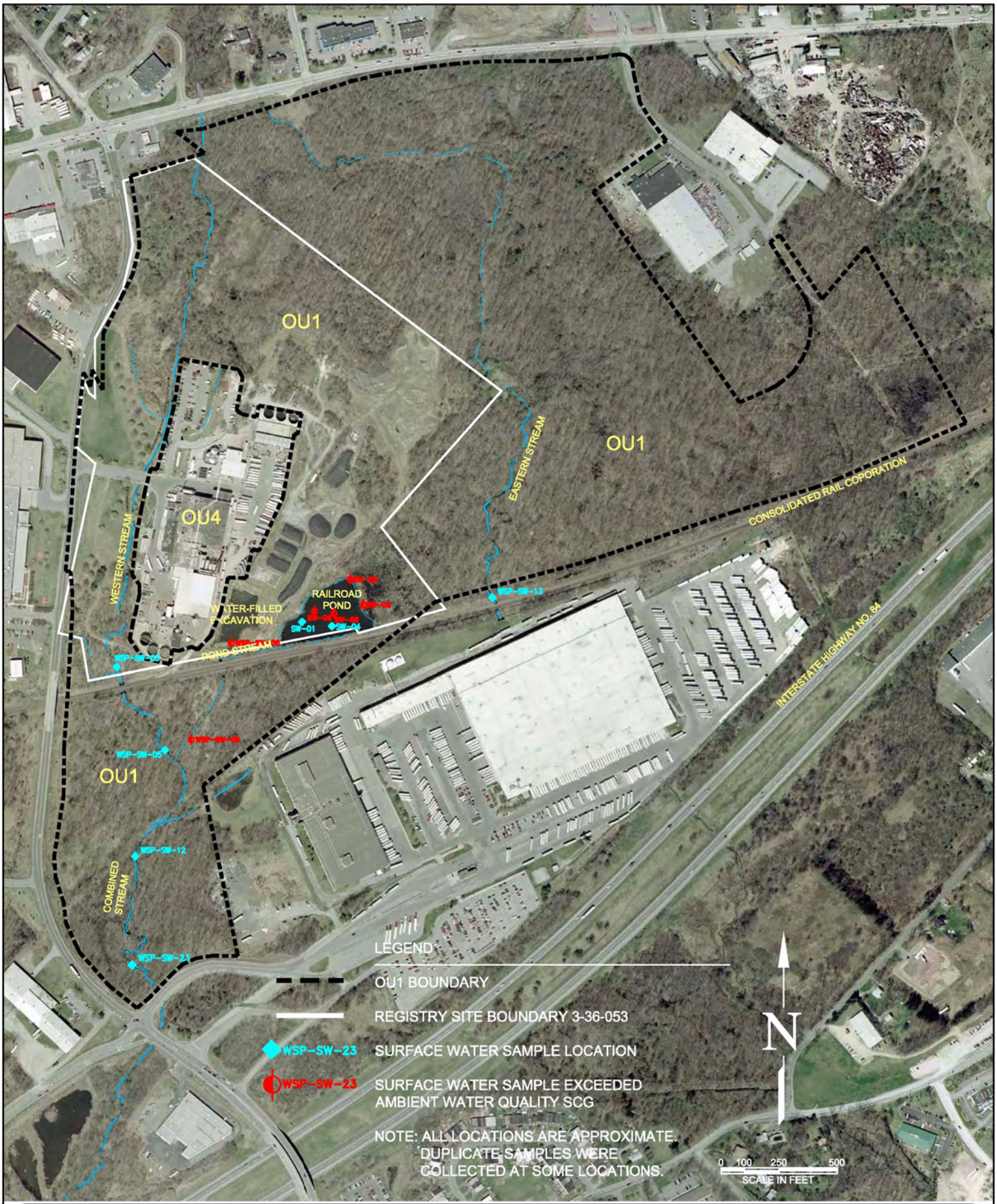

EXTENT OF SURFACE WATER CONTAMINATION

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 6

NO.	DATE	REVISION	APP.

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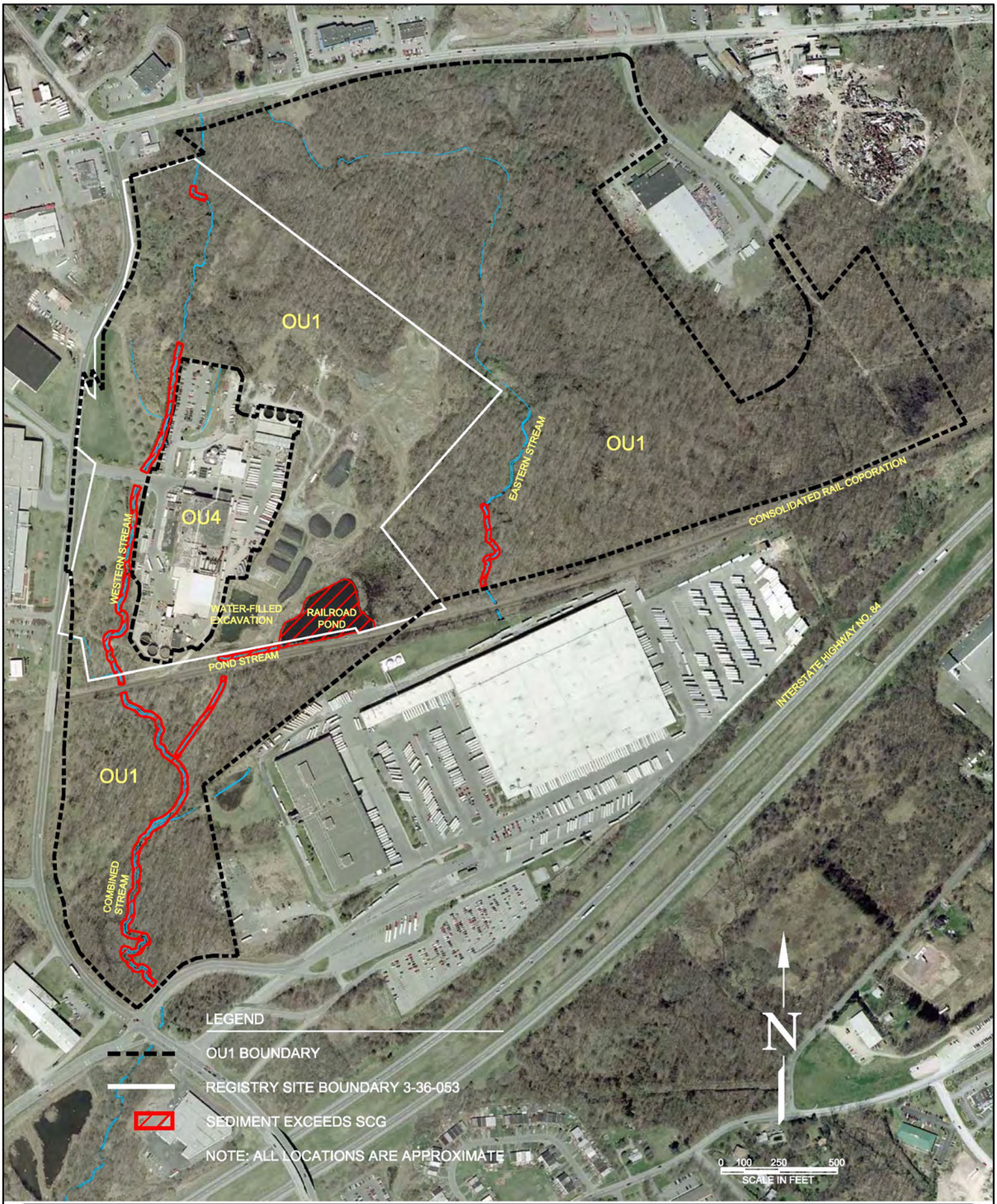

EXTENT OF SEDIMENT CONTAMINATION

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 7

NO.	DATE	REVISION	APP.

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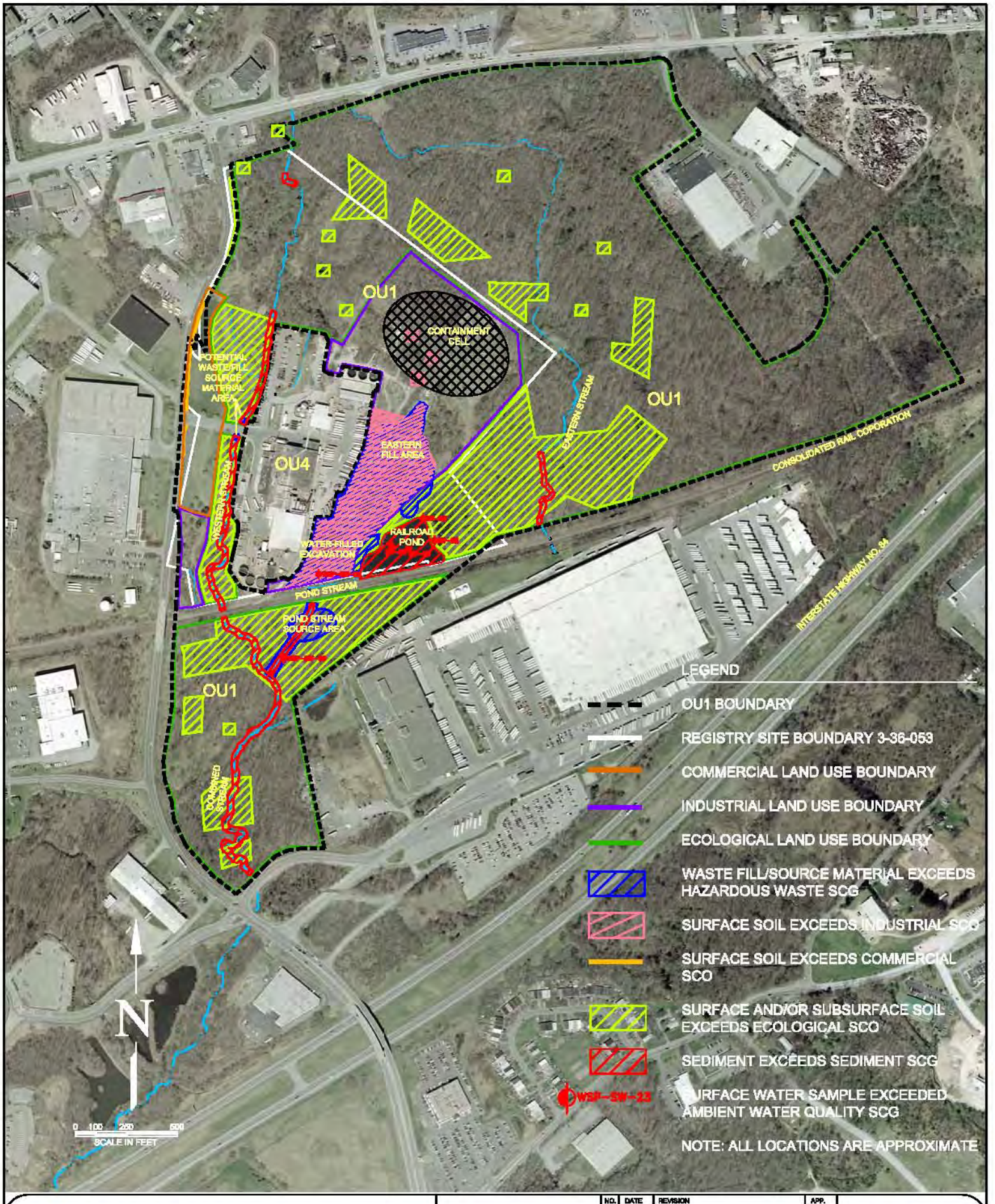

SELECTED REMEDY

REVERE SMELTING & REFINING CORPORATION
MIDDLETOWN, NEW YORK

FIGURE 8

NO.	DATE	REVISION	APP.

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Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation (RI) 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.

As identified in Section 3, the site is being addressed as four Operable Units (OUs). OU-1 consists of the four parcels which comprise the 60.6-acre Class 2 site, excluding the footprint of the active facility (OU-4). In addition, OU-1 also includes six off-site parcels (four of which are owned by Revere) where impacts from the site have been identified. OU-2 is all groundwater in the area of OUs 1, 3 and 4. OU-3 consists of off-site areas which are not a part of OU-1, while OU4 is the area defined as the active facility.

Given the large area and varying land uses addressed by OU1 in order to evaluate the impacts from the disposal, four areas of concern (AOCs) have been identified for this discussion of the nature and extent of contamination.

AOC 1 consists of the front lawn area portion of the site located to the west of OU-4, the active facility (see Figure 4). AOC 1 is bounded by Ballard Road on the east and the fenced active facility area to the west. The surface water body known as the Western Stream flows from north to south on the west side of this AOC. Land use for AOC 1 is considered commercial as an unsecured green lawn and landscaped area, adjacent to off-site commercial properties on the other side of Ballard Road. Included in this AOC are areas where the ecological use SCOs will apply adjacent to the western stream bank consistent with AOC 3 areas to the north.

AOC 2 consists of the remaining portion of the developed area of the site located to the east, north, and southwest of the active facility, including the Eastern Fill Area (see Figure 4). The area is generally fenced or heavily vegetated with limited access and is the location of, or in close proximity to, industrial activities. The significant area within AOC 1 is the Eastern Fill Area, an area of historic industrial waste disposal, where a previous RCRA Corrective Action was initiated but not completed by Revere. It includes several Corrective Action Management Units (CAMUs) established for the storage of the treated waste which will need to be addressed where treatment was incomplete. Unexcavated waste exists through the area and the southern end of the Eastern Fill Area includes an open, water-filled excavation where the previous Revere work stopped. The current land use for AOC 2 is considered industrial. Included in this AOC are areas where the ecological use SCOs will apply adjacent to the Railroad pond consistent with AOC 3 areas to the east.

AOC 3 consists of ecological areas within the OU-1 area which are delineated as wetlands in the proximity of the Western Stream and Railroad Pond, northern areas within the registry site boundary and all areas outside of the registry site and within OU-1 to the east of Ballard Road (see Figure 5). Any wetlands delineated within the other AOCs will be considered Ecological Areas as well. The final extent of Ecological Areas will be determined based in part on a wetland delineation approved by the Department.

AOC 4 consists of areas of surface water sediment within or adjacent to other OU-1 AOCs. The sediment areas of AOC 4 are defined as permanent or nearly permanent water bodies and streams which have been impacted by Revere's operations. Soils underlying sediment areas to a depth of two feet are considered sediments and shall be evaluated based on Department Standards, Criteria, and Guidelines (SCGs) for sediment and subject to sediment based Department regulations. The surface water bodies, as identified on Figure 2 from west to east, are the: Western Stream, Combined Stream, Pond Stream, Railroad Pond and Eastern Stream, as well as other OU-1 areas

meeting the above sediment area definition.

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 four categories: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). 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.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and are impacting groundwater, soil, surface water and sediment.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium.

Waste/source areas were identified at this site in OU-1 as fill material, soils, and sediment that exceed the hazardous waste threshold for lead (6 NYCRR Part 371) of 5 milligrams per liter (mg/L) by Toxicity Characteristic Leaching Procedure (TCLP) testing. The approximate extent of waste/source areas in OU-1 are shown on Figure 2. TCLP testing data collected during the OU-1 RI for soil and sediment are summarized and compared to hazardous waste thresholds in Table 1.

Table 1 – Waste/Source Areas

Detected Constituents	Concentration Range Detected (mg/L)[a]	TCLP Threshold	Frequency Exceeding TCLP
Soil			
Arsenic	0.0093 – 12.5	5	1 of 17
Lead	ND – 1,010	5	115 of 282
Sediment			
Lead	ND – 60.2	5	2 of 12

a – mg/L: milligrams per liter
b - TCLP: Part 371-3(e), Table 1, Maximum Concentration of Contaminants for the Toxicity Characteristic Leaching Procedure
ND – Not detected

Large quantities of waste containing lead slag and battery parts were buried throughout OU-1 in AOC 1 to the west of the active plant in the front lawn area, and to the east of the active plant primarily in the Eastern Fill Area (EFA) of AOC 2, as well as in the OU-4 area beneath the active plant. The EFA was the largest source area identified n AOC 2. An interim corrective measure under the RCRA program, identified by this document as an interim remedial measure (IRM), was started in 1997 which removed some of the fill material located to the west of the active facility in the AOC 1 area and the EFA. The IRM was terminated by Revere in 1999. The RI for OU-1

identified two distinct source areas: the Eastern Fill Area (EFA) in AOC 2 and the Pond Stream Source Area (PSSA) in AOC 3, as shown on Figure 2.

The EFA consists of approximately 6 acres to the east of Revere's active facility throughout which soils at various depths exceed the hazardous waste threshold of 5 mg/L for lead. The EFA contains approximately 50,000 cubic yards of hazardous waste at depths ranging from 2 to 24 feet below ground surface (bgs). The EFA also contains several stabilized, or partially stabilized, covered soil piles which remain from the terminated IRM, are also considered waste/source areas. The piles contain about 6,500 cubic yards of material. The terminated IRM also left an open excavation in the EFA.

The PSSA is located in AOC 3 to the south of the active facility and the railroad line which passes through OU-1. The PSSA is approximately 1 acre in area. It appears to be the result of waste material from the EFA which has migrated as a result of surface water runoff into the pond stream to the north of the railroad tracks through a railroad culvert, to a depositional area (the PSSA) located south of the railroad tracks. Samples exceeding the hazardous waste threshold for lead in the PSSA are generally found within 50 feet of the banks of the pond stream to the south of the railroad tracks. The depth of the impacted soil/sediment in this source area is one to two feet in most areas, but may extend greater than 2 feet in the immediate vicinity of the pond stream. Approximately 5,000 cubic yards of hazardous waste is present in the PSSA.

The waste/source areas identified in OU-1 will be addressed in the remedy selection process.

Groundwater

Groundwater samples have been collected on a quarterly basis since the early 1990's from overburden and bedrock monitoring wells and overburden piezometers throughout OU-1 and OU-4 as part of Revere's Part 373 operating permit. Groundwater samples are analyzed for total lead, antimony, cadmium, chromium, arsenic, pH, alkalinity, and sulfate on a quarterly basis. Groundwater samples from two shallow wells are analyzed for total metals on an annual basis. The scope of the quarterly groundwater monitoring events has varied over time, and currently consists of sixteen overburden wells, six piezometers and seven bedrock wells.

In general, groundwater flow in both the overburden and groundwater aquifer is to the south beneath OU-4 and OU-1. Depth to groundwater in the overburden varies throughout the site, but on average is about 10 feet.

Tables 2A and 2B show groundwater data collected during all four quarterly monitoring events in 2010. In 2010, groundwater SCGs were exceeded beneath OU-4 for lead, antimony, cadmium, and arsenic and beneath the EFA (OU-1) for lead, antimony, cadmium, chromium, and arsenic. Groundwater monitoring also indicated that while the SCGs for metals are exceeded in the groundwater beyond the railroad tracks to the south of the active facility, the plume does not appear to extend off the Revere property. Elevated levels of sulfate were also observed in several overburden and bedrock monitoring wells beneath the active facility and to the south of the active facility in OU-1.

Table 2A – OU-1 Shallow Groundwater (2010)

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Metals			
Aluminum	ND – 149	100	1 of 2

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Antimony	ND – 370	3	18 of 84
Arsenic	ND – 99.8	25	8 of 84
Cadmium	ND – 41.2	5	19 of 84
Chromium	ND - 123	50	2 of 84
Cobalt	ND – 50.8	5	1 of 2
Iron	364 – 3,920	300	2 of 2
Lead	ND – 5720	25	15 of 84
Magnesium	14,900 – 93,300	3,500	1 of 2
Manganese	1,850 – 25,700	300	2 of 2
Selenium	ND – 20.1	10	1 of 2
Sodium	21,500 – 335,000	20,000	2 of 2
Other			
Sulfate	19.7 - 4105 ppm[c]	250 ppm[c]	37 of 68

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

Table 2B – OU-1 Deep Groundwater (2010)

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Metals			
Lead	ND - 155	25	4 of 28
Cadmium	ND – 10	5	4 of 28
Arsenic	ND – 45.2	25	2 of 28
Other			
Sulfate	33.4 – 6940 ppm[c]	250 ppm[c]	18 of 28

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

Although aluminum, cobalt, iron, magnesium, manganese, selenium, and sodium exceeded groundwater standards in 2010 concentrations of these metals were not observed at significant levels in soils or wastes during the RI. As such

these compounds are considered to be naturally occurring and are not considered site specific contaminants of concern. The primary groundwater contaminants of concern are arsenic, antimony, cadmium, chromium, lead, and sulfate. The sources of groundwater contamination include the source areas and soil impacts identified in OUs-1 and 4 and the on-going industrial processes in OU-4.

Based on the findings of the RI and quarterly groundwater monitoring data, the past disposal of hazardous waste in OU-1 and OU-4 and the ongoing industrial processes in OU-4 have resulted in the contamination of groundwater. The remediation of groundwater will not be addressed by the remedy selection process for OU-1. The goal of the OU-1 remedy will be to eliminate the source of groundwater contamination beneath OU-1. Following the implementation of the remedy for OU-1, a remedial program will be developed for groundwater (OU-2). The remedial program for OU-2 will address groundwater contamination attributable to OUs 1, 3 and 4.

Soil

Over 1,000 surface (0-2 inches) and subsurface soil samples were collected in OU-1 during the RI. Due to the size and varying land uses of OU-1, the discussion of nature and extent of soil contamination has been divided into the four AOCs as shown on Figures 4, 5 and 7. Soil results will be discussed based on these AOCs.

Soil – AOC 1

AOC 1 includes the front lawn area to the west of the active facility outside of designated wetlands. Shallow soil analytical data (0 - 1 foot) for AOC 1 is compared to the unrestricted SCOs and commercial SCOs in Table 3A. Subsurface soil analytical data (1 foot and deeper) is compared to unrestricted SCOs and protection of groundwater SCOs (PGWSCOs) for constituents of concern identified in groundwater (arsenic, chromium, cadmium, lead) in Table 3B.

Table 3A – Surface Soil (0 to 1 ft bgs) – AOC 1

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Commercial Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Metals					
Arsenic	6.1 - 20.1	13	1 of 2	16	1 of 2
Lead	30.5 – 69,200	63	17 of 25	1,000	9 of 25
Nickel	21.9 – 30.7	30	1 of 2	310	0 of 2
Zinc	71.1 – 113	109	1 of 2	10,000	0 of 2

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b – SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
C – SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use.
ND – Not detected

Table 3B – Subsurface Soil (> 1 ft bgs) – AOC 1

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Groundwater SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Metals					
Arsenic	11.7 – 12.4	13	0 of 3	16	0 of 3
Cadmium	0.08 - 0.22	2.5	0 of 3	7.5	0 of 3
Chromium	25.1 – 28	30	0 of 3	Not specified	
Lead	18.8 – 32,256	63	37 of 46	450	28 of 46

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b – SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
C – SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.
ND – Not detected

Surface soil samples were collected between 0 and 1 foot below grade with vegetation removed. A subset of surface soil samples was collected from 0 to 2 inches below grade to assess direct human exposure. Subsurface soil samples in AOC 1 were collected to depths of approximately 10 feet bgs. All surface and subsurface samples were analyzed for lead with subsets of samples analyzed for VOCs, SVOCs, PCBs/Pesticides, and total metals. VOCs and PCBs were not detected in any samples. SVOCs and pesticides were detected in samples below unrestricted SCOs. Several metals were detected in surface soils above the unrestricted SCOs, but only arsenic and lead were detected above the commercial SCOs. The surface areas impacted by lead and arsenic in AOC 1 above the commercial SCOs are shown in Figure 4.

Only lead was detected in subsurface soils that exceeded the PGWSCO. AOC 1 subsurface soil concentrations that exceeded the PGWSCOs for lead are found along the perimeter of the front lawn at the limits of the IRM which was terminated in 1999.

Surface soil contamination identified in AOC 1 will be addressed by the remedy selection process for OU-1 for the contaminants of concern (lead and arsenic) that exceed the commercial SCOs. Subsurface soil contamination identified in AOC 1 is associated with the waste/source material discussed above and will be addressed in the OU-1 remedy selection process.

Soil - AOC 2

AOC 2 is the industrial areas of OU-1 which consists of the developed areas of the site within the registry site boundary, excluding the active facility (OU-4). AOC 2 includes the EFA. Surface soil analytical data (0 – 1 foot) is compared to the unrestricted soil cleanup objectives (SCOs) and industrial SCOs in Table 4A. Subsurface soil analytical data (1 foot and deeper) is compared to unrestricted SCOs and PGWSCOs for the contaminants of concern (arsenic, chromium, cadmium, lead) identified in the groundwater, in Table 4B.

Table 4A – Surface Soil (0 to 1 ft bgs) – AOC 2

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Industrial Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Metals					
Arsenic	7.2 – 465	13	21 of 31	16	16 of 31
Cadmium	ND – 19.5	2.5	11 of 29	60	0 of 29
Chromium	ND – 28	30	0 of 29	6,800	0 of 29
Copper	11 – 449	50	13 of 26	10,000	0 of 26
Lead	ND – 210,000	63	167 of 195	3,900	28 of 195
Mercury	ND – 0.43	0.18	2 of 26	5.7	0 of 26
Nickel	9.6 – 65.6	30	10 of 26	10,000	0 of 26
Selenium	ND – 18.1	3.9	3 of 26	6,800	0 of 26
Zinc	47 – 154	109	5 of 26	10,000	0 of 26
Pesticides/PCBs					
4,4,'-DDD	ND – 0.0038	0.0033	1 of 4	180	0 of 4
4,4,'-DDE	ND – 0.019	0.0033	2 of 4	120	0 of 4
4,4,'-DDT	ND – 0.0051	0.0033	2 of 4	94	0 of 4

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b – SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c – SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Industrial Use.
ND – Not detected

Table 4B – Subsurface Soil (> 1 ft bgs) – AOC 2

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Groundwater SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Metals					
Arsenic	0.42 – 6,700	13	16 of 30	16	16 of 30
Cadmium	ND – 160	2.5	10 of 30	7.5	7 of 30
Chromium	ND – 39	30	4 of 30	Not specified	
Lead	7 – 770,000	63	85 of 147	450	54 of 147

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b – SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c – SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.
ND – Not detected

Surface soil samples were collected at various depth intervals between 0 and 1 foot below grade with vegetation removed. A subset of surface soil samples, were collected from 0 to 2 inches below grade to assess direct human exposure. All surface and subsurface samples were analyzed for lead with subsets of samples analyzed for VOCs, SVOCs, PCBs/Pesticides, metals, and TCLP metals/lead (to identify waste fill/source material). PCBs were not detected in any samples. VOCs and SVOCs were detected in samples below unrestricted SCOs. Pesticides were detected in samples marginally above unrestricted SCOs but below industrial SCOs and are not considered a site related contaminant. These detections are likely attributable to historic use of some areas of OU-1 for agriculture. Several metals were detected in surface soils above the unrestricted SCOs, but only arsenic and lead were detected above the industrial SCOs. The surface areas impacted by lead and arsenic contamination above the industrial SCOs are shown in Figure 4. AOC 2 surface soil concentrations which exceed industrial SCOs are found throughout the EFA and areas to the northeast of the active facility in OU-1 which have been historically used for equipment storage and soil and contaminated concrete staging.

Subsurface soil samples in AOC 2 were collected to depths of approximately 24 feet bgs. PGWSCOs were exceeded for lead, arsenic, and cadmium as shown in Table 4B. In general, where PGWSCOs were exceeded in subsurface soil in the AOC, the contamination was co-located with the samples indicating the presence of waste fill/source material (see Figure 2).

Surface soil contamination identified in AOC 2 of OU-1 will be addressed by the remedy selection process for the contaminants of concern that exceed industrial SCOs (lead and arsenic). Subsurface soil contamination identified in AOC 2 is associated with the waste/source material in the EFA discussed above and will be addressed in the OU 1 remedy selection process.

Soil – AOC 3 Ecological Resource Areas

Areas of OU-1 identified as ecological resource areas are AOC 3 as shown on Figure 5. AOC 3 includes all designated wetlands and ecologically sensitive areas within the registry site boundary and all areas of OU-1 outside of the site boundary. Surface and subsurface soil analytical data for AOC 3 are compared to the unrestricted SCOs and protection of ecological resources SCOs in Table 5. Based on a comparison of the lead soil concentrations found during the RI and lead levels found in tissue samples of selected ecological receptors (i.e. earthworms and small mammals), a site specified protection of ecological resources SCO in soil of 400 ppm for lead was developed.

Table 5 – Surface and Subsurface Soil – AOC 3

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Ecological Resources SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Metals					
Arsenic	ND – 1,510	13	57 of 154	13	57 of 154

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Ecological Resources SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Barium	17.2 – 667	350	3 of 51	433	2 of 51
Cadmium	ND – 23.8	2.5	9 of 89	4	8 of 89
Chromium	8.9 - 32	30	1 of 84	41	0 of 84
Copper	8.9 - 163	50	11 of 57	50	11 of 57
Lead	7.2 – 175,000	63	919 of 1,073	400[d]	357 of 1,073
Manganese	67.8 - 5,180	1,600	9 of 56	1,600	9 of 56
Mercury	ND – 0.95	0.18	9 of 40	0.18	9 of 40
Nickel	7.4 – 87.4	30	8 of 53	30	8 of 53
Selenium	ND – 4.3	3.9	6 of 54	3.9	6 of 54
Zinc	23.3 – 210	109	10 of 57	109	10 of 57
Pesticides/PCBs					
4,4,'-DDE	ND – 0.096	0.0033	9 of 13	0.0033	9 of 13
4,4,'-DDT	ND – 0.043	0.0033	6 of 13	0.0033	6 of 13
Dieldrin	ND – 0.011	0.005	1 of 13	0.006	1 of 13
PCBs	ND – 0.31	0.1	1 of 13	1	0 of 13

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b – SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c – SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Ecological Resources, unless otherwise noted.
d – Site-specific value derived from soil analytical data and biota tissue sampling.
ND – Not detected

Soil samples in AOC 3 were generally collected between 0 and 2 foot below grade with vegetation removed. Surface soil samples were collected from 0 to 2 inches below grade at most locations to assess direct human exposure. Samples collected from the 0 to 6 inches below grade were used to assess terrestrial wildlife exposure. All soil samples were analyzed for lead with subsets of samples analyzed for VOCs, SVOCs, PCBs/Pesticides, total metals and TCLP Lead (to identify waste fill/source material). VOCs, SVOCs and PCBs were detected in samples above unrestricted SCOs. Pesticides were detected which marginally exceeded the unrestricted SCOs and protection of ecological SCOs, however these are not site related contaminants and are attributable to historic use of some areas of OU-1 for agriculture.

Several metals were detected which exceeded both unrestricted SCOs and protection of ecological resources SCOs. Lead was the most common contaminant identified which exceeded the SCOs. Lead contamination in soils in the AOC 3 is present over an area of approximately 20 acres in all directions from the active facility. The extent of surface soil contamination that exceeds the SCOs is shown in Figure 5. Concentrations of lead were highest to the

south of Revere's active facility, around the pond stream, where concentrations of total lead in soils exceeded 10,000 ppm in several samples and to the east of the railroad pond where concentrations generally exceeded 1,000 ppm. The highest lead levels in soils in these two areas are likely attributable to the transport of waste fill/source material by surface water runoff, while the more widespread lead contamination in the rest of the AOC 3 is likely attributable to a combination of surface water transport, air dispersion from the plant and dust transport from the waste fill/source material. The vertical extent of contamination in AOC 3 for lead was generally limited to one foot in depth in all areas except in the PSSA and the source/waste area surrounding the western stream to the west of the active facility. In source areas within AOC 3, contamination that exceeds SCOs was documented to 2 feet below grade, and may extend to greater depth. Where the protection of ecological resources SCOs were exceeded for other metals (primarily arsenic) the sample locations were also associated with the presence of elevated lead levels.

Based on the findings of the RI the past disposal of hazardous waste has resulted in the contamination of soil in AOC 3. The primary site contaminants of concern identified in the soil in AOC 3 to be addressed by the remedy selection process are lead and arsenic.

Sediment (AOC 4)

AOC 4 is defined as the sediment present in permanent or nearly permanent water bodies and streams (for example: Western Stream, Railroad Pond), which have been impacted by Revere's operations to the east of Ballard Road. Soils adjacent to and underlying sediment areas to a depth of two feet are considered sediments and shall be evaluated based on Department Standards, Criteria, and Guidelines (SCGs) for sediment and subject to sediment based Department regulations.

Sediment samples were collected during the OU-1 RI from the railroad pond, eastern stream, western stream, pond stream and combined stream. Sediment samples were analyzed for VOCs, SVOCs, PCBs/Pesticides, Metals, and TCLP Lead (to identify waste fill/source material). The results of the analytical sampling are summarized on Figure 7 and shown on Table 6. No VOCs or pesticides were detected. SVOCs and PCBs were detected in sediment samples at low levels attributable to background conditions associated with urban runoff and not attributable to site waste/source contamination. The primary contaminant of concern identified in AOC 4 during the RI was lead. Lead concentrations exceeded the lowest effects level (LEL) in all but one of 67 samples. As shown on Figure 7, lead contamination in AOC 4 exceeding SCGs extends from the railroad pond through the pond stream, from the northern boundary of the active facility in the western stream to the downstream limit of OU-1 in the combined stream, and persists in a section of the Eastern Stream to the east of active facility. Sediment contamination in the combined stream and its up gradient sources is likely attributable to surface water runoff from waste fill/source material in the EFA and to the west of the active facility. Waste fill/source material in AOC 4 was also documented during the RI in the pond stream, where waste fill/source material has migrated by surface water runoff from the EFA resulting in a secondary source area (the PSSA) in the AOC 4 area to the south of the railroad tracks. Sediment contamination in AOC 4 is impacting downstream areas in OU-3.

Table 6 – AOC 4 (Sediment)

Detected Constituents	Concentration Range Detected (ppm)[a]	SCGs[b] (ppm)	Frequency Exceeding SCG
Metals			
Antimony	ND - 633	LEL 2	19 of 20
		SEL 25	10 of 20

Detected Constituents	Concentration Range Detected (ppm)[a]	SCGs[b] (ppm)	Frequency Exceeding SCG
Arsenic	10 – 525	LEL 6	11 of 11
		SEL 33	6 of 11
Cadmium	ND – 17.6	LEL 0.6	7 of 11
		SEL 9	3 of 11
Chromium	ND – 66.4	LEL 26	2 of 11
		SEL 110	0 of 11
Copper	26.8 - 369	LEL 16	11 of 11
		SEL 110	2 of 11
Iron	26,000 – 56,800	LEL 20,000	11 of 11
		SEL 40,000	2 of 11
Lead	19.2 – 69,600	LEL 31	66 of 67
		SEL 110	57 of 67
Manganese	402 – 6,290	LEL 460	9 of 11
		SEL 1,100	4 of 11
Nickel	18.2 – 97.2	LEL 16	11 of 11
		SEL 50	3 of 11
Zinc	78.2 - 298	LEL 120	4 of 11
		SEL 270	1 of 11
Pesticides/PCBs			
Total PCBs	ND – 0.027	HH 0.0008	1 of 5

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;
b - SCG: The Department's "Technical Guidance for Screening Contaminated Sediments."
LEL = Lowest Effects Level and SEL = Severe Effects Level. Sediment is considered contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is impacted, the impact is considered moderate.
HH = Human Health Bioaccumulation (Sediment Criteria ug/gOC)

The contaminant of concern in AOC 4 is lead. Lead exceeds SCGs in virtually all sediment samples taken in the surface water bodies located down and side gradient to historic operational and waste/source disposal areas identified at the site. The sediment contamination extends downstream in the water bodies beyond the limits of OU-1 into the OU-3 area. An ongoing investigation is evaluating the extent of impacts in OU-3. All other metals detected which exceeded SCGs were co-located with lead.

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of AOC 4 (sediment). The site contaminant that is considered to be the primary contaminant of concern which will drive the remediation of sediment to be addressed by the remedy selection process is lead.

Surface Water

Surface water bodies in OU-1 consist of the streams and a pond shown on Figure 6, which have been identified as follows for purposes of this document. The "Railroad Pond" is located in the AOC 3 area to the east of the active facility abutting the southern part of AOC 1 and the railroad tracks. The Pond empties into a Pond Stream which

runs parallel to the northern side of the railroad tracks and then passes underneath the railroad tracks via a culvert, where it continues to flow along the south side of the tracks. The Western Stream is adjacent to AOC 1 and runs parallel to Ballard Road, flowing from north to south through the site also passing under the railroad tracks via a culvert joining the Pond Stream. The Western Stream and Pond Stream combine to the south of the active facility to form the "Combined Stream". The Combined Stream continues through the southern portion of OU-1, where it enters the OU-3 area. In OU-3 the Combined Stream passes beneath Ballard Road and I-84 via culverts, and eventually discharged to the Wallkill River. An additional surface water body, the "Eastern Stream", runs through the eastern portion of OU-1 before entering a culvert under the tracks where it continues to the south of OU-1.

Surface water samples were collected during the OU-1 RI from each stream and the railroad pond. Surface water samples were analyzed for dissolved antimony, arsenic, cadmium, chromium, and lead. Surface water samples were also analyzed for hardness so that the average site surface water hardness could be established to calculate the SCGs for cadmium and lead. The results of analytical sampling are summarized in Table 7 and shown on Figure 6. Seven of fifteen surface water samples exceeded the site specific SCG for dissolved lead of 7.8 ppb. Five of six surface water samples collected in the railroad pond and both samples collected from the pond stream (one to the north and one to the south of the railroad tracks) exceeded the SCG for lead. Arsenic, antimony, and cadmium were also detected in one surface water sample obtained from the pond stream.

Table 7 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Metals			
Antimony	ND - 85	3	1 of 8
Arsenic	ND - 55	150	0 of 8
Cadmium	ND – 8.3	3.5[c]	1 of 8
Lead	ND - 560	7.8[c]	7 of 15

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- Based on average site surface water hardness of 193 ppm.

The primary surface water contaminant is dissolved lead. Lead contamination in surface water is the results of sediment transport through waste fill/source areas in the EFA and PSSA to surface water bodies. Sampling during the RI indicates that the surface water in the railroad pond and the pond stream exceed the dissolved lead SCG, which is consistent with sediment contamination discussed below.

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of surface water. The site contaminant that is considered to be the primary contaminants of concern which will drive the remediation of surface water to be addressed by the remedy selection process is lead. Surface water contamination will be addressed by the remedy selection process by addressing sediment, the source of contamination to surface water.

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:

Public Health Protection

Soil

- Prevent ingestion/direct contact with contaminated soil.
- Prevent the generation of airborne particulate matter from impacted surface or subsurface soil and process waste/fill during the implementation of the selected remedy.

Surface Water

- Prevent surface water contamination which may result in fish advisories.

Sediment

- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.

Environmental Protection

Groundwater

- Remove the source of ground or surface water contamination.

Soil

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

Surface Water

- Restore surface water to ambient water quality criteria for contaminants of concern.
- Prevent impacts to biota from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the marine or aquatic food chain.

Sediment

- Prevent releases of contaminants from sediment that would result in surface water levels in excess of ambient water quality criteria.
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

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 Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: Consolidation of Source Material and Surface Soils to Industrial SCOs, Construction of Cap and Slurry Wall, Installation of a Groundwater Extraction System, Filling of Railroad Pond, Capping of Wetlands, Off-Site Wetland Mitigation, Installation of Drainage Culverts

Alternative 2 will include the excavation of source material beyond the limits of the Eastern Fill Area (EFA), surface soil in OU-1 in exceedence of the industrial SCO for lead (3,900 ppm), and subsurface soil in the open excavation within the EFA in exceedence of the protection of groundwater SCO for lead (450 ppm) and arsenic (16 ppm). Excavated soils will be consolidated with existing source material in the EFA beneath a multi-layer cap system. A slurry wall will be constructed around the consolidated material in the EFA. A groundwater extraction system will be installed to maintain an inward groundwater gradient within the slurry wall and cap footprint in the EFA.

A wetland delineation of OU-1 will be performed during the design. The Railroad Pond and delineated wetlands in OU-1 will be filled with soil meeting the PGWSCOs. A redesigned drainage system will be installed in the Railroad Pond and delineated wetlands to handle the volume of surface water flow that would have been previously stored or routed through these areas. All stream channels in OU-1 will be routed through engineered drainage culverts and filled with soil meeting the PGWSCOs. Any sediments requiring excavation for installation of drainage culverts will be dewatered and consolidated in the EFA. Off-site wetland mitigation will be conducted to mitigate wetland lost due to the filling of wetlands and the pond under this alternative.

An environmental easement will be placed on the site restricting use of OU-1 to industrial use. A site management plan requiring operation, maintenance, and monitoring of institutional and engineering controls and periodic certification will be required by the environmental easement.

The remedy will take approximately one year to design and one year to implement.

Present Worth: *$13,429,000*
Capital Cost: *$12,276,000*
Annual Costs:(Years 1-30) *$75,000*

Alternative 3: In-situ Stabilization and Placement of Low Permeability Cover System over Stabilized Material, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels

Alternative 3 will include in-situ treatment of all source material to non-hazardous levels using a stabilization technology and consolidation of treated source material within the EFA beneath a low permeability cover. The treatment additive will be determined in the design. An estimated 50,000 cubic yards of source material will be treated and consolidated from the EFA, and an estimated 17,000 cubic yards of source material will be treated and consolidation from other areas of OU-1. A groundwater monitoring well network will be placed around the consolidation area to monitor the effectiveness of the stabilization.

Non-source soils will be addressed based on location. Non-source soils in industrial areas (areas within the registry site boundary that are not otherwise classified) that exceed the industrial SCOs for lead or arsenic will be either excavated to a depth of one foot or capped by a one foot soil cover meeting the requirements of 6 NYCRR Part 375-6.7(d). Non-source soils in commercial areas (the front lawn) that exceed the commercial SCOs for lead or arsenic will be either excavated to a depth of one foot or capped by a one foot soil cover meeting the requirements of 6 NYCRR Part 375-6.7(d).

A wetland delineation of OU-1 will be performed during the design. The wetland delineation will be used by the Department to determine the extent of ecological areas in OU-1. Non-source soils in ecological areas exceeding the site specific remedial objective of 400 ppm for lead and 13 ppm for arsenic will be excavated to depths determined during the remedial design (maximum depth 2 feet). Excavated areas will be backfilled with soil that meets unrestricted SCOs and approximates the physical properties of the soil removed. Ecological areas will be restored and revegetated consistent with 6 NYCRR Parts 663 and 608. An estimated 44,000 cubic yards of non-source material soils will be excavated from ecological areas.

Sediment areas of OU-1 that will be addressed by this remedy are defined as permanent or nearly permanent surface water bodies and streams and include all stream channels within OU-1, the Railroad Pond, and certain areas of delineated wetland. Sediments will be excavated to a depth of two feet in all areas where sediment SCGs are exceeded. Soil underlying sediment areas will be excavated from a depth of two to three feet in exceedence of the site specific remedial objectives for lead and arsenic in ecological areas (see above). Sediment areas will be backfilled with soil that meets unrestricted SCOs and approximates the physical properties of the soil removed. Sediment areas will be restored and revegetated consistent with 6 NYCRR Parts 663 and 608.

Excavated non-source area soils and dewatered sediments may be consolidated in the consolidation area beneath the low permeability cover or disposed of off-site at a permitted facility.

An environmental easement will be placed on the site restricting use of industrial areas of OU-1 including the consolidation area to industrial use and restricting all other areas of OU-1 to commercial or industrial use. A site management plan requiring operation, maintenance, and monitoring of institutional and engineering controls and periodic certification will be required by the environmental easement.

The remedy will take approximately one year to design and two years to implement.

Present Worth: *$16,256,000*
Capital Cost: *$15,410,000*
Annual Costs:(Years 1-30) *$55,000*

Alternative 4: Excavation, Stabilization and On-Site Consolidation in Engineered Disposal Cell, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels

Alternative 4 differs from Alternative 3 with respect to the disposal of source material. Alternative 4 will include in-situ or ex-situ treatment of all source material to non-hazardous levels using a stabilization technology with consolidation of treated source material in an on-site containment cell meeting the substantive requirements of 6 NYCRR Part 360. The methodology for treatment, treatment additive, and location of the containment cell will be determined in the design. An estimated 50,000 cubic yards of source material will be treated and placed in the containment cell from the EFA, and an estimated 17,000 cubic yards of source material will be treated and placed in the containment cell from other areas of OU-1. The EFA will be backfilled and seeded as necessary to promote drainage with soils meeting the requirements of 6 NYCRR Part 375-6.7(d). A groundwater monitoring well network will be placed around the containment cell to monitor the effectiveness of the stabilization and the integrity of the containment cell.

Alternative 4 will be the same as Alternative 3 for non-source soils in industrials areas, commercial areas, ecological areas, and sediment areas except for disposal of excavated material. Under Alternative 4, excavated non-source area soils and dewatered sediments may be placed in the containment cell, used as backfill in the EFA if the soils meet the requirements of 6 NYCRR Part 375-6.7(d), or disposed of off-site at a permitted facility.

Alternative 4 is similar to Alternative 3 in that an environmental easement will be placed on the site. Under Alternative 4, the environmental easement will restrict use of industrial areas of OU-1 and the area of the containment cell to industrial use and restrict all other areas of OU-1 to commercial or industrial use. A site management plan requiring operation, maintenance, and monitoring of institutional and engineering controls and periodic certification will be required by the environmental easement.

The remedy will take approximately one year to design and two years to implement.

Present Worth:.....*$18,773,000*
Capital Cost:.....*$17,928,000*
Annual Costs:(Years 1-30).....*$55,000*

Alternative 5: Excavation, Ex-situ Stabilization and Off-Site Disposal, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels

Alternative 5 differs from Alternatives 3 and 4 with respect to the disposal of source material. Alternative 5 will include ex-situ treatment of all source material to non-hazardous levels using a stabilization technology followed by off-site disposal at a permitted facility. The methodology for treatment will be determined in the design. An estimated 50,000 cubic yards of source material from the EFA and an estimated 17,000 cubic yards of source material from other areas of OU-1 will be disposed of. The EFA will be backfilled and seeded as necessary to promote drainage with soils meeting the requirements of 6 NYCRR Part 375-6.7(d).

Alternative 5 will be the same as Alternative 3 and 4 for non-source soils in industrials areas, commercial areas, ecological areas, and sediment areas except for disposal of excavated materials. Under Alternative 5, excavated

non-source areas soils and dewatered sediments will be disposed of off-site at a permitted facility. Approximately 44,000 cubic yards of non-source areas soils sediments will be disposed of off-site.

Alternative 5 is similar to Alternatives 3 and 4 in that an environmental easement will be placed on the site. Under Alternative 5, the environmental easement will restrict use of industrial areas of OU-1 to industrial use and restrict all other areas of OU-1 to commercial or industrial use. A site management plan requiring operation, maintenance, and monitoring of institutional and engineering controls and periodic certification will be required by the environmental easement.

The remedy will take approximately one year to design and two years to implement.

Present Worth: *$24,534,000*
Capital Cost: *$24,073,000*
Annual Costs:(Years 1-30) *$30,000*

Alternative 6: Restoration to Pre-Disposal or Unrestricted Conditions

Alternative 6 achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil clean objectives listed in Part 375-6.8 (a). Alternative 6 will include the excavation and off-site disposal of all soils in OU-1 in exceedence of unrestricted SCOs and all sediments in exceedence of SCGs. Source material will be treated ex-situ to non-hazardous levels using a stabilization technology prior to off-site disposal. Approximately 200,000 cubic yard of soil and sediment will be excavated and disposed of off-site. Ecological areas and sediment areas will be backfilled with soil that meets unrestricted SCOs and approximates the physical properties of the soil removed and revegetated and restored consistent with 6 NYCRR Parts 663 and 608. All other areas of the site will be backfilled with soil that meets unrestricted SCOs as necessary to promote drainage.

Alternative 6 will not require an environmental easement because it does not rely on engineering or institutional controls to prevent future exposure. There is no Site Management, no restriction, and no periodic review. However, groundwater monitoring associated with OU-2 and OU-4 may include continued monitoring of groundwater beneath OU-1. This monitoring would not be associated with the remedy for OU-1. The remedy will have no annual cost, only capital cost.

The remedy will take approximately one year to design and one year to implement.

Capital Cost: *$42,115,000*

Exhibit D

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative 1: No Action	$ 0	$ 0	$ 0
Alternative 2: Consolidation of Source Material and Surface Soils to Industrial SCOs, Construction of Cap and Slurry Wall, Installation of a Groundwater Extraction System, Filling of Railroad Pond, Capping of Wetlands, Off-Site Wetland Mitigation, Installation of Drainage Culverts	$12,276,000	$ 75,000	$ 13,429,000
Alternative 3: In-situ Stabilization and Placement of Low Permeability Cover System over Stabilized Material, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels	$ 15,410,000	$ 55,000	$ 16,256,000
Alternative 4: Excavation, Stabilization and On-Site Consolidation in Engineered Disposal Cell, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels	$ 17,928,000	$ 55,000	$ 18,773,000
Alternative 5: Excavation, Ex-situ Stabilization and Off-Site Disposal, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels	$ 24,073,000	$ 30,000	$ 24,534,000
Alternative 6: Restoration to Pre-Disposal or Unrestricted Conditions	$ 42,115,000	$ 0	$ 42,115,000

Exhibit E

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4: Excavation, Stabilization and On-Site Consolidation in Engineered Disposal Cell, Excavation or Capping of Surface Soils based on Land Use, Excavation and Restoration of Railroad Pond, Wetlands and Stream Channels as the remedy for this site. The elements of this remedy are described in Section 7.2. The proposed remedy is depicted in Figure 8.

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 Section 7.1. It would achieve the remediation goals for OU-1 by the excavation, treatment, and placement in an on-site disposal cell of waste fill/source material to meet hazardous waste disposal requirements, the consolidation of non-hazardous waste to meet protection of human health soil cleanup objectives (SCOs), and the restoration of streams, designated wetlands, and ecological sensitive areas to protect ecological receptors. Alternative 4 will effectively isolate waste fill/source material in OU-1 and allow for continued use of the industrial, commercial, and ecological portions of OU-1 while minimizing energy use and potential short term impacts to the community associated with the transporting of waste material from the site.

Alternative 1 (No Action) is not considered protective of public health and the environment as lead soil and sediment contamination will continue to impact ecological receptors and potentially impact human health. Alternative 1 will not be evaluated further.

Alternative 2 provides only limited protection of public health through the consolidation of wastes and no protection of the environment resulting from the permanent destruction of streams and wetlands. Alternative 2 includes the excavation and consolidation without treatment of waste fill/source material which exceeds the 6 NYCRR Part 371 hazardous waste threshold for lead which contravenes requirements for hazardous waste disposal set forth in 6 NYCRR Part 376. Alternative 2 also calls for the permanent destruction of wetlands and streams, which contravenes 6 NYCRR Part 608 and 663. Therefore Alternative 2 does not satisfy the threshold criteria of protection of public health and the environment and compliance with New York State Standards, Criteria, & Guidance (SCGs). Accordingly it will not be evaluated further.

Alternatives 3, 4, and 5 each meet the threshold criteria because they properly addresses contamination (both hazardous waste and non-hazardous waste) in compliance with SCGs and they each are protective of public health and the environment through the proper application of SCGs and restoration of impacted ecological areas. Alternative 6 provides the best compliance with the threshold criteria by removing all OU-1 contamination which exceeds unrestricted SCGs and provides for future unrestricted use of OU-1. Because Alternatives 3, 4, 5, and 6 each satisfy the threshold criteria, the balancing criteria are particularly important in selecting a final remedy for OU-1.

Long-term effectiveness is best accomplished by those alternatives involving excavation and off-site disposal of contaminated soils and sediments (Alternatives 5 and 6). Alternative 6 provides the greatest long-term effectiveness because the alternative removes all contamination from OU-1 which exceeds unrestricted SCGs and therefore does not require institutional or engineering controls. Alternative 5 also achieves a greater degree of long term

effectiveness by removing all waste fill/source material and soils and sediment which exceed SCGs from OU-1, but requires institutional and engineering controls to ensure compliance with long term land use restrictions. The long-term effectiveness of Alternative 4 and 5 are similar because Alternative 4 also requires placement of the treated (stabilized) waste fill/source material in an on-site containment cell meeting the substantive requirements of 6 NYCRR Part 360, a standardized and proven engineered containment system that will have the same specifications as an off-site disposal facility. Alternative 3 consolidates treated waste fill/source material at the site and relies on engineering controls and monitoring which are not as comprehensive as provided for by Alternative 4.

Alternatives 3, 4, 5 and 6 each reduce the toxicity and mobility of waste fill/source material by treatment to render this material non-hazardous prior to disposal. Mobility is further reduced by Alternatives 4, 5, and 6 by the disposal of contaminated soil and sediment in a containment cell meeting the substantive requirements of 6 NYCRR Part 360. Reduction in mobility is less for Alternative 3 because material is not placed in a 6 NYCRR Part 360 cell. Ultimately, the volume of the contamination in the soil and sediment cannot be reduced because the contaminant (lead) cannot be chemically destroyed or feasibly removed from soil and sediment. Alternative 6 will reduces the volume of contamination in OU-1 the most by removing all contaminated soil and sediment from the site which exceeds unrestricted SCOs. Alternative 5 reduces the volume of contamination in OU-1 effectively as well by removing all contaminated soil and sediment from the site which exceeds land use based SCGs. Alternatives 3 and 4 provide similar reduction in toxicity, mobility and volume in OU-1 with contaminated soil and sediment that exceeds applicable SCGs either consolidated (Alternative 3) or placed in an on-site containment cell (Alternative 4), although the more secure placement in the containment cell results in Alternative 4 being more compliant with this criteria as the mobility reduction is greater than Alternative 3.

Alternatives 3 through 6 would all result in potential short-term impacts to the community, site workers and the environment to varying degrees during their construction. Implementation of proper health, safety and working procedures in the design will mitigate these impacts. Alternatives 3 through 6 all require an active construction period of approximately two years. The short-term impacts to the community of Alternative 3 and 4 however are much less significant than Alternatives 5 and 6. In the implementation of Alternatives 3 and 4 all of the contaminated soil and sediments excavated from the various areas of the site and associated wetlands and water bodies will be treated and will remain on-site. No significant volumes or hazardous or solid waste will be sent off site, and accordingly there will be much less truck traffic and associated impacts to area roadways. In addition Alternatives 3 and 4 result in a much smaller carbon footprint than the off-site disposal option in Alternatives 5 and 6, which would result in a minimum of 3,500 and 7,500 truckloads of waste material leaving the site respectively. Alternative 6 has the greatest short-term impact on the environment because it involves the disruption of a much larger area of ecological sensitive land for excavation and restoration and the most off-site truck impacts. The short term impacts and carbon footprint associated with the large scale ecological restoration proposed in Alternative 6 are unnecessary based on the results of biota sampling conducted during the RI.

There are limited technical issues in implementing Alternatives 3, 4 and 5. Excavation, treatment and consolidation, capping, and containment cell construction involve standard engineering and construction techniques that are readily implementable. The disturbance and restoration of wetlands in accordance with all state and federal requirements under Alternatives 3, 4, and 5 is challenging, however is required by the threshold criteria for the protection of the environment and ecological receptors. Alternatives 3, 4 and 5 require implementation of institutional and engineering controls due to soils and sediments which exceed unrestricted SCGs remaining on-site. Alternative 6 is the most difficult alternative to implement due to the large volume of removal necessary to meet unrestricted SCGs, and the larger scale of the disruption of ecologically sensitive areas in OU-1.

Alternative 6 is much more costly than Alternatives 3, 4 and 5 because it calls for the excavation and off-site disposal of all contamination in OU-1 to unrestricted SCOs, regardless of the current land use. This involves removal of nearly twice the volume of soil and sediment as that required under Alternatives 3, 4 and 5. Alternative 5 is more costly than Alternatives 3 and 4 because off-site transportation and disposal of contaminated soils and sediments is more costly than on-site consolidation or placement in a containment cell. Given the ever increasing cost of fuel the likelihood of increasing costs for Alternatives 5 and 6 is also greater. Alternative 4 is somewhat more costly than Alternative 3 because of the cost of the construction of the containment cell. Alternatives 3, 4, and 5 have annual costs associated with the site management of the institutional and engineering controls. Alternative 6 has only capital costs and no annual costs.

The current and reasonably anticipated future land use for OU-1 varies based on location on the site. Designated wetlands and ecological sensitive areas of OU-1 are restored and preserved for use by terrestrial and aquatic wildlife, while the use of developed areas of OU-1 will remain commercial (for the front lawn area) and industrial given the planned continued operation of the active facility at Revere. Alternatives 3, 4, 5 and 6 are compatible with the current and reasonably anticipated future land use of OU-1. Alternatives 3, 4, and 5 include institutional controls to restrict OU-1 use appropriately as well as ecological buffers to prevent migration of contamination between different land use areas of OU-1. Alternative 4 allows for future industrial development in certain areas of OU-1 outside of the containment cell footprint while the consolidation in Alternative 3 limits future industrial development due to institutional controls which restrict subsurface activities in the consolidation area. Alternative 6 returns OU-1 to pre-disposal conditions.

The Department has selected Alternative 4 as the remedy for OU-1 because it satisfies the threshold criteria and best satisfies the balancing criteria. Alternative 4 remediates OU-1 to land use based SCOs and restores designated wetlands and sensitive ecological areas to appropriate SCGs, thus providing for the protection of human health and the environment. Alternative 4 effectively treats and isolates waste fill/source material contamination in a containment cell meeting the substantive requirements of 6 NYCRR Part 360. This provides comparable long-term effectiveness and reduction in toxicity and mobility as Alternatives 5 and 6 and a greater degree of long-term effectiveness and reduction in toxicity and mobility than Alternative 3. Alternative 4 has a lower cost and significantly fewer short-term impacts to the community and the environment associated with the truck traffic necessary to dispose of contamination off-site than Alternatives 5 and 6. Alternative 4 has similar short term impacts as Alternative 3 but provides better long term effectiveness and reduction of toxicity and mobility than Alternative 3 because waste fill/source material is placed in a 6 NYCRR Part 360 cell.

Alternative 4 will remediate OU-1 to levels in the various areas of the site to allow the appropriate land use given the different uses of OU-1 (industrial, commercial, and ecological) and allows future industrial development in appropriate portions of OU-1. Alternative 3 would further limit land use of the industrial portions of OU-1 due to additional institutional controls necessary due to consolidation without a containment cell. Given the current and reasonably anticipated future land use of the site, Alternative 4 provides comparable protection of the environment as Alternative 5 and 6, with significantly less cost and short term impacts. Although Alternative 6 restores OU-1 to pre-disposal conditions, it has several drawbacks including high short-term impacts created by transportation and disposal, difficulty in implementability due to the scope of the project, and high costs.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Revere Smelting and Refining Site
Operable Unit No. 1
State Superfund Project
Town of Wallkill, Orange County, New York
Site No. 3-36-053

The Proposed Remedial Action Plan (PRAP) for the Revere Smelting and Refining site (Operable Unit 1) was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on July 22, 2011. The PRAP outlined the remedial measure proposed for the contaminated soil, sediment, surface water, and groundwater at the Revere Smelting and Refining site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on August 11, 2011, which included a presentation of the remedial investigation/feasibility study (RI/FS) for the Revere Smelting and Refining site (Operable Unit 1) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on August 22, 2011.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

COMMENT 1: Revere has an Industrial Wastewater Discharge Permit with the Town of Wallkill's Water and Sewer Department. The parameters of this permit call for notification of the Town of Wallkill in the event of any changes in the discharge from Revere's facility to the Town of Wallkill's Wastewater Treatment Plant. In the event that the proposed remedial action for OU-1 were to include the discharge of leachate to the Town of Wallkill's sanitary sewer system, approval would be needed prior to discharge and Revere would be required to update its Industrial Wastewater Discharge Permit accordingly to reflect such discharge.

RESPONSE 1: The Department agrees that Revere must comply with the City's Industrial Wastewater Discharge Permit including proper notifications for the treatment and disposal of leachate generated by the containment cell. The Department will require that Revere consult with the Town of Wallkill regarding any proposed treatment/disposal of leachate or other remedial waste water during the implementation of the remedy.

COMMENT 2: The Norfolk Southern Railway Company (NSRC) owns one of the six off-site properties in OU-1. This property has been historically and is currently used for commercial rail transportation. NSRC is not a Potentially Responsible Party (PRP) for the Revere site. NRSC has an

interest in the remediation of the Revere site to ensure that NSRC personnel are not exposed to contaminants identified in OU-1.

The PRAP indicates that a remedial design program will determine whether ecological and sediment areas can be fully remediated given the structural constraints of the NSRC rail line. Although the structural requirements of the rail line on the NSRC property should be considered in the design of the remedy, these requirements need not require deviation from the Department's Remedial Action Objectives and Soil Cleanup Objectives. NSRC will fully cooperate with the Department and Revere to communicate the NSRC rail line's structural requirements and safety concerns, and will grant necessary access to the NSRC property, subject to safety and design requirements, and operational schedules. NSRC sees no reason why it is not feasible to appropriately remediate the NSRC property that has been impacted by Revere's operations.

RESPONSE 2: The determination of responsibility is beyond the scope of this document. However, the Department appreciates NSRC's cooperation in implementing the remedial program for the Revere site. The Department agrees that the remedial program for the site should address, to the extent practicable, the ecological and sediment areas on the NSRC property in accordance with the Department's Remedial Action Objectives and Soil Cleanup Objectives. The remedial design will evaluate the necessary structural elements adjacent to or within the stone aggregate track ballast in order to remediate adjacent contaminated soil and sediment.

COMMENT 3: How many groundwater monitoring wells are there at the site? How often are groundwater monitoring wells tested and what are the findings?

RESPONSE 3: The current groundwater monitoring well network at the site consists of sixteen overburden wells, six piezometers and seven bedrock wells. Groundwater samples are collected on a quarterly basis and are analyzed for total lead, antimony, cadmium, chromium, arsenic, pH, alkalinity and sulfate. In general, concentrations of metals in groundwater exceed standards beneath the active facility and Eastern Fill Area (within the fenced area). Outside of the fenced area, groundwater occasionally exceeds the standards, however standard exceedances in groundwater do not extend beyond Revere's property.

COMMENT 4: What is the source of contaminated groundwater? Is the containment building a source of groundwater contamination? Is the Eastern Fill Area a source of groundwater contamination?

RESPONSE 4: The containment building and the Eastern Fill Area are identified sources of groundwater contamination at the site. The piezometers in the Eastern Fill Area have consistently shown elevated levels of lead in groundwater over the last several years. A monitoring well near the containment building has also historically shown elevated levels of lead in groundwater. The site remedy for OU-1 will address the source of groundwater contamination in OU-1 however contamination beneath the facility will be addressed by a future OU-4 remedy. Revere will however be installing a new liner system in the containment building this fall. The new liner system is designed to eliminate the containment building as a source of groundwater contamination from the OU-4 area. Following the remediation, the Department will require Revere to investigate and

develop a remedial action that addresses groundwater impacts (OU-2), as well as contamination remaining in the OU-1 subsurface.

COMMENT 5: Revere has six large water tanks on the site. This is sufficient capacity to treat groundwater. How much groundwater does Revere currently pump and treat each day? Revere should be required to treat all contaminated groundwater.

RESPONSE 5: Revere currently operates a groundwater pump and treatment system which extracts groundwater from beneath the active facility. The system includes several wells and extracts and treats an average of 3,040 gallons of water each day.

OU-2 for the Revere site addresses groundwater. Following the construction of the site remedy for OU-1 and the installation of a new liner system in the active facility's containment building, Revere will be required to complete the ongoing investigation and develop a Feasibility Study for OU-2 (groundwater) which will evaluate the present groundwater pump and treat system and determine the final remedial action for OU-2.

COMMENT 6: Approximately 10 years ago, Revere partially installed an underground slurry wall around the active facility. The slurry wall did not retain water as intended.

RESPONSE 6: In the late 1990's Revere began construction of a below grade slurry wall around the active facility. The slurry wall was not completed to the north and east of the active facility. A below grade slurry wall surrounding site contamination was considered as a remedial alternative for OU-1 during the Feasibility Study. This remedial alternative (Alternative 2 in the PRAP) was not selected as the remedy for the site. The slurry wall system is not part of the remedy for OU-1 but will be evaluated as part of the RI/FS for OU-2 (groundwater).

COMMENT 7: How will the buried stream near the front entrance to the Revere site be addressed?

RESPONSE 7: The stream to the west of the active facility (the Western Stream) runs beneath the main driveway to the active facility by way of two culverts. These culverts were recently cleaned out by Revere to improve site drainage. Soils and sediments removed from the Western Stream during this clean out were stockpiled and sampled for site contaminants of concern. Analytical results indicated that lead levels in the soils and sediment removed exceeded the hazardous waste threshold. As a result, this material was disposed of off-site.

The area where the western stream passes beneath the active facility's driveway will be investigated during the design of the site remedy to determine if there is additional source material subject to removal per this ROD in this area of the site. If source material will be removed, it will be treated to non-hazardous waste levels and consolidated in the on-site containment cell. Non-source contamination in the Western Stream will be addressed by excavation and on-site consolidation as outlined in the remedy for Sediment Areas. Non-source sediments will be excavated in exceedence of sediment SCGs to a depth of two feet and ecological SCOs to a depth of three feet. Following remediation, the Western Stream will be restored in accordance with Department regulations for wetlands and stream disturbance (6 NYCRR Parts 663 and 608).

COMMENT 8: The pond stream is almost always dry. How can the pond stream be a source of contamination to downgradient streams?

RESPONSE 8: Under dry conditions the portion of the pond stream which runs parallel and to the north of the railroad tracks contains little standing water, however, during rain events this portion of the pond stream receives surface water runoff from highly contaminated areas of the site including the eastern fill area, the open excavation, and the railroad pond. Sediments in this portion of the pond stream are highly contaminated and require removal. The pond stream also transports contamination from the site through the culvert beneath the railroad tracks to the pond stream source area.

COMMENT 9: The pond shown on Figures in the PRAP was created to handle emergency runoff. If the pond is contaminated, it is contaminated from soil in the Eastern Fill Area. Based on my experience as an employee at the site, the containment area floor within the active facility did not produce contamination via runoff.

RESPONSE 9: The Department agrees that the source of contamination to the railroad pond is primarily from historical filling to the east of the active plant. Historically, contamination of the railroad pond is also likely to have been due to releases from the active facility because battery crushing operations were conducted outside prior to the construction of the containment building. Since the construction of the containment building, contaminant releases from within the containment building have been controlled.

COMMENT 10: Contaminants of concern in soil were identified in the PRAP as lead and arsenic. Why is cadmium not identified as a contaminant of concern?

RESPONSE 10: In the commercial and industrial areas of OU-1, cadmium was not detected above applicable soil cleanup objectives (SCOs). In ecological and sediment areas of OU-1 the exceedances of the ecological soil cleanup objective for cadmium are co-located with much greater lead or arsenic contamination.

As noted in the ROD, 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. An assumption was made in the Feasibility Study that because the cadmium contamination in soil is within the extent of lead or arsenic contamination, remedial alternatives which addressed lead and arsenic contamination in soil would also address soil contaminated by cadmium. Therefore cadmium does not meet the definition of a contaminant of concern. Following excavation of the ecological areas, confirmation soil testing will be conducted which will include analysis for cadmium.

COMMENT 11: What do the green squares represent on Figure 5 of the PRAP?

RESPONSE 11: The green hatching on Figure 5 of the PRAP represents the approximate extent of soil contamination in ecological areas based on the Remedial Investigation. The small hatched green squares indicate isolated exceedances of ecological SCOs which are not contiguous with other areas of contamination.

COMMENT 12: The PRAP states that shipping waste off-site (Alternatives 5 and 6) is not cost effective. Revere recently installed a large rotary furnace that can treat the soil on-site and make it non-hazardous, as well as recover lead from soil for recycling. Therefore, Revere should be required to treat the soil in the rotary furnace. The public should not be required to pay for Alternative 4.

RESPONSE 12: It is our understanding that site soils cannot be smelted by the rotary furnace as it is not designed to handle soil/waste. Under the terms of the 2011 Consent Order between Revere and the Department, Revere will pay for all costs associated with the implementation of the site remedy for OU-1.

COMMENT 13: How will contamination at the site be encapsulated?

RESPONSE 13: Under the site remedy, source material (hazardous waste) will be treated to non-hazardous levels. Once rendered non-hazardous, the material will be placed in a containment cell which will be constructed at the site to meet the substantive requirements of 6 NYCRR Part 360. The containment cell will have a bottom liner overlain by a protective layer, a leachate collection and management system, and a multilayer engineered cap.

COMMENT 14: How will source material soils (hazardous waste) be treated with chemicals?

RESPONSE 14: Soil is considered hazardous waste when the Toxicity Characteristic Leaching Procedure (TCLP) testing threshold of 5 parts per million (ppm) for lead is exceeded. The TCLP concentration of a soil sample indicates how much lead will be leached into water which is run through the soil sample. Stabilization chemicals which include sulfides and phosphates when mixed with the soil are able to chemically bond with the lead in the soil and thereby prevent the lead from being leached by water. This process is called stabilization and requires thorough mixing of the stabilizing chemical with the contaminated soil. During the design of the site remedy, a treatability study will be conducted to determine the most effective stabilization additive and the specific design criteria for stabilization.

COMMENT 15: I am concerned that Revere is being allowed to bury hazardous waste on site. I am also concerned that water pollution issues are not being addressed at this time.

RESPONSE 15: Under the site remedy, hazardous waste at the Revere site will be treated to non-hazardous (solid waste) levels prior to containment. No hazardous waste will be disposed of at the site. Treated soil, which is now solid waste, will be disposed of in a containment cell that must meet requirements for soild waste landfills in New York State, 6 NYCRR Part 360.

The site remedy for OU-1 in combination with the installation of the new liner system in the containment building this fall, are designed to eliminate the major sources of groundwater contamination at the site. A Feasibility Study (OU-2) will be conducted in the future to address site-wide groundwater contamination which may remain after the source control remedy is in place. A Corrective Measure Study (OU-4) will also be conducted in the future to address remaining contamination beneath the active facility.

COMMENT 16: A large truck storage area used to operate in ecological areas of OU-1 to the north and east of Revere's active facility.

RESPONSE 16: The RI for OU-1 included an investigation of historical records to determine previous land uses of the site which may have lead to contamination. The investigation determined portions of the ecological areas of OU-1 may have been used historically for farming, but there is no evidence of historic use of this portion of the site for truck storage.

COMMENT 17: The Revere site is actually sitting on an old lead mine.

RESPONSE 17: The Records in the Department's Division of Mineral Resources were reviewed. There is no indication that lead mining activities have ever occurred on the Revere site.

APPENDIX B

Administrative Record

Administrative Record

Revere Smelting & Refining Site
Operable Unit No. 1
State Superfund Project
Town of Wallkill, Orange County, New York
Site No. 3-36-053

Proposed Remedial Action Plan for the Revere Smelting & Refining site, Operable Unit No. 1, dated July 2011, prepared by the Department.

Order on Consent, Index No. A3-0402-9911, between the Department and Revere Smelting & Refining Corporation, executed on September 1, 2000.

Order on Consent, Index No. D3-0502-12-06, between the Department and Revere Smelting & Refining Corporation, executed on June 25, 2007.

Order on Consent, Index No. D3-0001-11-07, between the Department and Revere Smelting & Refining Corporation, executed on June 26, 2008.

Order on Consent, Index No. 3-20100528-80, between the Department and Revere Smelting & Refining Corporation, RSR Corporation, and ECO-BAT New York LLC, executed on February 1, 2011.

Final Report: Remedial Investigation OU-1 & OU-2, dated May 2007, prepared by O'Brien & Gere.

OU-1 Feasibility Study Revision 1.0, dated October 30, 2009, prepared by Entact.

Fish & Wildlife Impact Analysis (FWIA) for OU-3, dated October 29, 2010, prepared by WSP Engineering of New York, P.C.

Addendum to Feasibility Study Revision 1.0, dated March 3, 2011, prepared by Entact.

Remedial Investigation Report Addendum OU-1, dated March 30, 2011, prepared by WSP Engineering of New York, P.C.