Town of Salina Landfill

Subsite of the Onondaga Lake Superfund Site
Town of Salina, Onondaga County, New York

NYSDEC

EPA Region 2

PURPOSE OF THIS REVISED PROPOSED PLAN

In January 2003, the New York State Department of Environmental Conservation (NYSDEC) released a Proposed Plan describing the remedial alternatives considered for the Town of Salina Landfill site (the "Site"), a sub-site of the Onondaga Lake site, and identified the preferred remedy with the rationale for the preference. Based upon input received during the public comment period, additional alternatives have been evaluated and are presented in this revised Proposed Plan.

This revised Proposed Plan was developed by NYSDEC pursuant to a Cooperative Agreement with the United States Environmental Protection Agency (EPA) and in consultation with the New York State Department of Health (NYSDOH). NYSDEC and EPA are issuing this Proposed Plan consistent with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, Section 300.430(f) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), New York's State Environmental Conservation Law, and 6 NYCRR Part 375.

This Proposed Plan follows the Town's March 2001 remedial investigation (RI) report, May 2002 feasibility study (FS) report and NYSDEC's September 2006 Addendum to the May 2002 Town of Salina Landfill Feasibility Study Report (Addendum FS report). This Proposed Plan informs the public of NYSDEC and EPA's preferred remedy and solicits public comment pertaining to all the remedial alternatives evaluated, including the preferred remedy. The alternatives summarized here are described in the FS report and Addendum FS report, and related documents contained in the Administrative Record file for this Site. NYSDEC and EPA encourage the public to review these documents to gain a more comprehensive understanding of the Site and activities that have been conducted at the Site.

NYSDEC and EPA's preferred remedial alternative to address the Town of Salina Landfill Site involves excavation of contaminated sediments in the western drainage ditch; construction of groundwater/leachate collection trenches north and south of Ley Creek, consolidation of the excavated sediments and the soils and wastes (from the excavation of the collection trenches) on the landfill areas; construction of 6 NYCRR Part 360 caps over the landfill areas north and south of Ley Creek; construction of a wastewater treatment plan on-Site, which would receive and treat the groundwater and leachate collected in the trenches and discharge the treated effluent to Ley Creek; lining the drainage ditches located along the northern and eastern borders of the Site; engineered drainage controls; fencing; institutional controls; maintenance of the caps and groundwater collection trench(es); and long-term monitoring. If before a Remedial Design Work Plan is approved for the Site-, the Town of Salina and Onondaga County enter into an agreement for the groundwater/leachate to be treated in the County's Metropolitan Wastewater Treatment Plant (METRO) following pre-treatment on-Site, -then the groundwater/leachate would be pumped first to a pre-treatment facility to be constructed on-Site and then to METRO, rather than to a full-scale on-Site wastewater treatment plant in the first instance, which would discharge treated effluent to Ley Creek.

Because the preferred remedy would result in contaminants remaining on-Site at levels that exceed health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, additional remedial actions may be implemented.

The remedy described in this Proposed Plan is the *preferred* remedy for the Site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedy. The final decision regarding the selected remedy will be made after NYSDEC and EPA have taken into consideration all public comments. NYSDEC and EPA are soliciting public comment on all of the alternatives considered in the detailed analysis section of the FS report and the [bridge document] because NYSDEC and EPA may select a remedy other than the preferred remedy.

1 Leachate is the liquid that trickles through or drains from landfilled waste, carrying soluble components from the waste.

MARK YOUR CALENDAR

December 29, 2006 through February 12, 2007: Public comment period on the Proposed Plan.

January 30, 2007: 7:00 PM, Public Meeting at Salina Town Hall, 201 School Road, Liverpool, NY 13088

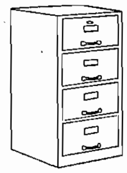
COMMUNITY ROLE IN SELECTION PROCESS

NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the Town of Salina Landfill RI/FS reports and Addendum FS report, and this Proposed Plan have been made available to the public for a public comment period which begins on December 29, 2006 and concludes on February 12, 2007.

An availability session and a public meeting will be held during the public comment period at the Salina Town Hall in Liverpool, New York on January 30, 2006 at 7 P.M. The Public Meeting will present the conclusions of the Town of Salina Landfill RI/FS, further elaborate on the reasons for recommending the preferred remedy, to provide an opportunity for the public to learn more about the Site and Proposed Plan from NYSDEC staff, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

The administrative record file, which contains the information upon which the selection of the response action will be based, is available at the following locations:



Town of Salina
201 School Road
Liverpool, NY 13088

Telephone: (315) 475-2710
Hours: Monday - Friday 9 AM - 4 PM

Salina Free Library
100 Belmont Street
Mattydale, NY 13211

Telephone: (315) 454-4524
Hours: Monday - Friday 9 AM - 4 PM

Onondaga County Public Library
Central Library at the Galleries
447 South Salina Street
Syracuse, New York 13202

Telephone: (315) 435-1900
Hours: Mon.&Thurs.-Sat., 9 AM - 5 PM
Tues. & Wed., 9 AM - 8:30 PM

NYSDEC Central Office
625 Broadway
Albany, NY 12233-7010

Telephone: (518) 402-9786
or toll-free (800) 342-9296
Hours: Monday - Friday, 8:30 AM - 4:45 PM
Please call for an appointment.

NYSDEC Region 7 Office
615 Erie Boulevard West
Syracuse, NY 13204-2400

Telephone: (315) 426-7400
Hours: Monday - Friday, 8:30 AM - 4:45 PM
Please call for an appointment.

Atlantic States Legal Foundation
658 West Onondaga Street
Syracuse, NY 13204-3711
Telephone: (315) 475-1170
Hours: Please call for hours and appointment.
Email :Atlantic.States@aslf.org

Written comments on this Proposed Plan should be addressed to:

David Tromp, Project Manager
New York State
Department of Environmental Conservation
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E-mail: DERweb@gw.dec.state.ny.us

SCOPE AND ROLE OF ACTION

The primary objectives of this action are to prevent direct contact (human and wildlife) with the landfill waste, minimize the migration of Site-related contaminants, and minimize any current and potential future health and environmental impacts.

SITE BACKGROUND

Site Description

The Town of Salina Landfill, approximately 55 acres in size, is located in the Town of Salina, Onondaga County, New York. It is designated a Class 2 Inactive Hazardous Disposal Waste Site by NYSDEC (New York Registry No. 7-34-036). The Site is bounded by the New York State Thruway to the north and by Route 11 (Wolf Street) to the east. An Onondaga County Resource Recovery Agency Transfer Station is located immediately to the west of the landfill. Ley Creek, a Class B stream, runs through the approximate eastern half of the Site and along the southern border of the approximate western half of the Site. The eastern half of the Site is bounded to the south by the banks of a separate tributary, known as the Old Ley Creek Channel (herein after "OLCC"). A portion of Ley Creek was moved in the early 1970s to its current location. Landfilled materials have been identified both north of Ley Creek and south of Ley Creek in the land area located between the current Ley Creek and the OLCC. (See Figure 1.)

The sediments, surface waters and banks of Ley Creek under and downstream of the Route 11 Bridge as well as the sediments, surface waters and banks of the OLCC are collectively a separate Class 2 New York State inactive hazardous waste disposal site known as the "Old Ley Creek Channel Site" (Site Number 734074). Further investigation of the OLCC Site is necessary.

Access to the Town of Salina Landfill has historically been gained from Route 11, either on foot or by vehicle. Although one entrance to the Site has a locked gate, it has been possible to walk or drive around the gate on another dirt road. Once a trespasser entered the Site, several well-worn paths provided vehicle access to most of the Site. Recently, the Town has attempted to limit access to the Site by placing barriers across the dirt access road. It has also placed signs indicating that no dumping is allowed on-Site.

A 48-inch abandoned sewer line runs across the Site. A 48-inch corrugated metal pipe (CMP) culvert is located in the eastern part of the Site, and drainage ditches are located along the western, northern, and eastern borders of the Site (see Figure 1). Storm water from the Site drains to Ley Creek via the drainage ditches and the culvert.

The Site is currently owned by five parties. The Town of Salina owns roughly 29 acres of the Site, comprising approximately the western half of the Site. Part of the site (east of the Town's property line and to the west of Route 11) is owned by a private individual. East Plaza, Inc. owns the portion of the Site located between Ley Creek and the OLCC. Onondaga County owns a strip of land trending east-west across the Site associated with the underground sanitary sewer pipe). Niagara Mohawk owns a strip of land trending east-west across the Site where public utilities (electrical wires and a gas line) are present).

The Salina Landfill is located within an area zoned as an Industrial District. Land located immediately to the south and to the west of the Site is also zoned as an Industrial District. The land directly east of the Site, on the opposite side of Wolf Street, is zoned both as a Highway Commercial District and a One-Family Residential District. The land located to the north of the Site, on the opposite side of the New York State Thruway, is zoned as Open-land District, Planned Commercial District, and One-Family Residential District. Based on the Code of the Town of Salina, land within each zoning district has specific intended uses.

The Town is considering other options to the current industrial zoning of the landfill property. These may include use of the property for passive recreational purposes (park, walking trails, etc.). There is also the potential for commercial development at and around the vicinity of the landfill. Any written proposals submitted to NYSDEC for the future use of the Site will be considered for incorporation into the remedial plans, as appropriate.

The area is served by municipal water.

Site History

The Town of Salina could not produce records indicating the actual date the Salina Landfill opened. However, in 1962, the Town Board closed the dump known as the "Mattydale Dump" pursuant to a court action. The Mattydale Dump was located in the vicinity of the current town garage off of Factory Avenue, approximately ½ mile to the east of the Site. With the closure of the Mattydale Dump, it is believed that the Town proceeded to work with a Site property owner (East Plaza, Inc.) to start landfill operations at the current location of the Town of Salina Landfill. In the same year, the Town adopted a garbage collection ordinance to regulate the collection of solid waste within the boundaries of the Town and to promote the public health, safety and welfare of the residents.

The Town of Salina established residential refuse districts as early as 1941. As such, the Town Board would solicit bids from independent haulers and enter into a contract each year. Licensing procedures were adopted to monitor the disposal of waste and permits were issued to haulers doing business in the Town. In 1970, periodic checks on the landfill indicated that in addition to waste generated within the Town, additional tonnage was coming from outside areas. The Highway Superintendent reported that the Landfill was reaching capacity and suggested that the boundaries be expanded up to Route 81 or additional property be purchased.

During the period the landfill was open, in addition to accepting municipal solid waste, the landfill also accepted hazardous wastes including paint sludge, paint thinner, polychlorinated biphenyl (PCB)-contaminated wastes, and contaminated sediment dredged from Ley Creek.

In 1971, several complaints were made by the New York State Thruway Authority because refuse was being left uncovered and debris was blowing over the Thruway. The Thruway Authority requested that the Town cover the landfill. Due to the capacity problems, the Town Board started looking into other solid waste disposal options, such as purchasing additional property to start another landfill, building an incinerator, or using a shredding plant which was being constructed by the City of Syracuse.

Between 1971 and 1974, landfill operations continued with little or no control over the refuse haulers that were dumping in the landfill. Town records indicate that the trucks with permit stickers were on the "honor system" and were not checked for source or quantity of refuse and that only town residents that brought their own refuse to the Landfill were checked. Reaching its capacity, the landfill was officially closed sometime in late 1974 or early 1975, pursuant to an order by NYSDEC.

In 1976, landfill cover specifications were issued by NYSDEC for dirt fill and grading of the Site. However, litigation proceedings commenced between the Town of Salina and the property owner East Plaza, Inc. In 1981, the Town purchased the western portion of the Site (approximately 29 acres) from East Plaza, Inc. Once again, landfill cover specifications were issued for the Site by the NYSDEC in July 1981.

In September 1981, pursuant to the specifications for landfill closure at that time, the Town awarded a contract to cover the landfill by applying a two-foot layer of clay-type soil. Once the soil was placed, the area was hydroseeded to establish a vegetative cover. This project was completed in November 1982.

Since that time, a number of investigations have been performed at the Town of Salina Landfill. The investigations have largely been focused on gathering only enough data to determine whether the landfill was a threat to human health and to the environment.

In 1986, NYSDEC and the Onondaga County Department of Health collected three soil samples adjacent to the north bank of Ley Creek along the landfill and four surface water samples from the same stretch of Ley Creek and drainage ditches north and east of the landfill. PCBs were not detected in the water samples, but were detected in the soil samples collected adjacent to Ley Creek.

In 1987, NUS Corporation (on behalf of EPA) collected five soil samples from the main fill area north of Ley Creek and three surface water and sediment samples were collected from Ley Creek as follows – one surface water and one sediment sample were collected from an upstream location in Ley Creek (west of Route 11), one surface water and one sediment sample were collected alongside the landfill (in the drainage swale in the northeast section of the landfill), and one surface water and one sediment sample were collected from just downstream of the landfill in Ley Creek. The soil samples contained polyaromatic hydrocarbon compounds (PAHs), metals, volatile organic compounds (VOCs) and pesticides in low levels, but no PCBs. The surface water and sediment samples collected downstream from the landfill did not contain higher concentrations of contaminants than the samples collected upstream from the landfill.

In 1987, Atlantic Testing (on behalf of NYSDEC) attempted to install three groundwater monitoring wells on-Site. Only one well was completed, as drilling for the other two wells encountered wastes in the form of black oil and petroleum-saturated soil in two boreholes. The soils in these borings contained PCBs, low levels of semi-volatile organic compounds (SVOCs) and dibenzofuran and elevated levels of cadmium, chromium, nickel and zinc. One upgradient monitoring well was installed. The groundwater from this well contained low levels of VOCs and SVOCs, high iron and manganese, but no PCBs.

In 1989, a bioaccumulation study conducted by O'Brien & Gere Co. (on behalf of General Motors Corporation) on fish caught in Ley Creek showed that the fish contained up to 6.8 mg/kg PCBs.

In 1991, during an inspection of the landfill by Ecology and Environment (on behalf of NYSDEC), a leachate outbreak was observed along the northern bank of Ley Creek downgradient of an area within the southwestern corner of the landfill.

In 1994, Ecology and Environment completed a Preliminary Site Assessment (on behalf of NYSDEC). This investigation included the collection of 10 surface water and sediment samples from locations in Ley Creek alongside the landfill, (including one upstream of the landfill) and in the adjacent drainage ditches situated to the north and west of the landfill within the Site. Additionally, five surface soil samples were collected on or around the landfilled area, and three leachate samples were collected from the north bank of Ley Creek (two along the southwestern corner of the landfill, and one near the power lines that pass over Ley Creek). The results indicated low levels of VOCs and SVOCs in the surface water (but no PCBs were detected). PCBs, pesticides, VOCs, and SVOCs were detected in the sediment samples, soil samples, and leachate samples.

In 1994, EPA designated Onondaga Lake, its tributaries, and the upland areas which have contributed or are contributing hazardous substance to the lake (subsites) as a Superfund National Priorities List (NPL) site. In 1997, NYSDEC and EPA jointly notified the Town that the Salina Landfill was a subsite of the Onondaga Lake NPL Site due to releases or the threat of releases of hazardous substance, pollutants or contaminants into the environment.

In 1996, Ecology and Environment prepared a Preliminary Site Assessment Addendum (on behalf of NYSDEC). This supplemental investigation was conducted to provide further information on potential groundwater contamination at the landfill. Five new monitoring wells were installed, developed and sampled in the landfilled area north of Ley Creek. The groundwater from most wells contained low levels of VOCs and SVOCs. A PCB compound was detected in one well at a low concentration. One of the downgradient wells (MW-4) (see Figure 2) contained almost no organic compounds, but did show elevated levels of a number of metals. Two surface water and sediment samples collected by NYSDEC from drainage ditches on-Site indicated PCBs were present in the sediment, but were absent from the surface water.

In 1996, NYSDEC designated the Town of Salina Landfill as a Class 2 Inactive Hazardous Waste Site. This designation means that NYSDEC considers the Site a significant threat to human health and/or the environment, which requires remedial action. This Site was designated a subsite to the Onondaga Lake Superfund Site in June 1997 by NYSDEC and EPA, due to the fact that Site contaminants had migrated to Ley Creek, which flows into the lake.

In 1997, representatives from NYSDEC collected three sediment samples from the OLCC. The results of that sampling show that detectable concentrations of VOCs, SVOCs, and PCBs are present in Old Ley Creek Channel.

The portion of Ley Creek adjacent to the landfill is not part of the Site due to the presence of upstream sources of contamination that need to be addressed. Upstream contaminated surface water and sediments in Ley Creek are currently being investigated under an RI/FS for the General Motors Former Inland Fisher Guide Facility and Ley Creek Deferred Media subsite of the Onondaga Lake site. As is stated in the "Site Description" section above, the sediments, surface waters and banks of Ley Creek under and downstream of the Route 11 Bridge as well as the sediments, surface waters and banks of the OLCC are collectively being addressed as the "Old Ley Creek Channel Site," which is a separate Class 2 New York State inactive hazardous waste disposal site (Site Number 734074) .

On October 29, 1997, the Town of Salina entered into an Order on Consent with the NYSDEC to perform the RI/FS, remedial design, and remedial action for the Site. On November 17, 1997, the Town also entered into a State Assistance Contract under the 1986 Environmental Quality Bond Act of New York State. This contract stated that the Town would be reimbursed 75% of the eligible costs during the RI/FS. This contract may be amended for the remedial design and remedial action costs.

The RI started on June 29, 1998. Two phases of sampling occurred over two summers. An RI report was submitted to NYSDEC by the Town, through its consultants, in May 2000. The report was reviewed by the EPA and NYSDEC, and then revised by the Town's consultants. The RI Report was approved in March 2001. The Town submitted a Draft FS Report in January 2001. The report was reviewed by the EPA and NYSDEC, and then revised by the Town's consultants. The FS Report was approved in May 2002.

In January 2003, NYSDEC released a Proposed Plan describing the remedial alternatives considered for the Site and identifying the preferred remedy with the rationale for the preference. The primary elements of the preferred remedy included constructing impermeable caps over the landfill areas north and south of Ley Creek, constructing groundwater/leachate collection trenches north and south of Ley Creek, with the collected leachate being pumped to the Onondaga County wastewater treatment plant.

Comments received during the public comment period indicated that Onondaga County has a policy not to accept wastewater from inactive hazardous waste sites for treatment at METRO. The Town of Salina and the County have participated in extended negotiations for an agreement to allow the landfill's groundwater/leachate to be treated at METRO (with or without pretreatment). As of the printing of this document, no agreement has been reached. Therefore, NYSDEC has developed and evaluated two on-Site groundwater/leachate treatment alternatives in this revised Proposed Plan. These new remedial alternatives are also detailed in NYSDEC's September 2006 Addendum to the May 2002 Town of Salina Landfill Feasibility Study Report.

RESULTS OF THE REMEDIAL INVESTIGATION

Groundwater

Groundwater underlying the Site is found in two water-bearing units. The uppermost water-bearing unit is unconfined. The water table ranges from four to 22 feet below grade and is present either within the waste or in the uppermost sand unit. (See Figure 5.) The lower water-bearing unit is under confined conditions and is present in the lower sand unit, above the till. In fact, the conditions are such that one groundwater monitoring well, screened in the lower sand unit, was a free-flowing artesian well.

Groundwater samples were collected from a total of seventeen permanent monitoring wells on-Site, including fourteen shallow wells, and three deep wells. (See Figure 2.)

The groundwater that appears to be most heavily impacted is located in the shallow aquifer in the southeast portion of the main landfilled area north of Ley Creek. Monitoring well MW-10 (see Figure 2) is the most heavily contaminated, with elevated concentrations of benzene (29 micrograms per liter [µg/l]; the groundwater standard is 1 µg/l), toluene (92,774 µg/l; the groundwater standard is 5 µg/l), ethylbenzene (3,100 µg/l; the groundwater standard is 5 µg/l), and xylenes (17,900 µg/l; the groundwater standard is 5 µg/l), as well as elevated concentrations of chlorinated solvents, such as trichloroethene (11,138 µg/l; the groundwater standard is 5 µg/l), 1,2-dichloroethene (3,100 µg/l; the groundwater standard is 5 µg/l), 1,1,1-trichloroethane (2,822 µg/l; the groundwater standard is 5 µg/l), tetrachloroethane (75 µg/l; the groundwater standard is 5 µg/l), and vinyl chloride (1,059 µg/l; the groundwater standard is 2 µg/l). Other wells in the southeastern vicinity of MW-10, including MW-6, MW-7, MW-8 and MW-9, contained a number of volatile organic compounds that exceed water quality standards or guidance values.

Four monitoring wells (MW-8, MW-9, MW-10 and MW-15) contained semi-volatile organic compounds that exceeded standards, 1,2-dichlorobenzene (5 µg/l; the groundwater standard is 3 µg/l), 1,4-dichlorobenzene (10 µg/l; the groundwater standard is 3 µg/l), bis(2-ethylhexyl)phthalate (17 µg/l; the groundwater standard is 5 µg/l), and naphthalene (36 µg/l; the groundwater guidance value is 10 µg/l). The groundwater in four monitoring wells (MW-7, MW-10, MW-12 and MW-15) also contained a few pesticides, BHC-alpha (0.011 µg/l; the groundwater standard is 0.01 µg/l) and endrin (0.014 µg/l; the groundwater standard is "non-detect").

PCBs (Aroclor 1248) were detected in six monitoring wells (MW-1, MW-5, MW-6, MW-8, MW-9 and MW-15) in excess of water quality standards or guidance values (maximum concentration of 1.6 µg/l; the groundwater standard is 0.09 µg/l).

The metals that exceed groundwater standards, the maximum detections, and the applicable groundwater standards include arsenic (73.6 µg/l; the groundwater standard is 25 µg/l), aluminum (32,444 µg/l; the groundwater standard is 2,000 µg/l), cadmium (34 µg/l; the groundwater standard is 5 µg/l), chromium (309 µg/l; the groundwater standard is 50 µg/l), iron (56,000 µg/l; the groundwater standard is 300 µg/l), magnesium (129,160 µg/l; the groundwater standard is 35,000 µg/l), manganese (7,633 µg/l; the groundwater standard is 300 µg/l) and sodium (1,256,700 µg/l; the groundwater standard is 20,000 µg/l). In general, the highest concentrations of iron, magnesium, and manganese are present in the wells with the highest turbidity. It should be noted that the sodium and chloride concentrations are particularly elevated in well MW-5D. These parameters, as well as elevated concentrations of total dissolved solids and specific conductance, may indicate that the groundwater is slightly brackish.

Review of the leachate indicator data from the monitoring wells indicates that most of the shallow wells have been impacted by the landfill. The ratio of alkalinity to sulfate can be used to show leachate impacts and the majority of the shallow wells show high alkalinity/sulfate ratios. Alternatively, the deep wells have a low alkalinity/sulfate ratio, indicating that they have not been impacted by leachate. This evaluation is supported by the presence of elevated levels of nitrogen compounds (ammonia and Total Kjeldahl Nitrogen [TKN]) and total organic carbon (TOC) in the shallow wells, but absence or low concentrations of these compounds in the deep wells. The groundwater in the confined aquifer was almost entirely free of organic compounds. The only exception was upgradient well MW-0D, which contained 2 µg/l of butyl benzyl phthalate (the groundwater guidance value is 50 µg/l). The stratigraphical information and information on contaminant distribution within monitoring wells MW-12 and MW-12D indicate that the two aquifers are not interconnected.

Water samples were also collected from seven temporary wells that were installed in the water table aquifer along the northern bank of Ley Creek. The wells were installed to help define groundwater flow direction and to aid in the understanding of the interconnection between groundwater and surface water. Three of the seven wells were installed immediately upgradient of active leachate seeps. The results show high alkalinity/sulfate ratios and elevated concentrations of ammonia, TKN, and TOC. These results would appear to confirm that groundwater immediately adjacent to Ley Creek is impacted by landfill leachate.

Leachate

Three leachate samples were collected from the northern bank of Ley Creek (see Figure 3). The organic compounds that exceeded Class GA groundwater standards, the maximum detections, and the applicable groundwater standards included benzene (4 µg/l; the groundwater standard is 1 µg/l), chlorobenzene (22 µg/l; the groundwater standard is 5 µg/l), and Aroclor 1248 (1.0 µg/l; the groundwater standard is 0.09 µg/l). The metals that exceeded groundwater standards, the maximum detections, and the applicable groundwater standards included aluminum (12,131 µg/l; the groundwater standard is 2,000 µg/l), barium (1,502 µg/l; the groundwater standard is 1,000 µg/l), chromium (126 µg/l; the groundwater standard is 50 µg/l), iron (156,090 µg/l; the groundwater standard is 300 µg/l), lead (199 µg/l; the groundwater standard is 25 µg/l), magnesium (69,371 µg/l; the groundwater standard is 35,000 µg/l), manganese (1,001 µg/l; the groundwater standard is 300 µg/l), and sodium (190,190 µg/l; the groundwater standard is 20,000 µg/l).

Surface Water

Surface water samples were collected from six locations (see Figure 3). Organic compounds were detected in 2 of the samples. The parameters that were detected, the maximum concentrations, and the applicable water quality standards or guidance values were benzo(k)fluoranthene (10 µg/l; the water quality guidance value is 0.002 µg/l) and Aroclor 1248 (0.14 µg/l; the water quality standard is $1x10^{-6}$ µg/l). Although there appear to be upstream sources of Aroclor 1248, the Site may be a potential source since it was detected in samples collected in Ley Creek alongside the landfill.

The parameters that were detected, the maximum concentrations, and the applicable water quality standards for the metals that exceeded water quality standards for Class B waters were aluminum (238 µg/l; the water quality standard is 100 µg/l) and iron (702 µg/l; the water quality standard is 300 µg/l). These compounds were found in all of the samples. Both metals showed a trend of increasing concentrations with increasing distance downstream. The increase in concentration of the metals between the 48-inch storm water discharge pipe and the drainage ditch along the western border of the landfill indicates that groundwater flowing into the landfill and through the Site that seeps into Ley Creek impacts stream water quality. Cyanide was detected in three of the six samples in excess of the standards or guidance values for Class B waters (13.6 µg/l, 13.6 µg/l, and 18.6 µg/l; the standard is 5.2 µg/l).

Sediment

At each surface water sample location, two sediment depths were targeted for collection—one from 0-6 inches below the sediment/water interface and a second from 6-12 inches below the interface. A sediment sample was selected upstream of the Site in Ley Creek (see Figures 3 and 4). With regard to VOCs, most of the sediment samples contained acetone (0.014 milligrams per kilogram [mg/kg] to 0.078 mg/kg) and three samples contained methylene chloride 0.003 mg/kg, 0.004 mg/kg, and 0.007 mg/kg). All of the Ley Creek samples contained numerous SVOCs in excess of New York State sediment criteria. The predominant SVOCs present in the sediments were PAHs. The PAHs detected above sediment criteria with their maximum concentrations were anthracene (2.55 mg/kg; the Site-specific sediment criterion[2] is 0.23 mg/kg), benzo(a)anthracene (9.1 mg/kg; the Site-specific sediment criteria is 0.0028 mg/kg), benzo(a)pyrene (7.45 mg/kg; the Site-specific sediment criterion is 0.0028 mg/kg), benzo(b)fluoranthene (11.7 mg/kg; the Site-specific sediment criterion is 0.0028 mg/kg), benzo(k)fluoranthene (2.200 mg/kg; the Site-specific sediment criterion is 0.0028 mg/kg), chrysene (10.15 mg/kg; the Site-specific sediment criterion is 0.0028 mg/kg), fluoranthrene (19.15 mg/kg; the Site-specific sediment criterion is 2.195 mg/kg), fluorene (4.1 mg/kg; the Site-specific sediment criterion is 0.017 mg/kg), indeno(1,2,3-cd)pyrene (3.2 mg/kg; the Site-specific sediment criterion is 0.0028 mg/kg), phenanthrene (9.5 mg/kg; the Site-specific sediment criterion is 0.258 mg/kg), and pyrene (23.7 mg/kg; the Site-specific sediment criterion

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2 NYSDEC's sediment screening values are specified in its Division of Fish and Wildlife, Division of Marine Resources, *Technical Guidance for Screening Contaminated Sediments*, November 1999. The sediment screening values for the organics have been corrected for the average organic carbon content for the Site, which makes them site-specific.

is 2.068 mg/kg). In most cases, the uppermost sample was 1.5 to two times higher in concentration compared to the deeper sample, with one location as the exception.

There were no pesticides detected in the sediments. PCBs (Aroclors 1248 and 1260) were detected in every sample in high concentrations (ranging from 3.6 mg/kg to 81mg/kg), with the exception of the sediment samples collected from the drainage ditch paralleling the New York State Thruway where PCBs were not detected. The Site-specific sediment screening criterion for PCBs is 0.0000017 mg/kg. The upstream sample location had PCB concentrations of 51.3 mg/kg and 49.7 mg/kg (shallow and deep, respectively). This upstream Ley Creek sample indicates that PCBs emanate from an upstream source. Ley Creek, and its PCB contamination will be addressed as part of the Old Ley Creek Channel Site.

A number of metals, including arsenic, cadmium, chromium, lead, nickel, silver, and zinc, were present in the sediments in excess of sediment criteria in virtually all samples except the sediment samples collected from the drainage ditch paralleling the New York State Thruway. The metals that were detected, the maximum detections, and the associated sediment criteria are manganese (1,133 mg/kg; the sediment criterion is 460 mg/kg), arsenic (25.7 mg/kg; the sediment criterion is 6.0 mg/kg), cadmium (83.7 mg/kg; the sediment criterion is 0.6 mg/kg), chromium (1,767 mg/kg; the sediment criterion is 26.0 mg/kg), nickel (363 mg/kg; the sediment criterion is 16.0 mg/kg), silver (8.7 mg/kg; the sediment criterion is 1.0 mg/kg), and zinc (1,185 mg/kg; the sediment criterion is 120.0 mg/kg). The concentrations for chromium and zinc in the downgradient samples were significantly higher than upstream concentrations, indicating that the contamination in the landfill could be contributing to the contamination of the sediments in Ley Creek.

Data from previous investigations at the landfill show PCBs and metals above sediment criteria in the drainage ditch west of the landfill which is located in a wetland. Cadmium concentrations ranged from not detected to 7.2 mg/kg; the criterion is 0.6 mg/kg. Lead concentrations ranged from not detected to 151 mg/kg; the criterion is 31 mg/kg.

Soil

The uppermost soils encountered over most of the Site consist of silt and clay and represent the soil cover placed over the waste in 1982. This uppermost layer is approximately 2 feet thick. The soil cover overlies landfilled waste. The waste is thickest on the western portion of the Site and thins to the east. Across the western portion of the landfill, the waste overlies a layer of clay varying in thickness from six to 40 feet. A discontinuous layer of sand appears between the waste and clay layer along the southern and eastern portions of the Site. A silt and sand unit up to 20 feet thick underlies this clay layer over most of the Site. This silt and sand unit overlies a sand unit up to 25-feet thick that appears to dip slightly to the west. A dense glacial till is present beneath the sand unit. The landfill appears to lie in a trough, as the till is found within 10 feet of the surface on the south side of Ley Creek, but is approximately 60 feet below grade in boring B-11 (see Figure 5).

The guidance used for the evaluation of contaminant concentrations in soil are the New York State Department of Environmental Conservation, Division Technical and Administrative Guidance Memorandum 4046: Determination of Soil Cleanup Objectives and Cleanup Levels (TAGM) objectives.

- **Surface Soil**

Twenty-nine surface soil samples were collected on and around the Site. Methylene chloride was the only VOC detected, but at 0.001 mg/kg, it was not above the TAGM objective of 0.1 mg/kg. As with the sediments, the predominant SVOCs were PAHs, and these compounds were detected in every sample. The concentrations of SVOCs are depicted in Figure 6. The PAHs that were detected above standards with their maximum concentrations were: benzo(a)anthracene (8.3 mg/kg; the TAGM objective is 0.224 mg/kg), benzo(a)pyrene (5.2 mg/kg; the TAGM objective is 0.061 mg/kg), benzo(b)fluoranthene (13.9 mg/kg; the TAGM objective is 1.1 mg/kg), benzo(k)fluoranthene (3.7 mg/kg; the TAGM objective is 1.1 mg/kg), chrysene (8.3 mg/kg; the TAGM objective is 0.4 mg/kg), dibenz(a,h)anthracene (0.96 mg/kg; the TAGM objective is 0.014 mg/kg), and indeno(1,2,3-cd)pyrene (3.9 mg/kg; the TAGM objective is 3.2 mg/kg). The highest concentrations of PAHs were detected in the samples collected over most of the landfill surface north of Ley Creek. A number of pesticides were detected in three samples, but none were in excess of the TAGM objectives. Aroclor 1248 was detected in two surface soil samples (0.22 mg/kg and 8.4 mg/kg; the TAGM objective is 1 mg/kg at the surface, 10 mg/kg in the subsurface), which are both located on the parcel between OLCC and Ley Creek. Aroclor 1248 was detected in one surface soil sample at a concentration of 8.4 mg/kg, which exceeds the TAGM objective of 1 mg/kg for surface soils. The sample was collected from the parcel between OLCC and Ley Creek.

Evaluation of the metals data shows that almost all metals concentrations exceeded TAGM objectives in every sample. In many cases, the metals concentrations in the samples collected on top of the landfill were present in concentrations only slightly above background. The notable exception was sample SS-16 which had a copper concentration 47 times the background level, a zinc concentration 32 times the background level, a chromium concentration seven times the background level, and a nickel concentration five times the background level. Also, one sample had a mercury concentration 103 times the TAGM objective and sample SS-15 had a lead concentration 65 times the background. The metals detected above standards with their maximum concentrations and background levels were: aluminum (13,000 mg/kg; background is 10,475 mg/kg), arsenic (7 mg/kg; background is 1.1 mg/kg), barium (530 mg/kg; background is 61.85 mg/kg), cadmium (17.3 mg/kg; background is 1 mg/kg), calcium (119,000 mg/kg; background is 10,845 mg/kg), chromium (116 mg/kg;

background is 10 mg/kg), cobalt (17 mg/kg; background is 8.55 mg/kg), copper (860 mg/kg; background is 18.45 mg/kg), iron (19,800 mg/kg; background is 2,000 mg/kg), lead (1,163 mg/kg; background is 18.75 mg/kg), magnesium (20,200 mg/kg; background is 6,580 mg/kg), manganese (557 mg/kg; background is 492 mg/kg), mercury (2.6 mg/kg; background is 0.1 mg/kg), nickel (70 mg/kg; background is 13 mg/kg), potassium (2,872 mg/kg; background is 903.5 mg/kg), selenium (23 mg/kg; background is 2 mg/kg), silver (8 mg/kg; background is 2 mg/kg), sodium (875 mg/kg; background is 108.25 mg/kg), thallium (3.6 mg/kg; background is 1.1 mg/kg), vanadium (22 mg/kg; background is 21.15 mg/kg), and zinc (1,733 mg/kg; background is 20 mg/kg).

- **Subsurface Soil**

Eight subsurface soil samples were collected from test pits during the waste area investigation. The sample from one test pit was collected from a black oily sludge with a strong petroleum odor. The samples from four test pits were collected near this test pit in an attempt to determine the extent of the black oily sludge. One sample was collected from a very compact yellow sandy material, with no odor. Another sample was collected from a dark stained soil, near where the original sanitary sewer line connected to the current sewer line. The samples from other test pits were collected from soils in contact with the original sanitary sewer line that crossed the Site.

A number of VOCs were detected in the subsurface soil samples. In particular, one sample had 0.377 mg/kg of 1,1-dichloroethane (the TAGM objective is 0.200 mg/kg) and 0.766 mg/kg of 1,2-dichloroethene (total) (the TAGM objective is 0.300 mg/kg). One sample contained a relatively high concentration of total xylenes (45.362 mg/kg; the TAGM objective is 1.200 mg/kg) and toluene (147.949 mg/kg; the TAGM objective is 1.500 mg/kg). Other soil samples contained 2-butanone (maximum concentration of 0.420 mg/kg; the TAGM objective is 0.300 mg/kg) and acetone (maximum concentration of 1.600 mg/kg; the TAGM objective is 0.200 mg/kg). As with the surface soil samples, the subsurface soil samples all contained PAHs as the predominant subclass of SVOCs present in excess of TAGM objectives. The PAHs detected above TAGM objectives with their maximum concentrations and the TAGM objectives were: benzo(a)anthracene (16.000 mg/kg; the TAGM objective is 0.224 mg/kg), benzo(a)pyrene (11.700 mg/kg; the TAGM objective is 0.061 mg/kg), benzo(b)fluoranthene (22.0 mg/kg, the TAGM objective is 1.1 mg/kg), benzo(k)fluoranthene (8.6 mg/kg; the TAGM objective is 1.1 mg/kg), chrysene (15.4 mg/kg; the TAGM objective is 0.4 mg/kg), dibenz(a,h)anthracene (1.5 mg/kg; the TAGM objective is 0.014 mg/kg), and indeno(1,2,3-cd)pyrene (5.2 mg/kg; the TAGM objective is 3.2 mg/kg). The subsurface soil samples did not contain pesticides but all samples contained PCBs. The samples from four test pits contained Aroclor 1248 in excess of the TAGM objective, the highest being 420 mg/kg (the TAGM objective is 10 mg/kg).

Again, as with the surface soil samples, virtually all of the metals in all of the samples exceeded TAGM objectives. However, the metals concentrations were generally within one to two times background concentrations. The exceptions were the samples from three test pits (collected along the edge of the creek, immediately north of the confluence of Ley Creek and the OLCC), where metals concentrations ranged from two to 250 times background concentrations. In particular, the concentrations of chromium and cyanide were significantly higher than both background concentrations and the concentrations found in other areas of the landfill. The metals detected above standards with their maximum concentrations were: aluminum (20,587 mg/kg; background is 10,475 mg/kg), antimony (22.0 mg/kg; background is 1.625 mg/kg), arsenic (20.8 mg/kg; background is 1.1 mg/kg), barium (251 mg/kg; background is 61.85mg/kg), cadmium (34.5 mg/kg, the background is 1 mg/kg), calcium (69,118 mg/kg; background is 10,845 mg/kg), chromium (4,265 mg/kg; background is 10 mg/kg), cobalt (16.1 mg/kg; background is 8.55 mg/kg), copper (3,273 mg/kg; background is 18.45 mg/kg), iron (39,078 mg/kg; background is 2,000 mg/kg), lead (418 mg/kg; background is 18.75 mg/kg), magnesium (23,336 mg/kg; background is 6,580 mg/kg), manganese (1,922 mg/kg; background is 492 mg/kg), mercury (0.87 mg/kg; background is 0.1 mg/kg), nickel (1,400 mg/kg; background is 13 mg/kg), potassium (2,722 mg/kg; background is 903.5 mg/kg), selenium (15.0 mg/kg; background is 2 mg/kg), silver (10.1 mg/kg; background is 2 mg/kg), sodium (1,927 mg/kg; background is 108.25 mg/kg), thallium (4 mg/kg; background is 1.1 mg/kg), vanadium (46.3 mg/kg; background is 21.15 mg/kg), and zinc (1,325 mg/kg; background is 20 mg/kg). It is likely that these elevated concentrations of metals in this area are predominantly the result of historical waste disposal in the area rather than an upstream source.

It is important to note that while the subsurface soil samples collected adjacent to the former sanitary sewer contained elevated levels of certain contaminants, there was no evidence of coarse-grained bedding material around the sewer. It appeared that the sewer was placed in native soils. Based on these direct visual observations, it appears unlikely that the material surrounding the sewer has, or will act as a preferred pathway for contaminant migration. However, it is unknown whether the interior of the sewer can act as a pathway.

In addition to the test pits, samples were collected from two soil borings at varying depths and analyzed for inorganic compounds. Several of the metal concentrations exceeded the background values, but virtually all metal concentrations were within one to 2 times the background concentrations, except selenium which was approximately three times the background. The samples collected from these borings were also analyzed to determine the feasibility of using bioremediation as a remedial alternative for soil in the vicinity of MW-10 (see Figure 2). (Bioremediation was determined to not be feasible based upon the tests due to the nature of the wastes present.) Two borings were also drilled in the middle of Ley Creek to determine if waste was present beneath the bed of the creek. No waste was found in these borings.

Biota

The analytical results for earthworm bioassays indicate that metals are the most common contaminant class in earthworms. The metals that were detected at levels of concern were chromium, copper, lead, mercury and zinc. Only two SVOCs were detected: 4-methylphenol and di-n-butyl phthalate. Since the earthworm samples were composited into one sample in order for the laboratory to perform the required analyses, no trends across the Site could be established.

Principal Threat Wastes

No principal threat wastes[3] have been identified at the Site. The nature and extent of the contamination at the Site is summarized in Table 1 at the end of this document.

SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health and ecological risks which could result from the contamination at the Site if no remedial actions were taken. The Town is considering other options to the current industrial zoning of the landfill property. These may include use of the property for passive recreational purposes (park, walking trails, etc.). There is also the potential for commercial development at and around the vicinity of the landfill.

Human Health Risk Assessment

Exposure pathways considered for the baseline risk assessment included:

Current and future land use scenarios by trespassers:

- Exposure to surface soils via ingestion;
- Exposure to surface soils via dermal contact;
- Exposure to leachate via ingestion; and
- Exposure to leachate via dermal contact.

Future exposure pathways for on-Site construction workers:

- Exposure to surface soil via ingestion;
- Exposure to surface soil via dermal contact;
- Exposure to subsurface soil via ingestion;
- Exposure to subsurface soil via ingestion;
- Exposure to subsurface soil via dermal contact; and
- Exposure to groundwater via incidental ingestion.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern (COC) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point of departure. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

3 Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. [A Guide to Principal Threat and Low Level Threat Wastes, USEPA, November 1991]

The results of the risk assessment indicate that the estimated excess cancer risks for the child trespasser (considering exposures to surface soil and leachate) in both the current and future land-use scenarios were 1.4×10^{-4}. This value represents the upperbound of EPA's acceptable risk range. The largest portion of this cumulative risk is from dermal contact with surface soil. The COCs contributing to the cancer risk for child trespassers are benzo(a)pyrene and benzo(b)fluoranthene for surface soil, and Aroclor 1248 for leachate.

The cumulative cancer risk (1.2×10^{-4}) for the construction worker in the future land-use scenario (through exposures to surface soil, subsurface soil, and groundwater) represents the upperbound of EPA's acceptable risk range. The largest portion of this risk is attributable to ingestion of and dermal contact with subsurface soil. Some of the COCs that contributed most significantly to the construction worker cancer risk were benzo(a)pyrene, benzo(b)fluoranthene, Aroclor 1248, and arsenic.

The estimated HI for the construction worker in the future land-use scenario was in excess of 1.0 (1.7). This value represents the cumulative effect of exposure to surface soil (ingestion and dermal contact), subsurface soil (ingestion and dermal contact), and groundwater (incidental ingestion only) at the Site in the future. The groundwater route represents the largest portion of the cumulative noncarcinogenic risk to construction workers. Thus, there appears to be a potential risk for noncancer health effects to this receptor in the future. The major COCs identified as contributing to the increased noncarcinogenic risk for construction workers were arsenic (for surface soil and subsurface soil), and arsenic, cadmium, and 1,2-dichloroethene (total) for groundwater.

Ecological Risk Assessment

Based on the results of the ecological risk assessment, the contamination at the Site poses a risk to soil invertebrates (worms) and terrestrial vertebrates (soil invertebrate-feeding birds and mammals). Specifically, using maximum contaminant concentrations in surface soil, a risk was calculated for soil invertebrates from total PAHs, chromium, copper, lead, mercury, and zinc. Using mean contaminant concentrations, a risk was calculated for soil invertebrates from chromium, copper, mercury, and zinc. Using the mean concentrations, chromium had the highest hazard quotient[4] (HQ=118), while copper, mercury, and zinc had lower quotients (HQs ranging from 1.1 to 6.3). Toxicity values for soil invertebrates were not available for many other contaminants present in site surface soils, particularly, many PAHs, bromoform, 4-chloroaniline, bis(2-ethylhexyl)phthalate, Aroclor 1248, nine metals, and cyanide. PAHs were evaluated by comparing total PAH concentrations with the toxicity value for fluorine. However, the potential risks to soil invertebrates from the remaining contaminants for which no toxicity value was available are uncertain.

The risk assessment also indicates that, using maximum contaminant concentrations, soil-invertebrate feeding birds are potentially at risk from aluminum, barium, cadmium, chromium, cobalt, copper, lead, mercury, selenium, silver, vanadium, zinc, and cyanide. Of these, chromium had the highest hazard quotients (HQs=67 and 6.7 using the No-Observed-Adverse-Effect Level [NOAEL] and Lowest-Observed-Adverse-Effect Level [LOAEL], respectively), while the remaining metals had lower quotients (HQs ranging from 1.3 to 26 using the NOAEL and 1.05 to 6.4 using the LOAEL).

The results of the ecological risk assessment also indicate that using the maximum contaminant concentrations, soil invertebrate-feeding mammals are potentially at risk from aluminum, arsenic, barium, cadmium, copper, lead, mercury, selenium, silver, thallium, vanadium, and cyanide. Of these, aluminum had the highest hazard quotients, with HQs of 259 and 26 using the NOAEL and LOAEL, respectively. The remaining contaminants had lower hazard quotients, ranging from 1.1 to 14 using the NOAELs and from 1.4 to 3.5 using the LOAELs. Toxicity values were not available for beryllium, iron, or thallium for birds, nor for iron for mammals. Therefore, the risks posed by these contaminants to these receptors are uncertain.

Summary of Human Health and Ecological Risks

The human health risk assessment conducted for the Site concluded that the COCs detected in environmental media at the Site (*i.e.*, PAHs, arsenic, Aroclor 1248) at the levels identified in the RI pose elevated carcinogenic (under both current and future land-use scenarios) and noncarcinogenic (under the future land-use scenario) health risks to potentially exposed populations at the Site.

Based on the results of the ecological risk assessment, the contamination at the Site poses a risk to soil invertebrates and terrestrial vertebrates. Specifically, using maximum contaminant concentrations in surface soil, a risk was calculated for soil invertebrates from total PAHs, chromium, copper, lead, mercury, and zinc. Using mean contaminant concentrations, a risk was calculated for soil invertebrates from chromium, copper, mercury, and zinc.

The risk assessment also indicates that, using maximum contaminant concentrations, soil-invertebrate feeding birds are potentially at risk from aluminum, barium, cadmium, chromium, cobalt, copper, lead, mercury, selenium, silver, vanadium, zinc, and cyanide.

The results of the ecological risk assessment also indicate that, using maximum contaminant concentrations, soil invertebrate-feeding mammals are potentially at risk from aluminum, arsenic, barium, cadmium, copper, lead, mercury, selenium, silver, thallium, vanadium, and cyanide. Using

[4] Hazard Quotients (HQs) are values obtained from dividing an estimated environmental exposure value by a toxicity reference value (such as a concentration known to cause no adverse effects. HQ values equal to or greater than 1.0 indicate potential ecological risk.

mean contaminant concentrations, a risk was calculated from aluminum, arsenic, barium, cadmium, lead, mercury, selenium, silver, thallium, vanadium, and cyanide.

Although the risk assessment did not address exposures that occur as a result of the discharge of contaminated groundwater to Ley Creek, the groundwater underlying the Site has been documented to be a source of contamination to Ley Creek. Surface water samples from Ley Creek contained PCBs exceeding the NYSDEC's ambient water quality standards for New York State Class B surface waters and the levels of PCBs in Site groundwater, which discharges into Ley Creek, also exceeded the Class B surface water quality standards for PCBs. These standards are based on impacts to humans who consume fish and on wildlife protection. In addition, the levels of aluminum and iron exceeded the State's Class B ambient water quality standards for these metals in both Ley Creek surface water samples and in Site groundwater. The standard for aluminum is based on fish propagation, and the standards for iron are based on fish propagation and fish survival.

It should also be noted that Ley Creek surface water and sediments were not evaluated in the baseline human health and ecological risk assessments conducted for the Town of Salina Landfill subsite RI/FS due to the presence of upstream sources of contamination. Upstream contaminated surface water and sediments in Ley Creek are currently being investigated under an RI/FS for the General Motors Inland Fisher Guide (IFG) Facility and Ley Creek Deferred Media subsite of the Onondaga Lake site. It is anticipated that surface water and sediment contamination in Ley Creek adjacent to the landfill will be addressed in a subsequent investigation.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are site-specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs)[5] and unacceptable exposures established in the risk assessment.

The following RAOs have been established for the Site:

- Reduce/eliminate contaminant leaching to ground water
- Control surface water runoff and erosion
- Prevent the off-Site migration of contaminated groundwater and leachate
- Restore groundwater quality to levels which meet state and federal drinking-water standards
- Prevent human contact with contaminated soils, sediment and ground water
- Minimize exposure of aquatic species and wildlife to contaminants in surface water, sediments, and soils

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The complete excavation and removal of the landfilled wastes was not considered to be a viable remedial alternative and was, therefore eliminated from further consideration. Not only is source containment (*i.e.*, landfill cap, measures to control landfill leachate, source area groundwater control to contain the plume, and institutional controls to supplement engineering controls) consistent with the *Presumptive Remedy for CERCLA Municipal Landfill Sites* [6], but the implementability and cost of complete excavation and removal of the landfilled wastes would be an order of magnitude higher than the remedial alternatives that were considered.

The January 2003 Proposed Plan presented two soil cover alternatives. "Compliance with ARARs" is a "threshold" evaluation criteria that must be satisfied in order for a remedial alternative to be eligible for selection. Since a 6 NYCRR landfill cap is an action-specific ARAR for landfill closure, the soil cover alternatives would not comply with this ARAR. Therefore, these alternatives are not included in this revised Proposed Plan.

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5 Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires that on-site remedial actions attain or waive Federal environmental ARARs, or more stringent State environmental ARARs, upon completion of the remedial action. The 1990 National Oil and Hazardous Substances Pollution Contingency Plan (NCP) also requires compliance with ARARs during remedial actions and during removal actions to the extent practicable. ARARs are identified on a site-by-site basis for all on-site response actions where CERCLA authority is the basis for cleanup.

6 See EPA Publication 9203.1-021, SACM Bulletins, *Presumptive Remedies for Municipal Landfill Sites*, April 1992, Vol. 1, No. 1, and February 1993, Vol. 2, No.1, SACM Bulletin *Presumptive Remedies*, August 1992, Vol.1, No. 3. and EPA Directive No. 9355.0-49FS, *Presumptive Remedy for CERCLA Municipal Landfill Sites*, September 1993.

The present-worth costs for all of the alternatives discussed below are calculated using a discount rate of 7 percent and a 30-year time interval.

It is important to recognize several important issues with respect to the cost estimates. First, the cost estimates were prepared based on conceptual plans and the actual cost of the selected remedial alternative may change after the detailed engineering design is completed. Additionally, the costs were prepared during the FS stage of the project and it will be several years until construction is completed. The cost of construction materials and energy costs have risen rapidly in recent years and therefore, the passage of time will likely impact the cost estimates presented in this Proposed Plan. That being said, NYSDEC will work closely with the Town in designing a cost-effective remedy. Under a State Assistance Contract with the Town, it is expected that the State will reimburse the Town for 75 percent of the eligible capital costs of the alternative that is ultimately selected.[7]

The time to implement reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy or procure contracts for design and construction.

The alternatives are:

Alternative 1: No Action

Capital Cost:	$0
Annual Operation, Monitoring and Maintenance (OM&M) Costs:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures.

Because this alternative would result in contaminants remaining on-Site, CERCLA requires that the Site be reviewed at least once every five years. If justified by this assessment, remedial actions may be implemented in the future to remove or treat the waste.

7 Each alternative will be evaluated in this Proposed Plan using eight of the nine criteria described below. The cost associated with each alternative is one of the criteria considered during this evaluation of the alternatives.

Alternative 2: Part 360 Cap North and South of Ley Creek, Contaminated Groundwater/Leachate Collection North and South of Ley Creek, On-Site Groundwater/Leachate Treatment, Discharge of Treated Effluent to Ley Creek, and Long-Term Operation, Monitoring and Maintenance

Capital Cost:	$18,436,000
Annual OM&M Costs:	$ 408,700
Present-Worth Cost:	$23,507,000
Construction Time:	1.5 years

The key elements of this alternative are as follows:

- Construction of groundwater/leachate collection trenches north and south of Ley Creek;
- Excavation of contaminated sediments in the western drainage ditch;
- Lining the drainage ditches located along the northern and eastern borders of the Site;
- Consolidation of the excavated sediments and the soils and wastes (from the excavation of the collection trenches) on the landfill area north of Ley Creek, as appropriate;
- Construction of 6 NYCRR Part 360 caps over the landfill area north and south of Ley Creek;
- Engineered drainage controls and fencing;
- Installation of an on-site, 150,000-gallon storage tank to hold excess water volume from the groundwater/leachate collection trench(es) stemming from storm events;
- Treatment of the collected contaminated groundwater/leachate at an on-Site treatment plant;
- Discharge of treated effluent to Ley Creek;
- Institutional controls;
- Operation and maintenance of the on-Site treatment plant and maintenance of the cap and groundwater/leachate collection trench(es); and
- Long-term monitoring

The northern collection trench would be approximately 2,900 feet long. The southern collection trench would be approximately 1,260 feet long. The trenches would be constructed and the creek banks would be restored in compliance with the New York State stream protection ARAR, 6 NYCRR Part 608 Use and Protection of Waters. The groundwater/leachate collection trench would be installed along (the channelized portion of) Ley Creek. Based upon available data and the conclusion that the groundwater flow from the landfill south of Ley Creek is likely to be influenced by a northwestern flowing gradient to the southern collection trench along Ley Creek, a collection trench along the northern side of OLCC may not be needed. If monitoring data indicates a different flow gradient, then the need for a groundwater collection trench along the north side of the OLCC would be evaluated.

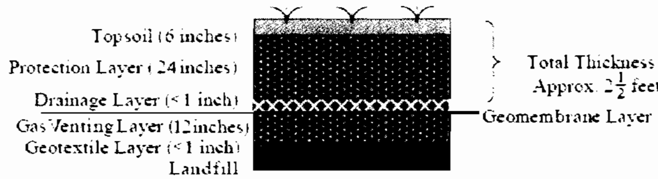
The institutional controls (such as deed restrictions) would prohibit the residential use of the Site property, the installation and use of groundwater wells, and excavation of soils that would negatively impact the integrity of the cap and groundwater/leachate collection trenches, and engineered drainage controls.

All excavated sediments, soils, and wastes which have PCB concentrations which equal or exceed 50 mg/kg would be sent off-Site for treatment/disposal at a Toxic Substances Control Act (TSCA)-compliant facility[8]. Those sediments that have PCB concentrations less than 50 mg/kg would be consolidated underneath the cover on the landfill area north of Ley Creek. Nonhazardous soils and waste would be consolidated on-Site over approximately 10 acres in a currently flat area in the northern portion of the Site. The consolidated material would be graded to improve drainage in this area and then covered with the Part 360 cap. It is anticipated that the high level of VOCs in the vicinity of MW-10 (see Figure 2) would be excavated, since the well is within the expected area of the leachate collection trench north of Ley Creek.

After spreading the waste materials, soils, and sediments on top of the landfilled areas, the surfaces north and south of Ley Creek would be graded and covered. Before installing the multilayer caps north and south of Ley Creek, the subgrades would be graded to promote drainage and exhibit final slopes between 4% and 33%. After its installation, the caps would be seeded.

A 6 NYCRR Part 360 cap is commonly used in New York State to close municipal solid waste landfills. The cap systems would include the following components:

1. A 12-inch gas venting layer with a hydraulic conductivity equal or greater than $1x10^{-3}$ cm/sec directly overlying the waste material. A filter fabric is typically directly below and above the venting layer to minimize the migration of fines into the venting layer. This layer is required to transmit methane for high organic waste material.
2. A synthetic 60 mil geomembrane overlying the gas venting layer.
3. A 24-inch compacted soil layer to protect the geomembrane from root penetration, dessication, and freezing.



Example of a 360 Cap Cross-Section

4. A final 6-inches of topsoil placed on top of the protective layer to promote vegetative growth for erosion control.

Results of an analysis to determine the infiltration rate through the multilayer caps show a significant reduction in infiltration through the caps. Estimates of collection trench flow are made with consideration of the reduced infiltration, which results in a reduced saturated thickness and a reduced hydraulic gradient. The collection rate would likely decline over time as the local groundwater table lowers in response to the ongoing collection and discharge.

Prior to the installation of collection trenches, any landfill wastes encroaching on or near the banks of Ley Creek and OLCC would be pulled back 30 feet from the northern and southern banks of Ley Creek and 30 feet from the northern banks of OLCC. This waste would be removed and disposed properly at a permitted off-Site facility if it is characterized as hazardous waste. If it is not characterized as hazardous waste, then the waste would be consolidated onto the landfill. Site preparation prior to trench construction would include clearing, grubbing, and removal of trees along the relevant banks of Ley Creek. Erosion controls, including silt fencing and/or hay bales would be installed to prevent soil and silt runoff. The existing slopes along the banks would be regraded to provide a suitable work pad for construction of the trenches. Contaminated material cut from the banks would be placed under the cap (contingent upon the results of the PCB testing noted above).

The groundwater/leachate collection trenches would be keyed into the clay layer that act as an aquitard between the shallow and deep aquifers at the Site. Where the clay layer is not present or is of insufficient thickness, the leachate collection trenches would be keyed into the dense glacial till. Additional investigation of the permeability of the glacial till would be conducted during the remedial design phase. If the glacial till is determined to not be a sufficiently low permeability material, then additional measures (e.g installation of sheet piling downgradient of the collection trenches) may be implemented to ensure that groundwater flow would not bypass the collection trenches.

Pending further evaluation, it is anticipated that the trenches would be installed using the bio-polymer slurry construction technique, which eliminates the need for shoring, dewatering, and personnel working in the trench. A barrier liner would be installed on the downgradient side of the trenches to prevent the inflow of uncontaminated water from Ley Creek. A perforated HDPE pipe would be installed at the bottom of the trenches and a porous media (such as large diameter gravel) would be backfilled. The trenches would be designed such that collected water would flow by

8 For cost estimating purposes, it was assumed that 25% of the materials in the waste area located to the south of Ley Creek would be hazardous.

gravity through conveyance piping to existing manholes located on the northwestern and eastern parts of the Site. From these manholes, the water would be conveyed and treated at an on-Site treatment plant.

The on-Site treatment plant would consist of several treatment trains to address the various contaminants. The metals would likely be removed through the addition of chemical coagulants that promote a flocculation/sedimentation process. The metals and other solids, in a sludge form, would be sent to a thickener and filter press for dewatering. The solid materials would be transported to an approved off-Site disposal facility. The VOCs would likely be treated by an air stripper. Air strippers cause the volatilization of the contaminants out of the water into a collection unit or air stack, depending on the concentrations and whether it is acceptable under air permitting regulations. It is more likely that the air would be sent straight to an air stack. The water would be filtered through a sand filter and would likely be "polished" with activated carbon to remove any dissolved organic contamination that the other treatment processes do not address. After treatment, the effluent would be discharged to Ley Creek in conformance with SPDES requirements.

After the installation of the trenches, the work areas in the buffer areas would be graded for proper drainage, covered with 0.5 foot of topsoil, and revegetated. The creek banks would be restored, as appropriate, in compliance with the New York State stream protection ARAR, 6 NYCRR Part 608 Use and Protection of Waters.

Calculations performed for this alternative estimated that approximately 45,600 gallons per day (gpd) would be discharged to the northern collection trench and 6,900 gpd would be discharged to the southern collection trench. These values would likely decline over time as the local groundwater table lowered in response to the collection and discharge.

The 48-inch abandoned sewer line that runs across the Site would be exposed, broken, and sealed with concrete (or some other suitable material) at the eastern and western borders of the Site, to prevent it from serving as a conduit to convey contaminated groundwater off-Site. In addition, a slip liner would be installed in the 48-inch CMP culvert located in the eastern part of the Site to prevent contaminated groundwater from leaking into the pipe and discharging to Ley Creek.

Sediments in the western drainage ditch would be excavated and the area restored, allowing for positive drainage of surface water runoff to Ley Creek. The drainage ditches located along the northern and eastern borders of the Site would be lined with a low permeability material. The liner would be covered with either riprap or soil, depending on the expected surface water velocity. For costing purposes, it is estimated that 72,000 square feet of liner (3,600 linear feet by 20 feet wide) would be required. The actual amount of liner would be determined during the design phase. Grading and redirection of the drainage ditches would be conducted as necessary to facilitate installation of the liner.

Because the installation of the liner would likely cause the disturbance of wetland areas, mitigation of the affected wetlands is also included under this alternative.

As part of a long-term groundwater monitoring program, the direction of groundwater flow across the southeastern portion of the Site toward the northwest would be confirmed, biodegradation parameters (*e.g.*, oxygen, nitrate, sulfate, methane, ethane, ethene, alkalinity, redox potential, pH, temperature, conductivity, chloride, and total organic carbon) would be used to assess the progress of the degradation of the contaminants in the groundwater downgradient of the groundwater/leachate collection trenches (*i.e.*, the buffer areas between the trenches and the northern and southern banks of Ley Creek and between the limit of waste north of OLCC and the banks of OLCC.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years. As part of any such review, groundwater monitoring results and Site modeling would be utilized to assess the effects of natural attenuation[9] in the 30-foot buffer areas (and downgradient of the groundwater/leachate collection trenches) and the buffer area north of the OLCC, and to otherwise confirm that the remedy remains protective. If justified by the review, additional remedial actions may be implemented.

Alternative 3: Waste Excavation South of Ley Creek and Consolidation North of Ley Creek, Part 360 Cap North of Ley Creek, Contaminated Groundwater/Leachate Collection North and Potentially South of Ley Creek, On-Site Contaminated Groundwater/Leachate Treatment, Discharge of Treated Effluent to Ley Creek, and Long-Term Operation, Monitoring and Maintenance

Capital Cost:	$20,448,000
Annual OM&M Costs:	$435,300
Present-Worth Cost:	$25,849,000
Construction Time:	2 years

This alternative is the same as Alternative 2, except that instead of capping the area between Ley Creek and OLCC, south of Ley Creek, the landfilled wastes would be excavated and relocated to the main landfilled area north of Ley Creek. This would be followed by a post-excavation

9 Natural attenuation is a variety of physical, chemical and biological processes which, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil and groundwater. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction.

assessment (to characterize groundwater and possibly other media, as appropriate, in the area where the removal had occurred).

Following the construction of a temporary bridge across Ley Creek and a haul road for the transport of excavated material to the northern part of the Site, the entire area south of Ley Creek (approximately four acres) would be cleared and grubbed to facilitate waste removal. Erosion controls would be established around the perimeter of the disturbed area. Once the area is prepared, an estimated 29,000 cubic yards of soil and waste would be excavated, transported to the northern portion of the Site, and staged. The excavation would remove apparent evidence of contamination, including visibly stained soils and soils with aromatic odors.

All excavated sediments, soils, and wastes which have PCB concentrations which equal or exceed 50 mg/kg would be sent off-Site for treatment/disposal at a TSCA-compliant facility[10]. Those sediments that have PCB concentrations less than 50 mg/kg would be consolidated underneath the cover on the landfill area north of Ley Creek. Nonhazardous soils and waste would be consolidated on-Site over approximately 10 acres in a currently flat area in the northern portion of the Site. The consolidated material would be graded to improve drainage in this area and then covered with the Part 360 cap. It is anticipated that the high level of VOCs in the vicinity of MW-10 (see Figure 2) would be excavated, since the well is within the expected area of the leachate collection trench north of Ley Creek.

The groundwater/leachate collection trench south of Ley Creek would not be immediately constructed. Following the excavation of the waste from the landfill area south of Ley Creek, groundwater monitoring and a study would be conducted to determine if (a) Site-related contaminants remaining in the area between Ley Creek and OLCC, if any, are a continuing potential source of contaminants to these tributaries (particularly PCBs and metals) at levels that require remediation, and (b) natural attenuation could reduce groundwater contaminants within and downgradient of the excavated source area to Maximum Contaminant Levels (MCLs)[11] within an acceptable time frame. If the study indicates that Site-related contaminants are migrating or may potentially migrate off-Site at levels that would require remediation or that natural attenuation has little potential to adequately reduce on-Site groundwater contamination to MCLs, then a groundwater/leachate collection trench would be constructed south of Ley Creek.

Results of an analysis to determine the infiltration rate through the multilayer cap show a significant reduction in infiltration through the cap. Estimates of collection trench flow are made with consideration of the reduced infiltration, which results in a reduced saturated thickness and a reduced hydraulic gradient. The collection rate would likely decline over time as the local groundwater table lowers in response to the ongoing collection and discharge.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years. As part of any such review, groundwater monitoring results and Site modeling would be utilized to assess the effects of natural attenuation in the area of the site south of Ley Creek and in the 30-foot buffer areas (and downgradient of the groundwater/leachate collection trench(es)), and to otherwise confirm that the remedy remains protective. If justified by the review, additional remedial actions may be implemented.

Alternative 4: Part 360 Cap North and South of Ley Creek and Contaminated Groundwater/Leachate Collection North and South of Ley Creek, Pre-Treatment of the Collected Contaminated Groundwater/Leachate, Off-Site Contaminated Groundwater/Leachate Treatment and Discharge of Treated Effluent, and Long-Term Operation, Monitoring and Maintenance

Capital Cost:	$16,452,000
Annual OM&M Costs:	$277,000
Present-Worth Cost:	$19,888,400
Construction Time:	1.5 years

Alternative 4 is the same as Alternative 2, except that the collected contaminated groundwater/leachate would be pre-treated on-Site to meet METRO's influent requirements. After pre-treatment, the effluent would be conveyed to METRO for final treatment and discharge to Onondaga Lake. The treated effluent would meet the substantive requirements of the SPDES program.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years. As part of any such review, groundwater monitoring results and Site modeling would be utilized to assess the effects of natural attenuation in the two 30-foot buffer areas (and downgradient of the groundwater/leachate collection trenches) and the buffer area north of the OLCC, and to otherwise confirm that the remedy remains protective. If justified by the review, additional remedial actions may be implemented.

Alternative 5: Waste Excavation South of Ley Creek and Consolidation North of Ley Creek, Part 360 Cap North of Ley Creek, Contaminated Groundwater/Leachate Collection North and, Potentially, South of Ley Creek, Pre-Treatment of the Collected Groundwater/Leachate, Off-Site Contaminated Groundwater/Leachate Treatment and Discharge of Treated Effluent, and Long-Term Operation, Monitoring and Maintenance

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10 For cost estimating purposes, it was assumed that 25% of the materials in the waste area located to the south of Ley Creek would be hazardous.

11 Drinking-water standards.

Capital Cost:	$18,464,000
Annual OM&M Costs:	$303,500
Present-Worth Cost:	$22,230,400
Construction Time:	2 years

This alternative is the same as Alternative 3, except that the collected groundwater/leachate would be pre-treated on-Site to meet METRO's influent requirements. After pre-treatment, the effluent would be conveyed via the sanitary sewer system to METRO for final treatment and discharge to Onondaga Lake. The treated effluent would meet the substantive requirements of the State Pollution Discharge Elimination System (SPDES) program.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years. As part of any such review, groundwater monitoring results and Site modeling would be utilized to assess the effects of natural attenuation in the area of the site south of Ley Creek and in the 30-foot buffer areas (and downgradient of the groundwater/leachate collection trench(es)), and to otherwise confirm that the remedy remains protective. If justified by the review, additional remedial actions may be implemented.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely short-term effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; implementability; cost; compliance with applicable or relevant and appropriate requirements; overall protection of human health and the environment; and support agency and community acceptance. The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with applicable or relevant and appropriate requirements addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refer to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs, and net present-worth costs.

- Support Agency acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, NYSDOH (the support agency for NYSDEC) concurs with, oppose, or has no comment on the preferred remedy at the present time.

- Community acceptance will be assessed in the ROD, and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above, follows.

- **Overall Protection of Human Health and the Environment**

Since Alternative 1 would not address the risks posed through each exposure pathway, it would not be protective of human health and the environment.

Alternatives 2, 3, 4, and 5 would be significantly more protective than Alternative 1, in that the risk of incidental contact with waste by humans and ecological receptors would be reduced by excavating the waste material, contaminated soils and sediments, and excavating and/or covering the landfilled waste material and contaminated soil. Collecting and treating the leachate and contaminated groundwater either on-Site or at METRO under Alternatives 2 and 4 would restore water quality in the aquifer downgradient of the collection trenches. Collecting and treating contaminated groundwater and leachate in a collection trench north and, possibly, south of Ley Creek, under Alternatives 3 and 5, in combination with removing landfilled wastes south of Ley Creek, would reduce groundwater contamination originating from this area and help restore water quality in the aquifer south of Ley Creek and downgradient of the northern collection trench.

Alternatives 2, 3, 4, and 5 would protect human health and the environment to a similar extent, since the excavation of the landfilled waste materials south of Ley Creek would involve removing known contaminant source material in this area, and the capping of landfilled waste in this area would significantly reduce infiltration of precipitation into the landfilled wastes, thereby reducing the volume of contaminants of concern that may migrate from the waste material to the groundwater. The use of collection trenches in all four of these alternatives would, in turn, direct the minimized flow of contaminated groundwater/leachate to appropriate treatment facilities. Alternatives 2 and 3 would achieve the treatment of contaminated groundwater/leachate by an on-Site treatment plant. Alternatives 4 and 5 would achieve the treatment of contaminated groundwater/leachate by an on-Site pre-treatment facility, followed by full treatment off-Site.

- **Compliance with ARARs**

A 6 NYCRR landfill cap is an action-specific ARAR for landfill closure. Therefore, Alternatives 2, 3, 4, and 5 would satisfy this action-specific ARAR. Alternative 1 would not meet this ARAR, since it does not include any provisions for a 6 NYCRR Part 360 landfill cap.

Since Alternatives 2 and 4 would involve the excavation of PCB-contaminated sediments and Alternatives 3 and 5 would involve the excavation of PCB-contaminated waste material, soils, and sediments, their disposition would be governed by the requirements of TSCA. Those excavated waste materials, soils, and sediments which equal or exceed 50 mg/kg PCB would be sent off-site for treatment/disposal at a TSCA-compliant facility. If off-Site disposal of contaminated waste material, soils, or sediments is necessary under Alternatives 2, 3, 4, and 5, state and federal regulations related to the transportation and off-Site treatment/disposal of wastes would apply. Since these alternatives would involve the excavation of contaminated soils and sediments, fugitive dust and VOC emission regulations would apply.

Alternatives 2, 3, 4, and 5 would comply with 6 NYCRR Part 608 by protecting Ley Creek and OLCC during construction and restoring the creek banks after construction is completed, as appropriate.

Alternative 1 does not provide for any direct remediation of groundwater and would, therefore, not comply with chemical-specific ARARs (*i.e.*, MCLs). A combination of the groundwater/leachate collection trench(es) and monitored natural attenuation (in the buffer areas downgradient of the trench(es) and north of OLCC, and in the area where landfilled wastes are removed south of Ley Creek in Alternatives 3 and 5) would result in the downgradient groundwater eventually meeting MCLs. However there is no expectation that MCLs would be met in the areas beneath the new landfill caps under Alternatives 2, 3, 4, and 5. The discharge to Ley Creek from the on-Site treatment facility under Alternatives 2 and 3 would need to meet State surface water discharge limits.

The groundwater/leachate collection trenches would prevent the migration of the contaminated groundwater away from the Site. Prevention of off-Site migration of contaminated groundwater and leachate is an action-specific ARAR for the Site.

The lower precipitation infiltration rate associated with placing an impermeable cap over the landfilled areas would significantly reduce the generation of leachate and additional groundwater contamination. The excavation of the waste materials south of Ley Creek under Alternatives 2, 3, 4 and 5 would significantly reduce the migration of contaminants to the groundwater in this area. Since the viability of monitored natural attenuation of the contaminated groundwater south of Ley Creek under Alternatives 3 and 5, and in the buffer areas in Alternatives 2 and 4 cannot be confirmed until after the landfilled waste material is removed, it is unknown whether removing the waste material in combination with natural attenuation of the groundwater in this area would adequately reduce off-Site migration of Site-related contaminants of concern or restore the on-site groundwater exceeding MCLs to groundwater quality standards within an acceptable time frame.

- **Long-Term Effectiveness and Permanence**

Alternative 1 would not provide reliable protection of human health and the environment over time. Alternatives 2, 3, 4, and 5 would be more effective over the long-term than Alternative 1, since they include the collection and treatment of the contaminated leachate and groundwater. Excavating the waste from the landfill area south of Ley Creek, excavating contaminated sediments from the western drainage ditch, consolidating the waste material, soils, and sediments on the landfill area north of Ley Creek and constructing an impermeable cap over the landfill area north of Ley Creek under Alternatives 3 and 5, and excavating contaminated sediments from the western drainage ditch, consolidating the sediments on the landfill area north of Ley Creek, and constructing caps over the landfill areas north and south of Ley Creek under Alternatives 2 and 4, would substantially reduce the residual risk posed by the landfilled waste on the Site by essentially isolating it from contact with human and environmental receptors. The impermeable caps constructed under Alternatives 2, 3, 4, and 5 would also reduce mobility of contaminants caused by infiltrating rainwater. The impermeable caps proposed in Alternatives 2, 3, 4, and 5 represent permanent measures that could be maintained at regular intervals to ensure their structural integrity. The long-term effectiveness of the remedial measures in the buffer areas would also be expected, as the contaminated soils would be removed. In addition, the removal of contaminated soils in the buffer areas would permanently eliminate the mobility of the contaminants.

The 6 NYCRR Part 360 cap(s) that would be constructed under Alternatives 2, 3, 4, and 5 would require routine inspection and maintenance to ensure their long-term effectiveness and permanence. Routine maintenance, as a reliable management control, would include mowing, fertilizing, reseeding, and repairing any potential erosion or burrowing rodent damage. The fencing under these alternatives would need to be inspected for holes or breeches. In addition, flushing of the collection trench drainage systems would need to be performed on a periodic basis, and engineered drainage controls would need to be inspected and repaired as needed. If it is determined that a groundwater/leachate collection system is not needed south of Ley Creek (*i.e.*, natural attenuation of the contaminated groundwater in this area would restore the groundwater exceeding MCLs to groundwater quality standards within an acceptable time frame), then Alternatives 3 and 5 would require less overall maintenance than Alternatives 2 and 4, since there would only be a single groundwater/leachate collection trench and a cap.

Reliability is another measure of the long-term effectiveness of a remedial action. A reliable alternative performs its function with reduced long-term oversight and maintenance. Long-term operation and maintenance would be required for all of the action alternatives.

- **Reduction in Toxicity, Mobility, or Volume Through Treatment**

Alternative 1 would not actively reduce the toxicity, mobility, or volume of contaminants through treatment. This alternative would solely rely on natural attenuation to reduce the levels of contaminants.

The impermeable landfill caps in Alternatives 2, 3, 4, and 5 would result in significantly reduced infiltration of precipitation into the landfill, and therefore a significant reduction in the mobility of the contaminants, and a significantly reduced volume of contaminated groundwater/leachate requiring treatment.

Treating the collected leachate and contaminated groundwater, at either an on-Site or off-Site treatment plant, under Alternatives 2, 3, 4, and 5 would reduce the toxicity, mobility, and volume of contaminants in collected leachate/groundwater through treatment, and it would also reduce the possibility of additional groundwater contamination.

To the extent that Alternatives 2, 3, 4, and 5 would limit further migration of and potential exposure to hazardous substances, by nearly eliminating the infiltration of rainwater into the waste disposal areas and the associated leaching of contaminants from these areas would be nearly eliminated, the reduction in mobility would not be accomplished through treatment.

- **Short-Term Effectiveness**

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, does not present a risk to the community as a result of their implementation. The excavation of 4 - 5 acres of waste under Alternatives 3 and 5 may result in the release of objectionable odors. The excavation and relocation of this waste would also pose a much more significant risk of exposure of on-Site workers to potentially contaminated soils and waste material than any of the other alternatives. Long-term monitoring activities related to Alternatives 2, 3, 4, and 5 would present some risk to on-Site workers through dermal contact and inhalation. Alternatives 2, 3, 4, and 5 would pose an additional risk of exposure of on-Site workers to waste material and contaminated sediments and soils through excavating, moving, placing, and regrading the waste and contaminated soils and sediments. Alternatives 2, 3, 4, and 5 would also pose a risk of exposure of on-site workers to potentially contaminated soils and groundwater through the installation of groundwater/leachate collection trenches. The noted exposures to on-Site workers under Alternatives 2 through 5 can be minimized by utilizing proper protective equipment. The vehicle traffic associated with landfill cap construction and the off-Site transport of contaminated soils/sediments could impact the local roadway system and nearby residents through increased noise level. Disturbance of the land during excavation and cap and groundwater/leachate collection trench construction could affect the surface water hydrology of the Site. There would also be the potential for increased stormwater runoff and erosion during excavation and construction activities that must be properly managed to prevent excessive water and sediment loading.

Excavation and impermeable cap construction activities, as well as groundwater/leachate collection trench installation activities as part of Alternatives 2, 3, 4, and 5, would require substantial clearing of trees and vegetation across the Site, which would temporarily disrupt animal habitats during the construction. Alternatives 3 and 5 would likely be most disruptive to habitats, since they would likely take longer to implement and would be more invasive than Alternatives 2 and 4. Excavation of the waste under Alternatives 3 and 5, as well as the construction of the collection trenches could result in fugitive dust generation, and direct contact with waste and contaminated soil or water. Engineering controls could be applied to reduce the production of dust, and health and safety measures can reduce direct contact with contamination.

Since no activities would be performed under Alternative 1, there would be no implementation time. It is estimated that Alternatives 3 and 5 would be implemented in approximately 2 years. Alternatives 2 and 4 would be implemented in approximately 1.5 years.

- **Implementability**

Alternative 1 involves no construction and would, therefore, be easy to implement. Excavating contaminated sediments from the western drainage ditch, consolidating the sediments on the landfill area north of Ley Creek, constructing mulitlayer caps over the landfill areas north and south of Ley Creek, and installing groundwater/leachate collection trenches north and south of Ley Creek under Alternatives 2 and 4, and excavating the waste from the landfill area south of Ley Creek, excavating contaminated sediments from the western drainage ditch, consolidating the waste material, soils, and sediments on the landfill area north of Ley Creek, constructing an impermeable cap over the landfill areas north of Ley Creek, and installing a groundwater/leachate collection trench north and, if needed, south of Ley Creek under Alternatives 3 and 5, although more difficult to implement than Alternative 1, can be accomplished using technologies known to be reliable and can be readily implemented. Since they involve the movement of a substantial amount of waste material, Alternatives 3 and 5 would be more difficult to implement than Alternatives 2 and 4. Alternatives 2, 3, 4, and 5 would also involve monitoring of natural attenuation parameters. Equipment, services and materials for this work are readily available. These actions would also be administratively feasible.

With regard to the groundwater components of the action alternatives, the construction of the on-Site treatment plant (Alternatives 2 and 3) would be more difficult to implement than the on-Site pre-treatment plant (Alternatives 4 and 5), as there would be more construction necessary.

The on-Site and off-Site treatment facilities would be a reliable source of treatment of the collected groundwater/leachate.

Alternatives 4 and 5, which include off-Site treatment, would need to obtain permission to send the collected groundwater/leachate to the disposal/treatment facility.

Since Alternatives 2, 3, 4, and 5 may result in the disturbance of wetland areas, mitigation of the affected wetlands is also included under these alternatives. If wetland mitigation would include the establishment of a new on-Site high quality wetland, this may be more feasible to implement under Alternatives 3 and 5 since the area south of Ley Creek may be available for wetland development.

- **Cost**

The estimated capital, annual OM&M, and present-worth costs for each of the alternatives are presented in Table 2, at the end of this document. The present-worth costs are calculated using a discount rate of 7 percent and a 30-year time interval[12].

As is indicated from the cost estimates, there are no costs associated with the no action alternative, Alternative 1. The estimated present-worth costs for Alternatives 3 and 5 are $2,342,000 greater than those for Alternatives 2 and 4, respectively (reflecting the greater cost of excavating vs. capping the landfill south of Ley Creek). The estimated present-worth costs for Alternatives 2 and 3 are $3,618,600 greater than those for Alternatives 4 and 5 (reflecting the greater cost for full-scale on-Site treatment vs. on-Site pretreatment followed by off-Site treatment at the Onondaga County Metropolitan Wastewater Treatment Plant).

- **Support Agency Acceptance**

NYSDOH (the support agency for NYSDEC) concurs with the preferred remedy.

- **Community Acceptance**

Community acceptance of the preferred remedy will be assessed in the ROD following review of the public comments received on the Town of Salina Landfill RI/FS reports and this Proposed Plan.

PREFERRED REMEDY

Description of the Preferred Remedy

Based upon an evaluation of the various alternatives, NYSDEC and EPA recommend Alternative 2, which includes:

- Excavation of contaminated sediments in the western drainage ditch;
- Construction of groundwater/leachate collection trenches north and south of Ley Creek;
- Consolidation of the excavated sediments and the soils and wastes (from the excavation of the collection trenches) on the landfill areas;
- Construction of 6 NYCRR Part 360 caps over the landfill areas north and south of Ley Creek;
- Lining the drainage ditches located along the northern and eastern borders of the Site;
- Engineered drainage controls and fencing;
- Installation of an on-site 150,000-gallon storage tank to hold excess water volume stemming from storm events;
- Treatment of the collected contaminated groundwater/leachate at an on-Site treatment plant;
- Discharge of treated effluent to Ley Creek;
- Institutional controls (such as deed restrictions) to prohibit residential use of Site property and the installation and use of groundwater wells, as well as

12 For cost estimating purposes, it was assumed that 25% of the materials in the waste area located to the south of Ley Creek would be hazardous, and would, therefore, require off-Site treatment/disposal at a TSCA-compliant facility.

to protect and ensure the integrity of the caps, groundwater/leachate collection trenches, and engineered drainage controls;

- Maintenance of the caps and groundwater/leachate collection trenches; and

- Long-term monitoring.

The Town of Salina would need to certify the continued effectiveness of the institutional and engineering controls on a yearly basis in an annual report. The certification would need to indicate that the required long-term monitoring is being conducted, identify the required institutional and engineering controls, indicate whether they remain effective for the protection of public health and the environment, and indicate whether they should remain in place.

All excavated sediments and any excavated soils or wastes which have PCB concentrations which equal or exceed 50 mg/kg would be sent off-Site for treatment/disposal at a TSCA-compliant facility. Those sediments that have PCB concentrations less than 50 mg/kg would be consolidated underneath the cap on the landfill areas.

Before installing the multilayer caps, the subgrade would be graded to promote drainage and exhibit final slopes between 4% and 33%. The entire cap would then be seeded.

Currently, the limits of the landfill waste encroach on the banks of Ley Creek in several locations. Landfilled waste would be pulled back 30 feet from the northern and southern banks of Ley Creek and 30 feet from the northern banks of OLCC prior to the installation of the groundwater/leachate collection trenches[13]. This landfilled waste would be removed and disposed properly at a permitted off-Site facility if it is characterized as hazardous waste. If it is not characterized as hazardous waste, then the waste would be consolidated onto the landfill. The groundwater/leachate collection trenches would then be installed along the northern and southern banks of Ley Creek at the new limits of the waste. Based upon available data and the conclusion that the groundwater flow from the landfill south of Ley Creek is likely to be influenced by a northwestern flowing gradient to the southern collection trench along Ley Creek, a collection trench along the northern side of OLCC may not be needed. If monitoring data indicates a different flow gradient, then the need for a groundwater collection trench along the north side of the OLCC will be evaluated. Site preparation prior to trench construction would include clearing, grubbing, and removal of trees along the northern and southern banks of Ley Creek. Erosion controls, including silt fencing and/or hay bales would be installed to prevent soil and silt runoff from entering the creek. The existing slopes along the banks would be regraded to provide a suitable work pad for construction of the trench. Contaminated material cut from the banks would be placed under the cap (contingent upon the results of the PCB testing noted above).

The groundwater/leachate collection trenches would be keyed into the clay layer that act as an aquitard between the shallow and deep aquifers at the Site. Where the clay layer is not present or is of insufficient thickness, the leachate collection trenches would be keyed into the dense glacial till. Additional investigation of the permeability of the glacial till would be conducted during the remedial design phase. If the glacial till is determined to not be a sufficiently low permeability material, then additional measures (e.g installation of sheet piling downgradient of the collection trenches) may be implemented to ensure that groundwater flow would not bypass the collection trenches.

Pending further evaluation during design, it is anticipated that the trenches would be installed using the bio-polymer slurry construction technique, which eliminates the need for shoring, dewatering, and personnel working in the trench. A barrier liner would be installed on the downgradient side of the trenches to prevent the inflow of uncontaminated water from Ley Creek. A perforated HDPE pipe would be installed at the bottom of the trenches and a porous media (such as large diameter gravel) would be backfilled. The trenches would be designed such that collected water would flow by gravity through conveyance piping to existing manholes located on the northwestern and eastern parts of the Site. From these manholes, the water would be treated at an on-Site treatment plant.

After the installation of the trenches, the downgradient work areas would be graded for proper drainage and covered with 0.5 foot of topsoil. All areas disturbed by the construction would be revegetated. The trenches would be constructed and buffer areas and the banks of Ley Creek and OLCC would be restored, as appropriate, in compliance with the New York State stream protection ARAR, 6 NYCRR Part 608 Use and Protection of Waters.

The 48-inch abandoned sewer line that runs across the Site would be exposed, broken, and sealed with concrete (or some other suitable material) at the eastern and western borders of the Site, to prevent it from serving as a conduit to convey contaminated groundwater off-Site. In addition, a slip liner would be installed in the 48-inch CMP culvert located in the eastern part of the Site to prevent contaminated groundwater from leaking into the pipe and discharging to Ley Creek.

Sediments in the western drainage ditch would be excavated and the area restored, allowing for positive drainage of surface water runoff to Ley Creek. The drainage ditches located along the northern and eastern borders of the Site would be lined with a low permeability material. The liner would be covered with either rip rap or soil, depending on the expected surface water velocity. It is estimated that 72,000 square feet of liner (3,600 linear feet by 20 feet wide) would be required. Grading and redirection of the drainage

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13 The northern and southern collection trenches would be approximately 2,900 feet long and 1,260 feet long, respectively.

ditches would be conducted as necessary to facilitate installation of the liner. Additionally, surface water would be temporarily rerouted if necessary during the construction. Because the installation of the liner would likely cause the disturbance of wetland areas, mitigation of the affected wetlands is also included under the preferred alternative.

Because the preferred alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years. As part of any such review, groundwater monitoring results and Site modeling would be utilized to assess the effects of natural attenuation in the two 30-foot buffer areas associated with Ley Creek and in the buffer area north of OLCC, and to otherwise confirm that the remedy remains protective. If justified by the review, additional remedial actions may be implemented.

If the ongoing negotiations between the Town of Salina and Onondaga County related to the utilization of METRO to treat the collected contaminated groundwater/leachate are successful before the Remedial Design Work Plan is approved for the Site, then the collected leachate and groundwater would be pre-treated on-Site and conveyed to Metro in lieu of undergoing complete treatment at an on-Site treatment facility and discharged to Ley Creek (*i.e.*, Alternative 4 would be implemented).

Basis for the Remedy Preference

Under the requirements of the NCP, the "Overall Protection of Human Health and the Environment" and "Compliance with ARARs" evaluation criteria are threshold requirements that each alternative must meet in order to be eligible for selection. Each of the Alternatives 2, 3, 4, and 5 would reduce the risk of incidental contact with waste by humans and ecological receptors.

As discussed above, Alternatives 4 and 5 are the same as Alternatives 2 and 3, respectively, except that on-Site treatment and discharge of leachate/groundwater for Alternatives 2 and 3 would be replaced by on-Site pretreatment and off-Site treatment and discharge at METRO for Alternatives 4 and 5. While Alternatives 2 and 3 would both effectively prevent the risk of incidental contact with waste material, contaminated soils, and contaminated sediment by humans and ecological receptors, Alternative 2, the preferred remedy, has the following advantages over Alternative 3:

- Alternative 2 could be implemented more quickly (it is estimated that Alternative 2 would be implemented in 1.5 years while Alternative 3 would take an estimated two years to implement) and at a lower cost than Alternative 3 (the estimated present-worth cost for Alternative 2 is $2,342,000 less than that for Alternative 3, which presents a significant cost savings to the Town of Salina and State of New York);
- For cost-estimating purposes, it was assumed that 25% of the waste in the waste area to be excavated south of Ley Creek would be hazardous. If the volume of hazardous waste increases, so would the excavation and disposal-related capital costs for Alternative 3;
- Alternative 3 has greater potential than Alternative 2 to generate short-term impacts, such as objectionable odors during excavation; and
- The presumptive remedy for landfills[14] (of the size of the waste area south of Ley Creek is 4 - 5 acres) is capping.

As is described in the above evaluation of alternatives, NYSDEC and EPA believe that the preferred remedy for the Site will provide the best balance of tradeoffs among alternatives with respect to the evaluation criteria, would be protective of human health and the environment, and would comply with all ARARs.

The preferred remedy would mitigate the migration of contamination to Onondaga Lake via Ley Creek; it would provide a reduction in the toxicity, mobility, and/or volume of contaminated groundwater and leachate through treatment; it would satisfy the ARARs and RAOs; and it would provide long-term effectiveness. The preferred alternative would be implemented in a reasonable time frame with minimal significant short-term impacts to human health or the environment. The preferred remedy would be cost-effective, and would utilize permanent solutions to the maximum extent practicable. The preferred remedy would also meet the statutory preference for the use of treatment (of the contaminated groundwater and leachate) as a principal element. Finally, the preferred remedy would provide overall protection to human health and the environment.

[14] http://www.epa.gov/superfund/resources/presump/clms.htm

Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (mg/kg)	FREQUENCY OF EXCEEDING CLEANUP OBJECTIVE	CLEANUP OBJECTIVE (mg/kg) *
Surface Soils	Semivolatile Organic Compounds	Benzo(a)anthracene	ND to 88.0	21 of 27	0.224
		Benzo(a)pyrene	ND to 87.0	23 of 27	0.061
		Benzo(b)fluoranthene	ND to 13.9	14 of 27	1.1
		Benzo(k)fluoranthene	ND to 3.7	8 of 27	1.1
		Indeno(1,2,3-cd)pyrene	ND to 5.0	4 of 27	3.2
		Dibenzo(a,h)anthracene	ND to 0.95	19 of 27	0.014
		Chrysene	ND to 9.1	20 of 27	0.4
Surface Soils	Inorganics	Arsenic	ND to 7.0	8 of 27	1.1
		Barium	ND to 530	17 of 27	61.85
		Beryllium	ND to 0.48	7 of 27	0.16
		Cadmium	ND to 17.3	11 of 27	1.0
		Chromium	ND to 127	27 of 27	10
		Cobalt	ND to 17	6 of 27	8.55
		Copper	ND to 103	12 of 27	18.45
		Iron	4,800 to 18,800	27 of 27	20000
		Lead	ND to 1,163	13 of 27	28.6
		Manganese	273 to 557	1 of 27	492.0
		Mercury	ND to 1.5	18 of 27	0.100
		Nickel	11 to 70	26 of 27	37.3
		Selenium	ND to 23	20 of 27	2.0
		Silver	ND to 8	12 of 27	1.1
		Thallium	ND to 3.6	10 of 27	1.1
		Vanadium	ND to 22	2 of 27	21.15
		Zinc	39 to 1,733	27 of 27	20.0

* - NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046 - Determination of Soil Cleanup Objectives and Cleanup Levels

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (mg/kg)	FREQUENCY OF EXCEEDING CLEANUP OBJECTIVE	CLEANUP OBJECTIVE (mg/kg) *
Subsurface Soils	Volatile Organic Compounds	1,1-Dichloroetane	ND to 377	1 of 8	200
		1,2-Dichloroethene (total)	ND to 766	1 of 8	300
		2-Butanone	ND to 420	2 of 8	300
		Acetone	ND to 1,600	3 of 8	200
		Ethylbenzene	ND to 9,700	1 of 8	5,500
		Toluene	ND to 147,949	1 of 8	1,500
		Xylene (Total)	ND to 45,362	1 of 8	1,200
Suburface Soils	Semivolatile Organic Compounds	Benzo(a)anthracene	ND to 16.0	6 of 8	0.224
		Benzo(a)pyrene	ND to 11.7	7 of 8	0.061
		Benzo(b)fluoranthene	ND to 22.2	6 of 8	1.1
		Benzo(k)fluoranthene	ND to 8.6	1 of 8	1.1
		Indeno(1,2,3-cd)pyrene	ND to 5.2	1 of 8	3.2
		Dibenzo(a,h)anthracene	ND to 1.5	1 of 8	0.014
		Chrysene	ND to 15.4	7 of 8	0.4
		Phenol	ND to 0.5	1 of 8	0.030
Subsurface Soils	Polychlorinated Biphenyls **	Aroclor-1248	0.087 to 420	8 of 8	10.0*
Sediment	Inorganics	Arsenic	5.3 to 6.7	1 of 2	6.0
		Cadmium	5.3 to 6.7	2 of 2	0.6
		Copper	13 to 28	1 of 2	16.0
		Mercury	ND to 0.15	1 of 2	0.15

* - NYSDEC TAGM #4046 - Determination of Soil Cleanup Objectives and Cleanup Levels

** - Values listed reflect the combined guidance for "Total PCBs" - Approximate Background

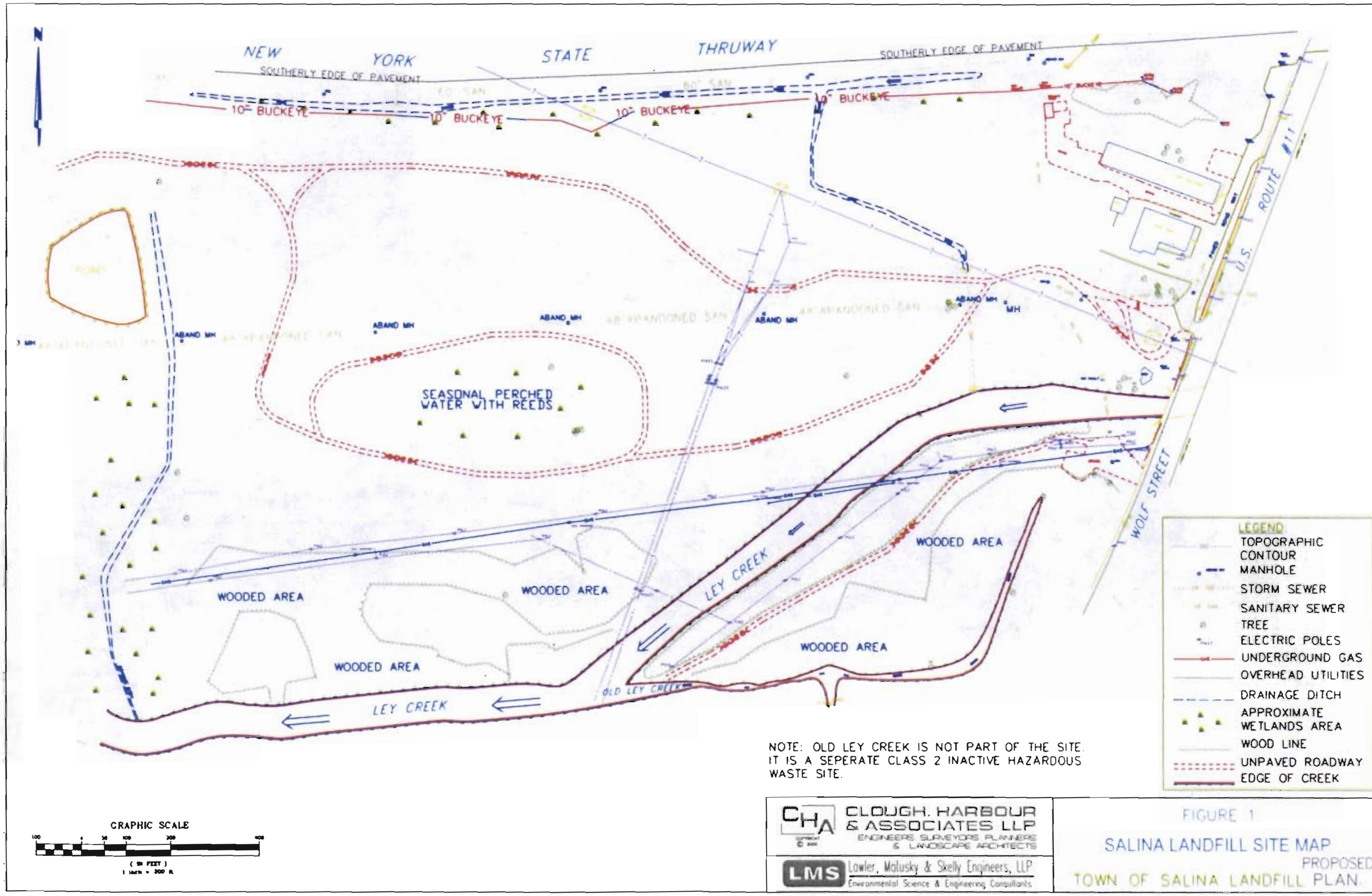
MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ug/l)	FREQUENCY OF EXCEEDING CLEANUP OBJECTIVE	CLEANUP OBJECTIVE (ug/l) *
Groundwater	Volatile Organic Compounds	1,1,1-Trichloroethane	ND to 2,822	3 of 19	5.0
		1,2-Dichloroethene	ND to 26,742	5 of 19	5.0
		Acetone	ND to 3,100	1 of 19	5.0
		Benzene	ND to 29	4 of 19	1.0
		Chlorobenzene	ND to 23	2 of 19	5.0
		Chloroethane	ND to 136	4 of 19	5.0
		Toluene	ND to 92,774	4 of 19	5.0
		Vinyl Chloride	ND to 1,059	3 of 19	2.0
		Xylenes (Total)	ND to 17,900	4 of 19	5.0
Groundwater	Semi-Volatile Organic Compounds	1,4-Dichlorobenzene	ND to 10	4 of 19	3.0
		Naphthalene	ND to 36	2 of 19	10.0
Groundwater	PCBs	Aroclor 1248	ND to 1.6	6 of 19	0.09
Groundwater	Inorganics	Arsenic	ND to 73.6	2 of 19	25
		Barium	ND to 1,687	1 of 19	1,000
		Cadmium	ND to 34.0	12 of 19	5
		Iron	701 to 56,000	19 of 19	300
		Lead	ND to 52.2	2 of 19	25
		Manganese	33.4 to 7,633	14 of 19	300
Leachate	Volatile Organic Compounds	Benzene	ND to 4	1 of 3	1**
		Chlorobenzene	ND to 22	2 of 3	5**
Leachate	Pesticides/ PCBs	Aroclor 1248	0.7 to 1.0	3 of 3	0.09**
Leachate	Inorganics	Aluminum	1,051 to 12,131	2 of 3	2,000**
		Barium	460 to 1,501	1 of 3	1,000**
		Chromium	42 to 125	2 of 3	50**
		Iron	31,183 to 156,000	3 of 3	300**
		Lead	29 to 198	3 of 3	25**
		Manganese	412 to 1,000	3 of 3	300**

* - TOGS 1.1.1 Standards or Guidance Values for Class B Surface Waters

** - No Promulgated Standards for Leachate, TOGS 1.1.1 Standards or Guidance Values Used

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital	Annual	Present Worth
1. No Action	$ 0	$ 0	**$ 0**
2. Capping on Both Landfills and On-Site Leachate Treatment	$18,436,000	$408,700	**$23,507,000**
3. Consolidation, Capping and On-Site Leachate Treatment	$20,448,000	$435,300	**$25,849,000**
4. Capping on Both Landfills and Leachate Treatment at Metro	$16,452,000	$277,000	**$19,888,400**
5. Consolidation, Capping and Leachate Treatment at Metro	$18,464,000	$303,500	**$22,230,400**



NOTE: OLD LEY CREEK IS NOT PART OF THE SITE. IT IS A SEPERATE CLASS 2 INACTIVE HAZARDOUS WASTE SITE.

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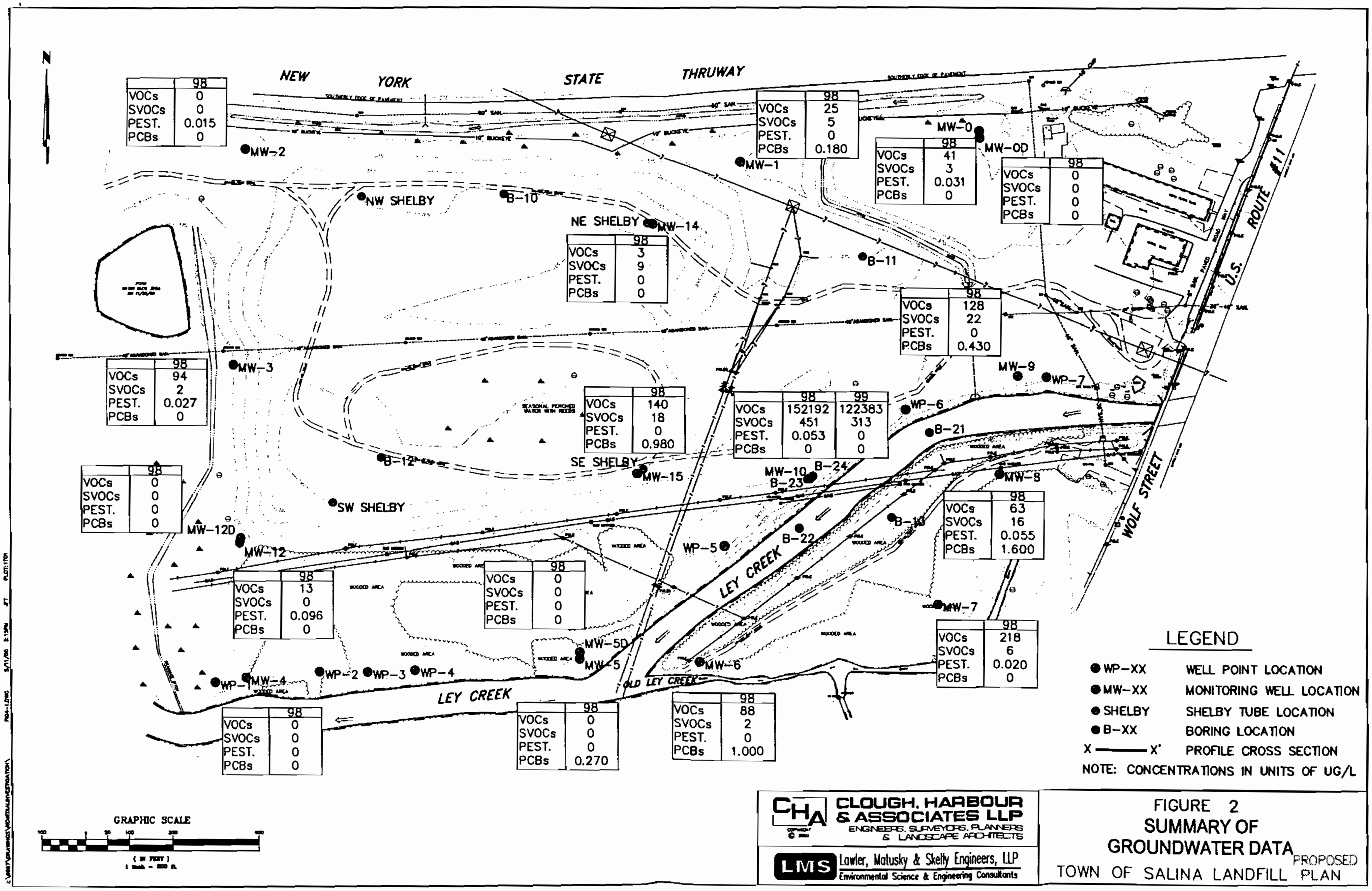
FIGURE 1

SALINA LANDFILL SITE MAP

PROPOSED

TOWN OF SALINA LANDFILL PLAN



N
NEW YORK STATE THRUWAY
U.S. ROUTE #11
WOLF STREET
LEY CREEK
OLD LEY CREEK
MW-2
98 — VOCs 0, SVOCs 0, PEST. 0.015, PCBs 0
MW-1
98 — VOCs 25, SVOCs 5, PEST. 0, PCBs 0.180
MW-0
MW-0D
98 — VOCs 41, SVOCs 3, PEST. 0.031, PCBs 0
98 — VOCs 0, SVOCs 0, PEST. 0, PCBs 0
NW SHELBY
B-10
NE SHELBY
MW-14
98 — VOCs 3, SVOCs 9, PEST. 0, PCBs 0
B-11
98 — VOCs 128, SVOCs 22, PEST. 0, PCBs 0.430
MW-3
98 — VOCs 94, SVOCs 2, PEST. 0.027, PCBs 0
MW-9
WP-7
WP-6
B-21
98 — VOCs 140, SVOCs 18, PEST. 0, PCBs 0.980
98 — VOCs 152192, SVOCs 451, PEST. 0.053, PCBs 0; 99 — VOCs 122383, SVOCs 313, PEST. 0, PCBs 0
B-12
SE SHELBY
MW-15
MW-10
B-23
B-24
MW-8
98 — VOCs 0, SVOCs 0, PEST. 0, PCBs 0
SW SHELBY
B-13
98 — VOCs 63, SVOCs 16, PEST. 0.055, PCBs 1.600
MW-12D
MW-12
WP-5
B-22
98 — VOCs 13, SVOCs 0, PEST. 0.096, PCBs 0
98 — VOCs 0, SVOCs 0, PEST. 0, PCBs 0
MW-7
98 — VOCs 218, SVOCs 6, PEST. 0.020, PCBs 0
MW-5D
MW-5
MW-6
WP-1
MW-4
WP-2
WP-3
WP-4
98 — VOCs 0, SVOCs 0, PEST. 0, PCBs 0
98 — VOCs 0, SVOCs 0, PEST. 0, PCBs 0.270
98 — VOCs 88, SVOCs 2, PEST. 0, PCBs 1.000
LEGEND
● WP-XX WELL POINT LOCATION
● MW-XX MONITORING WELL LOCATION
● SHELBY SHELBY TUBE LOCATION
● B-XX BORING LOCATION
X —— X' PROFILE CROSS SECTION
NOTE: CONCENTRATIONS IN UNITS OF UG/L
GRAPHIC SCALE
(IN FEET)
1 inch = 200 ft.
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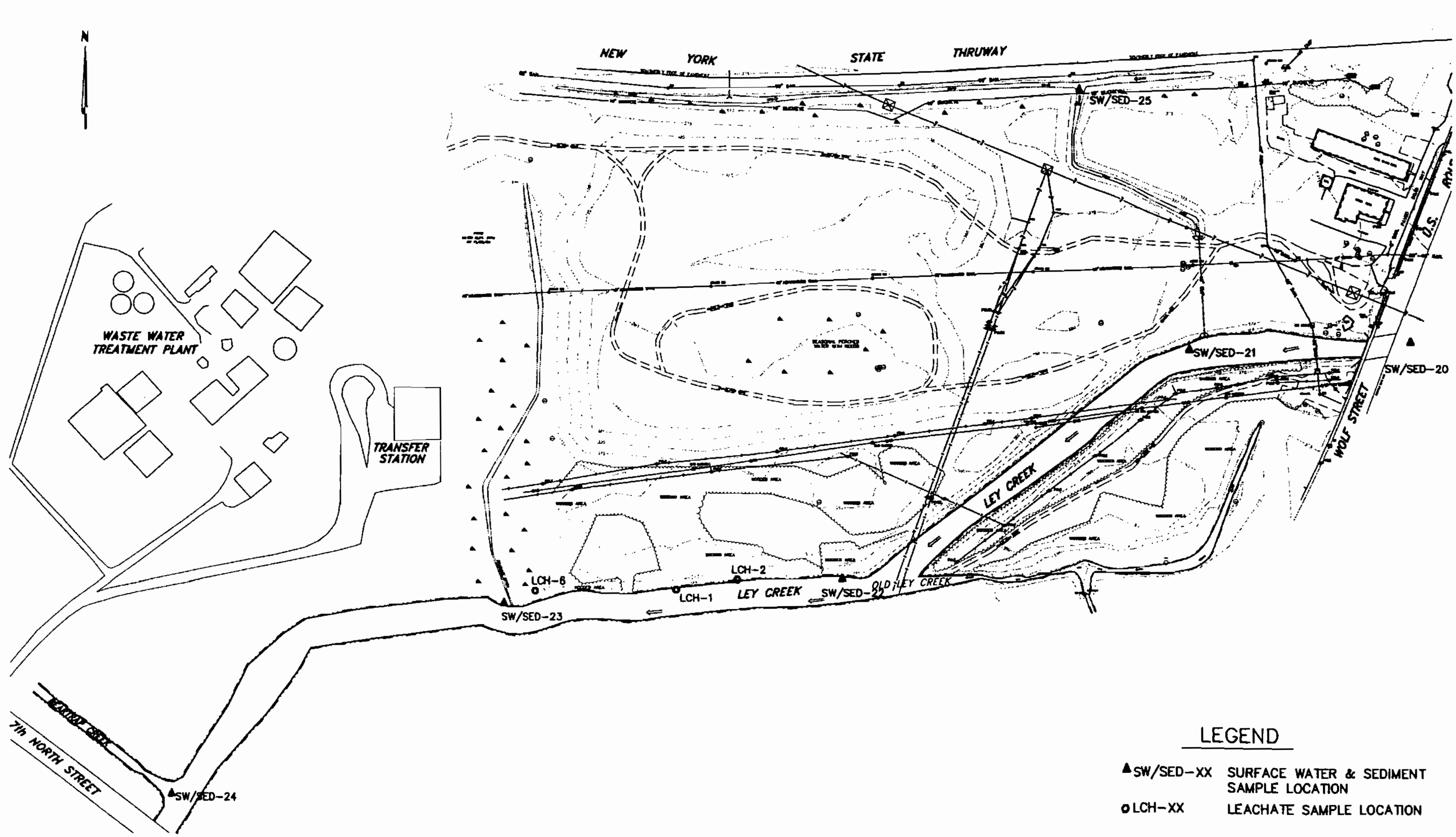
FIGURE 2
SUMMARY OF GROUNDWATER DATA
TOWN OF SALINA LANDFILL PROPOSED PLAN



LEGEND

▲ SW/SED-XX — SURFACE WATER & SEDIMENT SAMPLE LOCATION

○ LCH-XX — LEACHATE SAMPLE LOCATION

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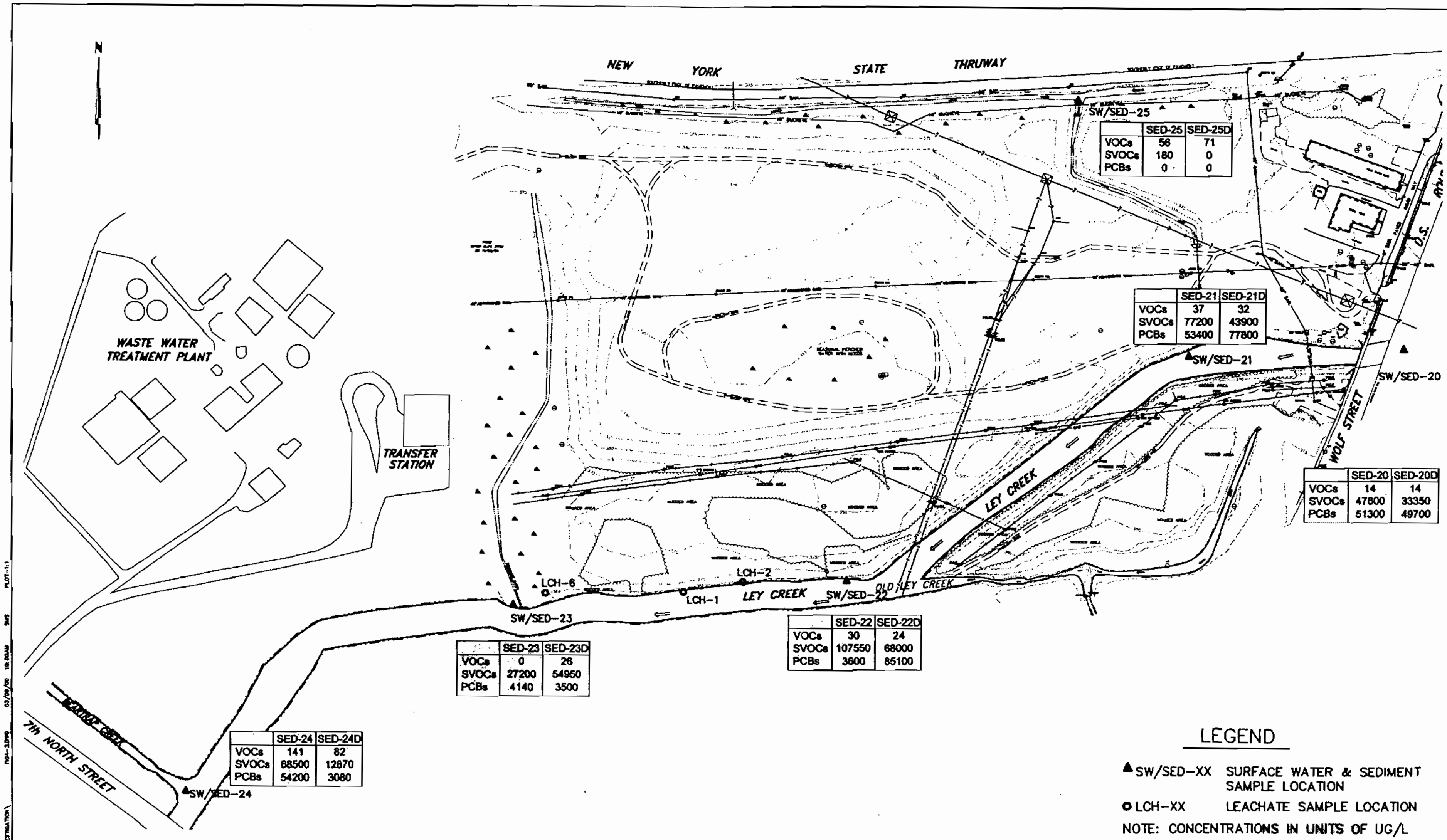
FIGURE 3
SURFACE WATER, SEDIMENT AND LEACHATE SAMPLE LOCATIONS
TOWN OF SALINA LANDFILL PROPOSED PLAN



LEGEND

▲ SW/SED-XX SURFACE WATER & SEDIMENT SAMPLE LOCATION

○ LCH-XX LEACHATE SAMPLE LOCATION

NOTE: CONCENTRATIONS IN UNITS OF UG/L

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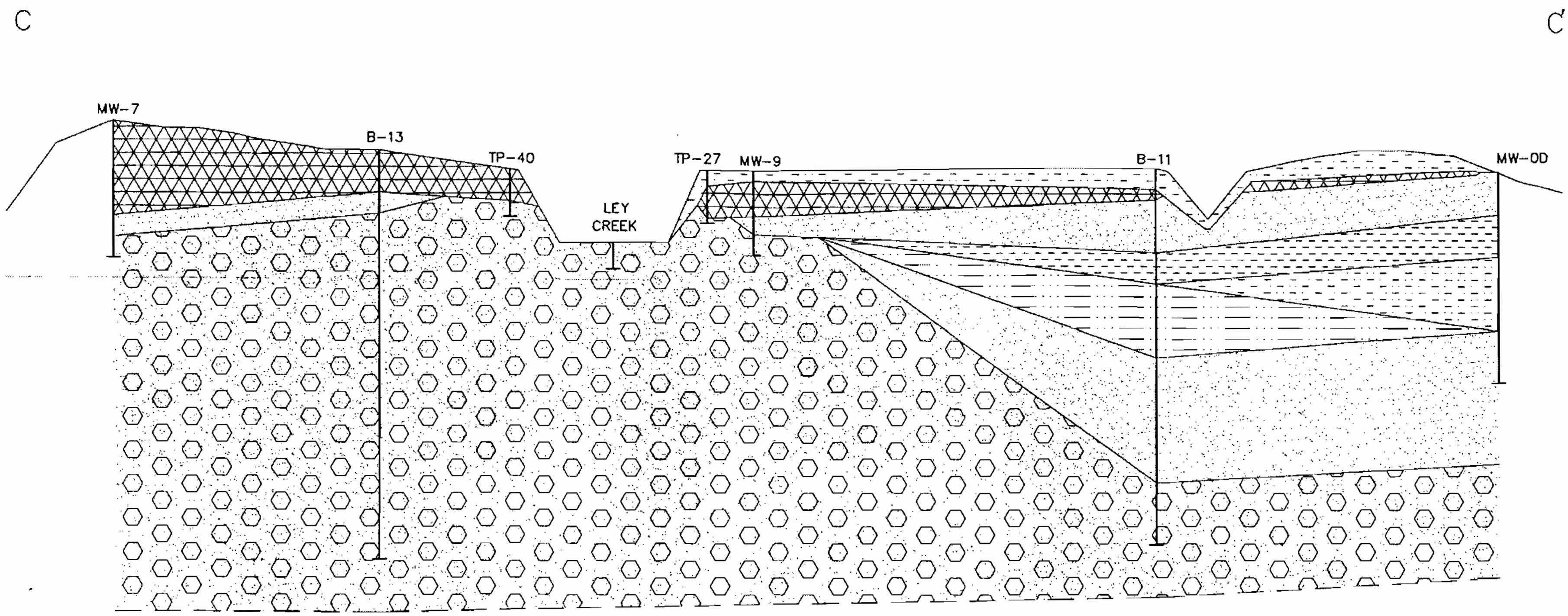
FIGURE 4
SUMMARY OF SEDIMENT DATA
TOWN OF SALINA LANDFILL PROPOSED PLAN



SCALE

HORIZONTAL: 1"=80'

VERTICAL: 1"=20'

LEGEND

SAND	SILT AND CLAY	SAND AND SILT
CLAY	DEBRIS/WASTE	TILL

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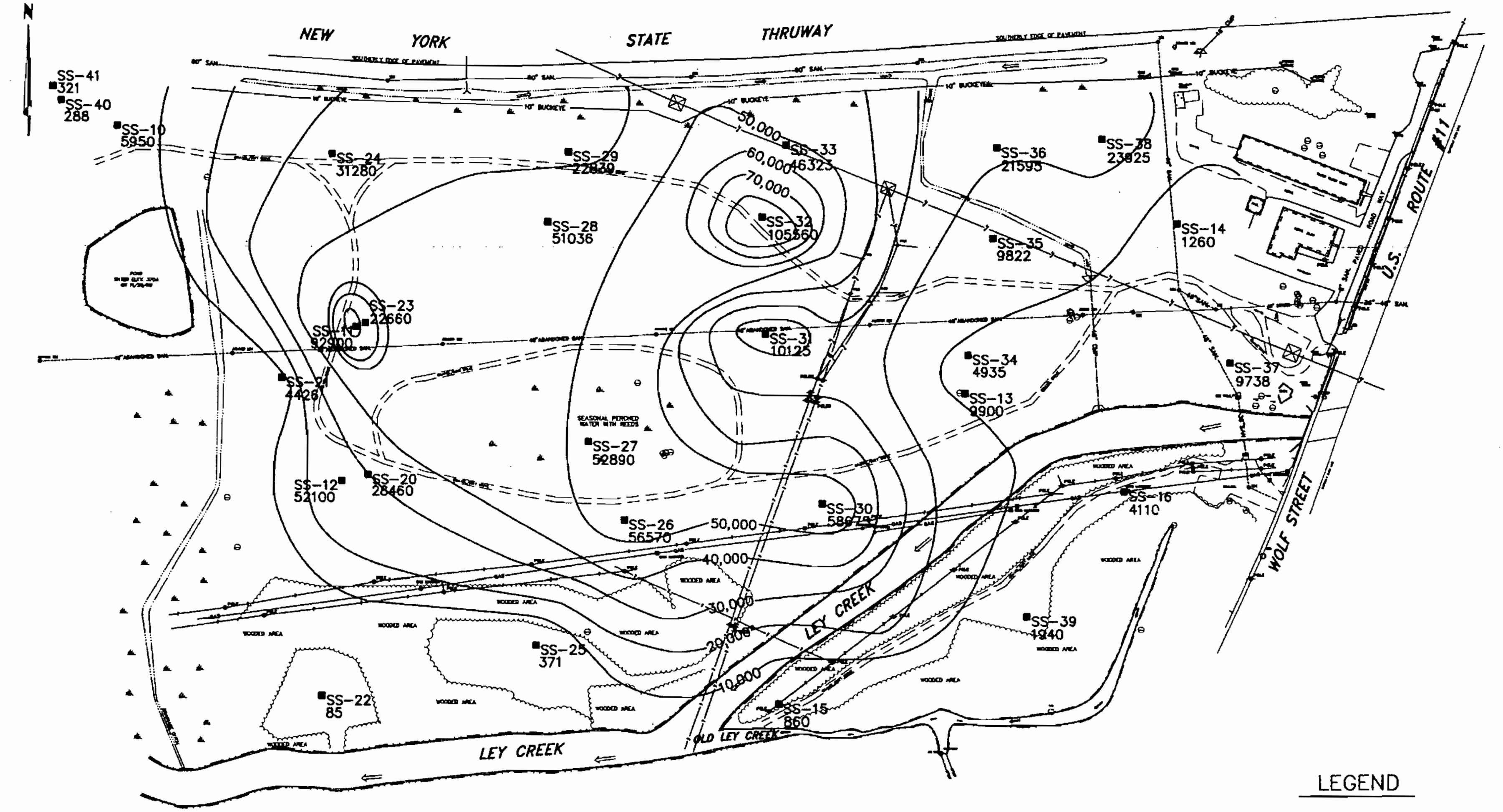
FIGURE 5
GEOLOGIC CROSS-SECTION
C-C'
TOWN OF SALINA LANDFILL PROPOSED PLAN



LEGEND

■SS-XX SURFACE SOIL SAMPLE LOCATION

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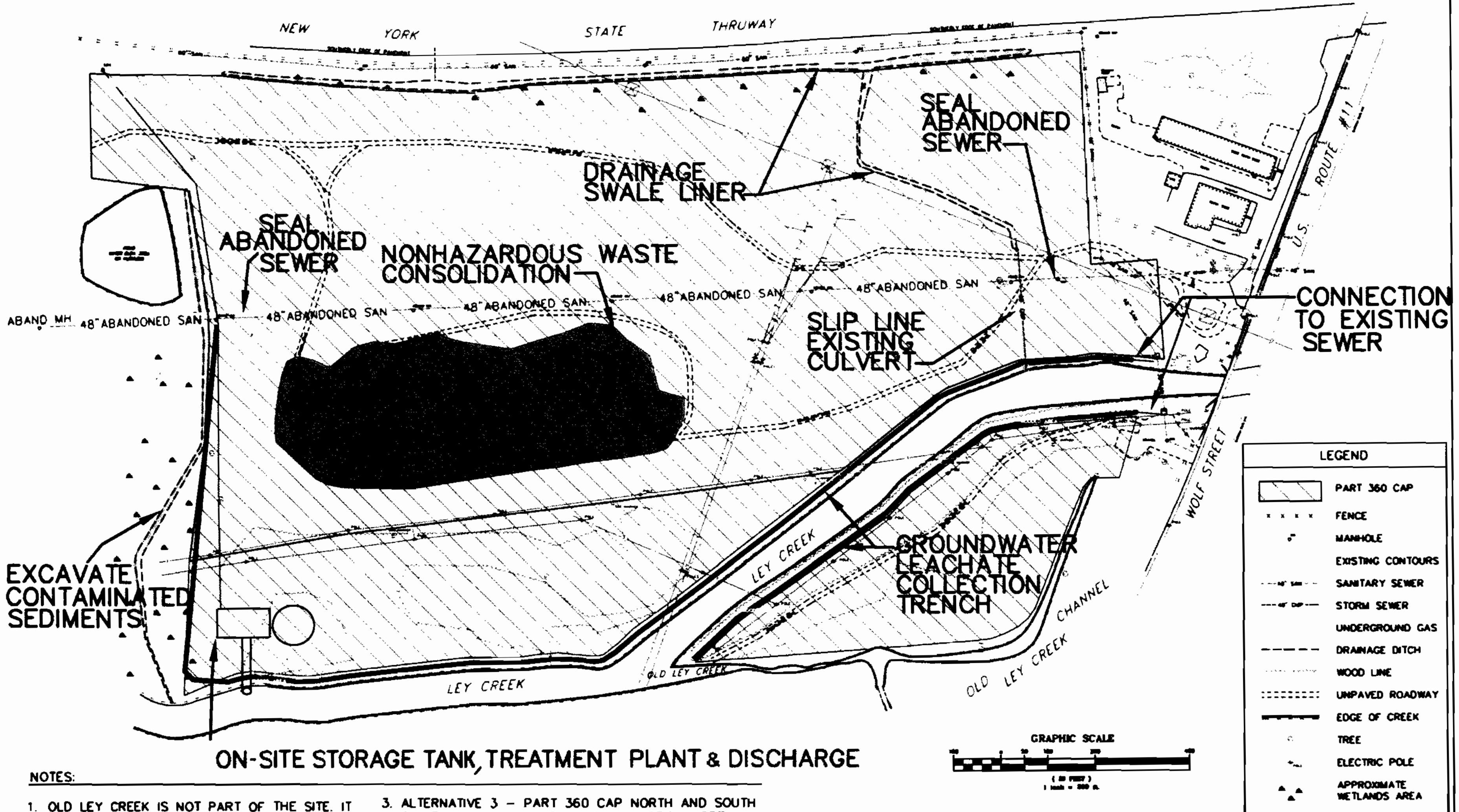
FIGURE 6

SURFACE SOIL SAMPLE SVOC CONCENTRATIONS

TOWN OF SALINA LANDFILL PROPOSED PLAN



NOTES:

1. OLD LEY CREEK IS NOT PART OF THE SITE. IT IS A SEPARATE CLASS 2 INACTIVE HAZARDOUS WASTE SITE.
2. LOCATIONS OF REMEDIAL COMPONENTS ARE APPROXIMATE AND SUBJECT TO CHANGE DURING REMEDIAL DESIGN.
3. ALTERNATIVE 3 – PART 360 CAP NORTH AND SOUTH OF LEY CREEK, GROUNDWATER COLLECTION NORTH AND SOUTH OF LEY CREEK.
4. NON-HAZARDOUS WASTE CONSOLIDATION FROM EXCAVATION OF LEACHATE COLLECTION TRENCHES

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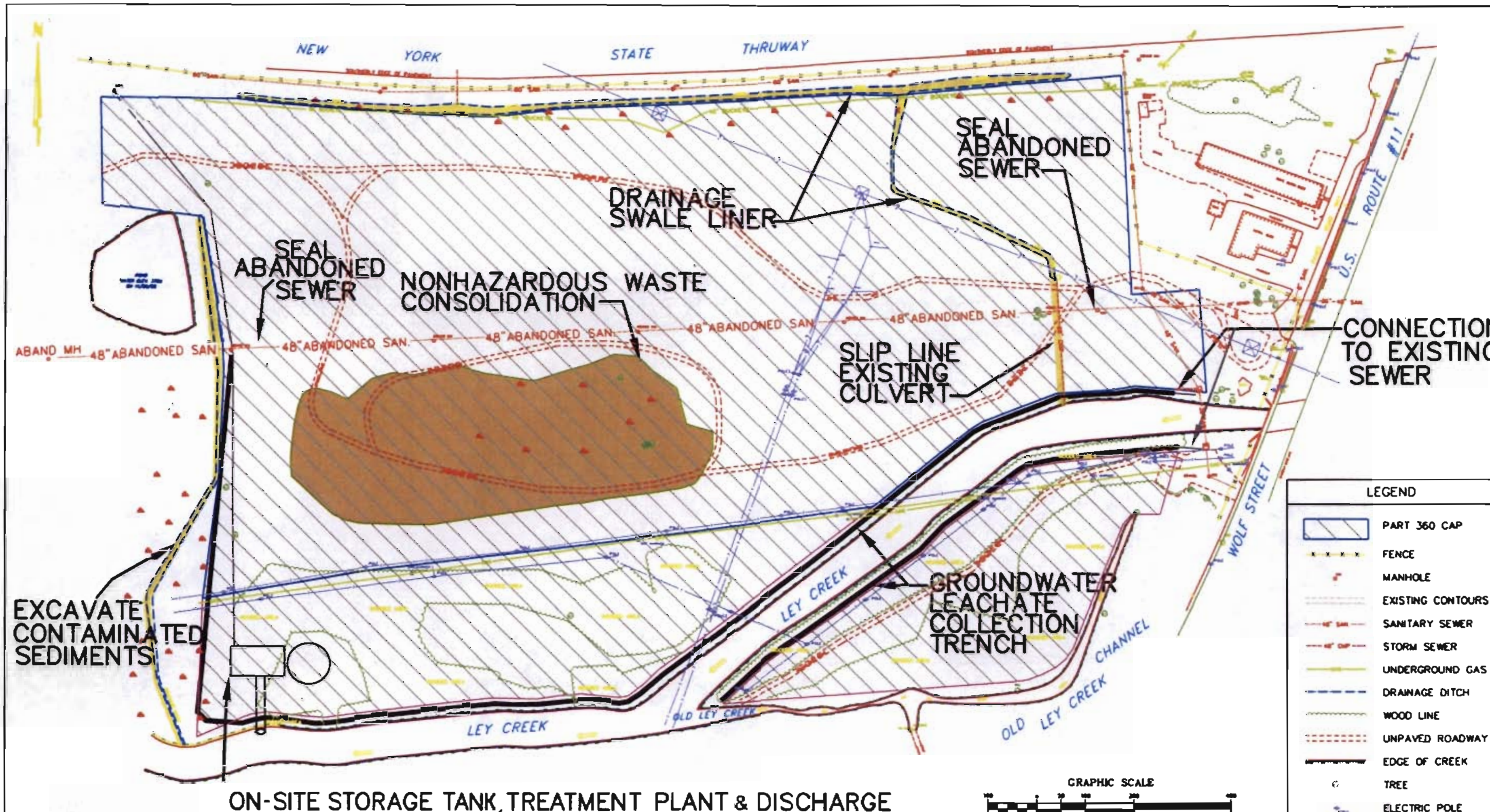
FIGURE 7

ALTERNATIVE 2

TOWN OF SALINA LANDFILL PROPOSED PLAN



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4. NON-HAZARDOUS WASTE CONSOLIDATION FROM EXCAVATION OF LEACHATE COLLECTION TRENCHES

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FIGURE 7

ALTERNATIVE 2

TOWN OF SALINA LANDFILL PROPOSED PLAN