PROPOSED REMEDIAL ACTION PLAN
Former Roblin Steel Site
Environmental Restoration Project
City of Dunkirk, New York
Site No. B00173-9

February 2005

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act
Environmental Restoration Project

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the former Roblin Steel Site. The presence of hazardous substances has created threats to human health and/or the environment that are addressed by this proposed remedy.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration (Brownfields) Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated the property can then be reused.

As more fully described in Sections 3 and 5 of this document, the general operation of the steel making facility have resulted in the disposal of hazardous substances, including:

- Typical degreasing solvents (VOCs: volatile organic compounds);
- Metals from bag house dust collections;
- PCBs (polychlorinated biphenyls) from transformer operations; and
- SVOCs (Semi-volatile organic compounds) from the burning of fossil fuels.

These hazardous substances have contaminated the surface soils, subsurface soil and groundwater at the site, and have resulted in:

- a threat to human health associated with the potential exposure to contaminated surface soil;
- an environmental threat associated with the impacts of contaminants to groundwater resources impacted by the VOCs; and
- a threat to human health associated with the potential exposure to contaminated soil vapor.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy to allow for commercial/industrial use of the site:

- Excavation and off-site disposal of surface soil and debris that exceed the SSALs. Cover remaining soil/fill that exceeds TAGM (Technical and Administrative Guidance Value) values through the installation of asphalt pavement or soil cover;

- Excavation and off-site disposal of subsurface soils that are impacted with chlorinated VOCs that exceed SSALs. Cover remaining soil/fill that exceeds TAGM values through the installation of asphalt pavement or soil cover;
- Cover of subsurface soil/fill with PAH (polyaromatic hydrocarbons), Metals that exceeds TAGM values, and Petroleum Nuisance Characteristics through the installation of asphalt pavement or soil cover system;
- Placement of a minimum, one foot soil cover over all vegetated areas or a minimum 6 inch thick asphalt or concrete in paved areas, to prevent exposure to contaminated soils,
- Remove contaminated sediment from interior building sumps, catch basins and Hyde Creek outfall and backfill with grout;
- Removal and off site disposal of non-friable asbestos within the building structure;
- Installation of a sub-slab vapor venting system for the existing building combined with treatment through enhanced natural attenuation for the groundwater through chemical/nutrient addition;
- Imposition of an institutional control in the form of an environmental easement;
- Develop a Site Management Plan for implementation of the institutional and engineering controls including soil management, groundwater monitoring, and site use restrictions; and
- Certification to the Department that all institutional or engineering controls are in place and are being maintained.

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

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

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the *Site Investigation Report (SI)* dated May 2003, *Draft Interim Remedial Measures Work Plan*, dated June 2003, *Remedial Alternatives Report (RAR)* dated May 2004, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

NYSDEC Region 9 Office
270 Michigan Avenue
Buffalo, New York 14203
For an appointment contact:
Mr. Gregory Sutton, P.E.
(716)851-7220

City Clerk's Office
Dunkirk City Hall
342 Central Avenue
Dunkirk, New York 14048

Dunkirk Free Library
536 Central Avenue
Dunkirk, New York 14048

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 4, 2005 to March 20, 2005 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for February 22, 2005 at the Dunkirk City Hall beginning at 6:30 P.M.

At the meeting, the results of the SI/RAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Gregory Sutton, P.E. - Project Manager, at the above address through March 20, 2005.

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

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

SECTION 2: SITE LOCATION AND DESCRIPTION

The project site is located along the eastern side of South Roberts Road in the City of Dunkirk, Chautauqua County and occupies approximately 12-acres of an inactive industrial park (Figure 1). The adjoining properties located in this park include the former Alumax Extrusions site and the Edgewood Warehouse site (Figure 2). Over 85 years ago, all three of these sites were developed as part of a larger industrial complex operated by the American Locomotive Company (ALCO). The former Roblin Steel Site was most recently occupied by a rolling mill that was closed, dismantled and partially demolished in the late 1980's. Since that time, the former Roblin Steel Site has been vacant.

The project site is located in an area that is zoned for industrial use. Land use in the site vicinity is characterized by a mixture of commercial, industrial and residential uses. The project site is bounded to the north by an active CSX rail yard; to the east by active Norfolk Southern railroad tracks; to the south by the former Alumax Extrusions site; and to the west by the Edgewood Warehouse site. Residential properties are situated to the northwest and south of the project site beyond the adjoining properties. Additionally, mixed commercial and light industrial properties are located to the north and west of the project site, while an undeveloped wooded area and Hyde Creek are located to the east. Lake Erie is located approximately 4000 feet to the northwest of the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The following represents a brief history of the former ownership and operations of the subject site:

- 1860's - Site was part of a complex that included the original Brooks Locomotive Works constructed on the west side of S. Roberts Road.
- 1910 - The project site was first developed as part of a larger locomotive manufacturing complex operated by the American Locomotive Company (ALCO). The complex also included the industrial properties that abut the project site to the west and south, which currently contain the Edgewood Warehouse and former Alumax Extrusions plant, respectively.
- 1930 - Facilities operation converted to manufacture process equipment primarily consisting of heat exchangers, feed water heaters, tunnel shields, pressure vessels and steel pipe, fittings and conduits.
- 1936 - The portion of the complex situated west of South Roberts Road was largely demolished and ALCO's operations were concentrated on the project site and abutting properties. The 1930's plans indicated that three 157,000 gallon above ground fuel oil storage and three pickling tanks were once located on this western corner of the site.
- 1940's - During and after World War II, manufacturing operations at the plant were expanded to include military equipment. This equipment included gun carriages,

fragmentation bombs, thrust shafts and king posts for navel vessels, missile housings, nozzles, boosters, and other components.

- Late 1940's - Following the war, ALCO was contracted by the Atomic Energy Commission to manufacture nuclear reactor components and packaged reactor units. It is not clear whether nuclear fuel was ever stored or utilized at the Dunkirk plant. ALCO also manufactured components for the crawler for the Apollo/Saturn V space rocket. In connection with these operations, ALCO maintained radiological sources at the Dunkirk plant that were used to inspect the integrity of welds on nuclear reactor and missile components. An undated article by the Chief Inspector of the Dunkirk plant indicated that the radiographic inspection setup consisted of five machines. The article also indicated that Cobalt 60 was used in an outdoor area of the site on rare occasions.
- 1950's&60's Site plans indicate that the property contained a plate shop where pressure vessels and heavy fabricated plate equipment was manufactured, as well as facilities for the manufacturing and hydrostatic testing of large diameter municipal water pipes. These plans indicate that the existing building was utilized for the application of corrosion preventative coatings to municipal water pipes; and, following its expansion, missile fabrication and heat treating.
- 1962 - ALCO's plant operations close.
- 1963 - The ALCO complex was purchased by Progress Park, whose mission was to facilitate the re-occupation of the complex by new industrial concerns.
- 1969 - The Roblin Steel Company acquired the project site with the exception of the South Bay area that was briefly owned by Allegheny Ludlum.
- 1984 - Roblin Steel Company purchased the remainder of the plant site from Progress Park.
- 1969-1987 - Roblin Steel occupied the project site and operated a steel reclamation business on the property. High quality scrap steel was reclaimed using electric arc furnaces and then forged into steel rods. The plant contained three electric arc furnaces, several dust collection system baghouses, an outdoor electrical substation, numerous transformer rooms, rolling and hammer mills, a compressor house, and a variety of other process equipment (e.g., casting and cooling towers). The operation of the arc furnaces generated air pollution emissions control dust (KO61). The company operated a landfill on a separate property located approximately 0.5-miles to the south of the project site, which was utilized for the disposal of waste materials from the plant which is not part of this project.
- 1987 - Champion Inc. was contracted to salvage the equipment from the plant.
- 1990 - MRDI (Material Recovery of Dunkirk Inc.), the reputed former owner of the site acquired the property, from the bankruptcy of Roblin Industries. MRDI undertook the demolition of the portion of the plant located to the north of the existing on-site building, and continued salvage operations until the early to mid 1990's.
- 1994 - A removal action was conducted by the USEPA (U.S. Environmental Protection Agency) to address over 700 drums of hazardous waste and piles of emission control dust abandoned on the property.
- 2001 - Chautauqua County takes ownership of the property through foreclosure and enters into the NYS Environmental Restoration Program to assess and remediate the site for future development.

3.2: <u>Remedial History</u>

The project site has been the subject of multiple environmental assessments and investigations prior to the activities that are the subject of this PRAP.

- *Environmental Site Review of Roblin Steel Plant Site, Dunkirk, New York, Acres International Corp.*, January, 1989.
- *Phase 11 Environmental Site Assessment, Roblin Steel Plant*, Dunn Geoscience Corp., October 1990.
- *Groundwater Assessment, Roblin Steel Plant, Dunkirk, New York*, Harrison Hydrosciences, May, 1991.
- *Analysis of Soil and Slag Piles for Lead, Roblin Steel Site*, Roy F. Weston, Inc., January, 1994.
- *Groundwater Investigation Report, Common Boundary of the Former Roblin Steel and Alumax Extrusions Sites*, Clough Harbour and Associates, May, 1999.

The results of these investigations confirmed the presence of contaminated fill, soil, groundwater, storm water and sewer sediment on the project site. Contaminants detected on the project site included chlorinated solvents, polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and heavy metals. However, the data collected was not sufficient to determine the magnitude and extent of contamination or the scope and cost of remediation required to enable redevelopment.

SECTION 4: ENFORCEMENT STATUS

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

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. Chautauqua County will assist the state in its efforts by providing all information to the state which identifies PRPs. Chautauqua County will also not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 5: SITE CONTAMINATION

Chautauqua County has recently completed a site investigation/remedial alternatives report (SI/RAR) to determine the nature and extent of any contamination by hazardous substances at this environmental restoration site.

5.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site. The SI was conducted between June 2002 and February 2003**.** The field activities and findings of the investigation are described in the SI report.

The following activities were conducted during the SI:

- Research of historical information;
- Radiological Survey was conducted over the building and ground surfaces to locate any areas of elevated radiation;
- Excavation of 35 test pits to investigate areas of suspected contamination and to determine the depth to bedrock;
- Screening of surface soil and fill using a XRF (x-ray fluorescence) unit to determine elevated areas of metals contamination. Screening results were later followed by 10 composite soil samples in specific site areas;
- Installation of 41 soil borings and 11 monitoring wells for analysis of subsurface soils and groundwater as well as physical properties of the soil, bedrock, and hydrogeologic conditions;
- Sampling of 11 new and 4 existing monitoring wells was completed to determine the groundwater quality below the site;
- A survey of public and private water supply wells in the area around the site;
- Collection and analysis of two surface water samples;

- Collection and analysis of two aquatic sediment samples;
- Collection and analysis of one discrete and two composite samples of sediment/soil from floor drains located within the existing buildings and tributary to the site storm water system. Sediment within the discharge pipe to Hyde Creek was also sampled;
- Collection and analysis of two "background" soil samples from separate off-site areas;
- Collection and analysis of eight concrete samples from the former transformer area. The area was the location of a former transformer oil spill;
- Completion of an Asbestos Survey to determine quantity of ACM (asbestos containing materials) within the building structure. A total of 32 samples of potential ACM were collected and analyzed; and
- Perform a topographical site survey.

To determine whether the surface/subsurface soil, groundwater, sediments and surface water contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code; and
- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; and specific Soil Action Level criteria that was evaluated particular to the site. A qualitative risk assessment was performed to assess the potential human health and environmental risks associated with the contaminants detected on the Site. As part of the risk assessment, it was determined that, based on the intended end use of the Site for commercial or light industrial purposes, the NYSDEC recommended cleanup objectives for soil/fill set forth in TAGM 4046, were not appropriate. Therefore, SSALs (Site Specific Action Levels) for contaminants of concern detected in surface and subsurface soil/fill, were developed for the Site. These SSALs values are appropriate only if sufficient controls are in place, such as cover (soil or pavement), over existing subsurface soils.

  Under the intended future use scenario for the Site, the primary consideration used during the determination of acceptable clean-up levels is the potential risk to human health posed by residual chemical constituents in the soil/fill and groundwater. The approach taken to develop SSALs is detailed in the *Risk Assessment Report* included as Appendix J of the *Site Investigation Report* of May 2003. Table 2 summarizes the SSALs developed for the Site and is further discussed in Section 6.

- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."
- Background soil samples were taken from two locations. These locations were upwind and adjacent to the site, and were unaffected by historic or current site operations. The samples were analyzed for SVOCs (semi-volatile organic compounds) and metals. The results of the analysis were compared to data from the SI (Table 1) to determine appropriate site remediation goals.

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

5.1.1: Site Geology and Hydrogeology

The results of this site investigation indicate that fill material consisting of slag, foundry sand, soil, gravel, brick and concrete is present across the project site and extends from the ground surface to depths ranging from approximately 2-7 feet. Native soil underlies the fill and consists of a heterogeneous mixture of fine-grained glacial deposits ranging from clayey silts to silty clay units with varying percentages of sand and gravel. The glacial deposits are generally comprised of an upper, laminated lacustrine unit underlain by a thin till unit that overlies shale bedrock, which occurs at approximate depths ranging from 2-15 feet below the ground surface. The bedrock surface slopes generally to the north over the majority of the site, with a dip to the southwest on the western side of the site. Bedrock core samples taken during the site investigation indicated that the upper most 3 to 5 feet of bedrock is slightly to severely weathered and consists mainly of a dark gray to gray shale.

No surface water bodies occur on the project site, which is located within the Lake Erie - St. Lawrence River system, and locally within the drainage area of Hyde Creek. Hyde Creek is located approximately 100 feet from the northeast corner of the project site, and flows in a northwesterly direction towards Middle Road where it enters a city storm sewer that eventually discharges to Lake Erie at the foot of Serval Street. Hyde Creek is a Class C stream according to 6 NYCRR Part 839. The best usage of Class C waters is fishing, and the water quality is considered to be suitable for primary and secondary contact recreation.

Storm water runoff occurring on the project site that does not percolate into the subsurface generally flows to the northwest. One confirmed catch basin located approximately 25 feet west of the existing building still exists on the subject property. This catch basin discharges to the city storm sewer system, A review of the Flood Insurance Rate Map developed for the project vicinity by the Federal Emergency Management Agency, indicated that the property is not located within a 100 year flood plain.

The upper-most water bearing zone occurs within the overburden/fill soils and varies in depth within the fill from 2 to 7 feet below grade . Groundwater flow north of the building is generally to the north and northwest towards Lake Erie. East of the building, groundwater flow is to the northeast towards Hyde Creek. However, localized variations in groundwater flow direction likely occur in the vicinity of utility lines, building foundations and other undefined subsurface features, and Hyde Creek, based on field data.

5.1.2: <u>Nature of Contamination</u>

As described in the SI report, many soil/fill, groundwater, concrete, sludge and sediment samples were collected to characterize the nature and extent of contamination on the site. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are various volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs), and inorganics (metals) parameters.

The primary contaminants in soil and groundwater at the site were: VOCs such as TCE (trichloroethene) and its various breakdown products such as dichloroethene and vinyl chloride, in addition to several petroleum related contaminants such as benzene, toluene, xylene, and ethylbenzene. SVOCs, in particular PAHs, (polycyclic aromatic hydrocarbons) were also encountered across the plant site. PAHs are commonly associated with industrial applications involving petroleum-based products, and are found in heavy fractions of petroleum distillation, asphalt, coal tar, and creosote. Potential sources of VOCs and PAHs in these areas include the former operation of rail spurs; poor housekeeping practices resulting in past releases of petroleum products and/or wastes used in connection with machine shop and compressor operations; and/or past spills and/or leaks associated with the use of fuel oil.

The majority of the metals detected at concentrations exceeding the guidance values were contained in the upper four feet within the fill layer across the entire plant property. The metals most routinely detected over guidance values included; calcium, copper, iron, magnesium, manganese, sodium and potassium. In addition, surface soils exhibited the presence of elevated concentrations of lead, cadmium and chromium. These metals are likely related to the presence of residuals from emissions control equipment (bag house dust) as well as the deposition of foundry sands, slag, scrap metal and various other processing wastes associated with steel production that were disposed on the property.

Elevated levels of PCBs were detected in concrete in the area of a former transformer room and are most likely due to a spill or release in this area. Various sumps and other drainage structures on the site also contain elevated levels of VOCs and PAHs that exceed SCGs.

A Radiological Survey was conducted at the site during all investigation activities to assess the site potential for increased radiation levels. The need for this work was based on the Western New York steel industries historical involvement with the atomic arms development of the 1940's. The results of the radiological survey detected no areas of radiation above normal background levels.

5.1.3: Extent of Contamination

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

Chemical concentrations are reported in parts per billion (ppb) for water, parts per million (ppm) for waste, soil, and sediment. For comparison purposes, where applicable, SCGs are provided for each medium.

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

Surface Soil (depth; 0-2 inches)

Representative composite samples of surface soils were collected from previously identified areas of concern (e.g. transformer oil dumping area, bag house dust areas, construction and demolition debris areas, etc.), as well as from points selected to represent conditions across the site. Each of the surface samples collected from the site was analyzed for Target Compound List (TCL) SVOCs, pesticides and PCBs, as well as TAL (Target Analyte List) metals. The results of the metals analysis for the composite soil/fill samples indicate that eight or more parameters were detected above the guidance values (TAGM 4046) in each of the samples collected. The highest concentrations of metals in these composite samples were observed in samples SS12 (319 ppm-chromium), SS15 (2,950 ppm - lead), in the former Bag House Dust Area and SS16 (569 ppm-chromium) and SS17 (10.5 cadmium, 474 ppm-chromium) in the former Building 47 foundation area, where steel production activities took place (Figure 3). SVOCs were also detected in each of the samples at concentrations above the guidance values. The highest concentrations of SVOCs were detected in samples collected from the area of former Building 47. Total SVOCs ranged from 2.54 ppm to 127.7 ppm. Supplemental samples collected in this area had total SVOC concentrations in discrete samples of 1,977 ppm and 1,374 ppm.

No pesticides were detected at levels above the guidance values in the surface soil samples. Total PCBs were detected in the surficial soil in the area of the former transformer room in concentrations that ranged from below the detection limit to 61.8 ppm.

Subsurface Soil

Subsurface soil/fill samples were collected from test pits, soil probes, and test borings across the site property (Figure 4). The selection of subsurface soil/fill samples for chemical analysis was based upon visual and/or volatile monitoring instrument (photoionic) evidence of contamination. Each of the subsurface samples collected from the site was analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. All subsurface soil/fill samples were screened for Total Organic Vapors (TOVs) using a MiniRAE 2000 photoionization detector (PID).

All of the subsurface samples showed exceedances of the TAGM values for two or more TAL metals. The results of the metals analysis for the subsurface soil/fill varied throughout the site with the majority of the metals concentrations exceeding the TAGM values in the upper four feet of the fill layer. The concentrations of metals in the subsurface soil were generally lower than the surface soil/fill results. Copper, calcium, iron, manganese and potassium represented the most widespread detections of elevated metals with the majority of the locations exceeding guidance values.

Several samples were sampled only for VOCs, based on visual, olfactory (odor), and photoionic evidence of contamination and recommendations by the NYSDEC staff. Volatile organic compounds were detected in some of these locations. However, none of the parameter were detected at levels that exceeded the guidance values. Total VOCs in these type of samples ranged from 8 ppb to 10 ppb. The remainder of samples collected on site showed VOC levels in subsurface soils from 2 ppb to 200,000 ppb.

The highest VOC level was sampled from only one location, TB-12, which was collected on the south side of the existing building in the area of the former cooling tower. The sample was collected from 0'-4' below ground surface (bgs) and consisted of a black and dark brown sandy fill. VOCs consisted primarily of trichloroethene (200,000 ppb), which was the only parameter detected above guidance values.

Semi-volatile organic compounds were also detected in all subsurface samples collected. With the exception of one location, each sample contained one or more SVOCs at concentrations exceeding the guidance values. Total SVOCs ranged from 0.158 ppm to 53.75 ppm.

Pesticides were also detected at several locations, however all results were at levels below the guidance values. Total pesticides at these locations ranged from 1.7 ppb to 57 ppb. Only three subsurface soil samples contained PCBs, but all were detected at concentrations below guidance values.

Sediments

Two sediment samples were collected from the bank of Hyde Creek. Each sample was analyzed for VOCs, SVOCs, pesticides, PCBs and metals.

The analytical results for metals in the sediment samples indicated eleven exceedances of the TAGM values at the up gradient location and thirteen exceedances of guidance values at the downgradient location. Of these exceedances, only cyanide in the downgradient location represented a detection that was an order of magnitude higher than the TAGM value.

No VOCs were detected above guidance values in either of the sediment samples.

Semi-volatile organic compounds were detected in both sediment samples, with five compounds exceeding guidance values in the up gradient location and two compounds exceeding guidance values in the downgradient location. Total SVOCs at the upgradient and downgradient locations were detected at 16,019 ppb and 813 ppb, respectively.

No pesticides were detected above guidance values in the up gradient location and pesticides were not detected in the downgradient location. PCBs were not detected in either of the sediment samples.

Groundwater

Groundwater samples were collected from the eleven newly installed monitoring wells and the four existing monitoring wells that had been located at the site as part of previous investigation activities (Figure 5). New wells were installed in either the upper water bearing zone to address potential contamination contained within the over lying fill/soil and above the bedrock or the within the lower bedrock zone beneath the property. Groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. No pesticides or PCBs were detected in any of the groundwater samples. As a result of the high turbidity recorded in each of the monitoring wells, the groundwater samples were filtered in the field and analyzed for dissolved metals. Additionally, MW01, MW03, and MW12 were also analyzed for total metals. The groundwater sample data were compared to applicable water quality standards (WQS) and guidance values established in the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS).1.1.1 (1998).

Interface Groundwater Monitoring Wells: The analytical results for groundwater samples revealed exceedances of metals for one or more parameters at each of the interface groundwater monitoring locations. However, inorganic parameters analyzed were relatively uniform across the site and were generally below the groundwater standards. The majority of the exceedances of the WQS occurred for aluminum, iron, magnesium, manganese, selenium and sodium. As reflected by Table 1, the concentrations of dissolved metals in the samples were generally comparable to the levels of total metals in unfiltered samples. Exceptions to this presumption include aluminum, cobalt, and copper in MW12, which were detected at levels that exceeded the results of the dissolved analysis by an order of magnitude.

One or more VOCs were detected in the majority of the groundwater samples collected from the interface monitoring wells, with the exception of two wells. The majority of the VOCs detected in the groundwater consisted primarily of chlorinated solvents and BTEX (benzene, toluene, ethylbenzene, and xylenes) compounds. The VOCs detected at the highest concentrations included 1,2-dichloroethene, and vinyl chloride (which are degradation by-products of trichloroethene); benzene; tetrachloroethene; toluene; total xylenes; and trichloroethene. Volatile organic compounds exceeding the regulatory values were detected in nine of the thirteen interface groundwater monitoring wells. MW02, MW07 and MW09 had the most exceedances of the regulatory values, each exceeding the regulatory values for at least six parameters. Trichloroethene concentrations in existing monitoring well 11 were significantly greater (30,000 times) the regulatory value. VOCs at much lower concentrations were also detected in interface wells EX-MW-9 (870 ppb), MW-9 (766 ppb), and MW-7 (1,900 ppb); and in bedrock well MW-5 (8 ppb).

Semi-volatile organic compounds were detected in each of the groundwater samples collected from the interface monitoring wells. However, samples from only three monitoring well locations contained SVOCs at levels that exceeded the WQS. This included the sample from MW01, which exceeded the WQS for four compounds; the sample from MW06 which exceeded the WQS for one compound and the sample from MW04 which exceeded the WQS for three compounds.

Bedrock Groundwater Monitoring Wells: The analytical results for groundwater samples collected from the two bedrock groundwater monitoring wells revealed the presence of iron, selenium and sodium above WQS. The concentration of dissolved metals detected in the sample from MW03 were generally comparable to the total metals levels for this location, with the exception of aluminum, cobalt, copper, iron and lead which were detected at levels that exceeded the results of the dissolved analysis by an order of magnitude.

The groundwater sample collected from MW05 contained BTEX compounds and trichloroethene at concentrations exceeding the WQS. No VOCs were detected above the WQS in the groundwater sample collected from MW03.

Semi-volatile organic compounds were not detected above the WQS in either of the bedrock groundwater monitoring wells.

It should be noted that bedrock below the site was very competent and little horizontal fracturing observed during the well installation.

Surface Water

Surface water samples were also collected from Hyde Creek. Only antimony in the upgradient location, and iron and sodium in both the up and downgradient locations exceeded the guidance values.

The creek is located in a generally industrialized area with existing railroad facilities located on both sides of the creek bed.

Concrete Sampling

Four samples (SS01-SS04) of the concrete pads from the former electrical substation and four samples (SS05-SS08) of the concrete flooring from the former transformer rooms on the east side of the site were collected using destructive methods (Figure 3). These samples were analyzed for PCBs. PCB concentrations exceeding the regulatory values for two parameters (Aroclors 1260 and 1242) were detected at one sampling location (SS05) at a total concentration of 1,100 ppm. PCB concentrations exceeding the regulatory values for two other parameters (Aroclors 1221 and 1248) were also detected at an additional sampling location at a total concentration of 40.8 ppm. PCB levels at the remaining sample locations were below the regulatory guidance values.

Drain, Sewer and Sump Sampling

Five sediment/sludge samples were collected and analyzed from various below grade sump structures on the project site (Figure 6). Additionally, one sediment sample was collected from within the storm water outfall pipe at Hyde Creek. All of these samples were analyzed for VOCs, SVOCs, pesticides, PCBs and metals.

The concentrations of the majority of the metals detected in the majority of the sediment/sludge samples collected from the sumps exceeded guidance values. The highest contravention of the guidance values was found in the composite sludge sample collected from sumps SMP02-SMP05. Lead, chromium, cadmium, and mercury were detected at levels of at least an order of magnitude greater than the guidance values in the majority of the sediment/sludge samples.

Volatile organic compounds were detected in each of the sediment/sludge samples. The highest values of VOCs were detected at concentrations above the guidance values in two locations. Total VOCs were 5,580 ppb and 15,287 ppb, respectively. Total VOCs at the other locations ranged from 2 ppb to 195 ppb.

Semi-volatile organic compounds were also detected in each of the sump samples. Exceedances of the guidance values for four or more compounds were detected at each location. Total SVOCs ranged from 4,668 ppb to 519,400 ppb.

Pesticides were also detected in each of the sump samples however, only one sample contained pesticide levels exceeding the guidance value. Total pesticides at this location were detected at 2,050 ppb. Total pesticides in the remaining samples ranged from 5.5 ppb to 169 ppb.

PCBs were detected within two of the sump sampling locations. However, only one location contained PCBs at levels exceeding the guidance values.

The data for the sediment sample collected from within the outfall pipe at Hyde Creek showed metals at this location at levels exceeding the guidance values, with the exception of cobalt, lead, mercury, potassium, thallium and vanadium. Although volatile organic compounds were detected, no parameters exceeded the guidance values. Numerous SVOCs were detected in this sample, six of which exceeded the guidance values. Total SVOCs at this location were recorded at 44,612 ppb. No pesticides and two PCBs were detected in this sample at levels below the guidance values.

Based on the results of the remedial investigation the following specific areas of contamination have been identified at the site (Figure 7):

Area 1:	VOCs in Subsurface soil
Area 2:	VOCs in Site Groundwater
Area 3a&b:	Metals in Surface soil in former Bag House areas

Area 4: SVOCs in Surface Soils
Area 5: PCB contaminated concrete
Area 6: Demolition Debris Piles
Area 7: Interior Building Sumps
Area 8: Wooden block floors
Area 9: Former East End Tank Farm
Area 10: Hyde Creek Outfall Pipe removal
Area 11: Building Asbestos Removal
Area 12: Building Light Fixtures
Area 13: Subsurface Soil In former Oil Cellar
Area 14: Metals in Surface Soil

5.2: Interim Remedial Measures (IRM)

An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR.

The United States Environmental Protection Agency (USEPA) performed an IRM in the summer of 2004 to address several areas of contamination identified during the remedial investigation. These areas were remediated to address specific areas of contamination that were determined to be an immediate threat to either human health or the environment if left in place. The areas remediated by the USEPA were Area 3 (Metals in surface soils in the two former bag house areas), Area 5 (PCB contaminated concrete), Area 11 (Building Asbestos) and Area 12 (Building Lighting fixtures). In addition to the above noted work, the USEPA also removed the majority of the remaining piles of miscellaneous debris from the site as part of their site activities. The piles consisted of steel, brick, concrete and vegetation. After removal of the steel for recycling the remaining material was disposed of at the Chautauqua County Municipal Landfill. A draft report entitled, *USEPA Remedial Summary of Roblin Steel Site*, dated December 2004, describes the results of IRM.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Appendix J of the SI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

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

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

At this site, contamination exists in surface and subsurface soil, and groundwater. For a complete exposure pathway to occur, persons would have to come into contact with the contaminated soil or groundwater, or inhale organic vapors, or contaminated dust. Exposure to these media could occur through trespassing, construction, or utility maintenance activities in and around the site. Currently, completed pathway of exposure are for site workers and utility workers entering on-site utilities and structures.

These pathways of exposure are:

- dermal contact with contaminated surface and subsurface soils, and groundwater; and

- inhalation of organic vapors and contaminated dust.

The site is located in a mixed residential and industrial area, and is not readily accessible to the public or workers at adjacent businesses. All occupied structures in the area are served by public water. Complete pathways could occur in the future to utility workers or site workers during subsurface construction activities and routine utility work.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

While a complete pathway of contaminant release could be identified at the site with the direct discharge of site storm water run-off to Hyde Creek, samples of sediment from the creek contained only marginally elevated levels of contaminants. Only a few metals exceeded sediment criteria and then only above the Lower Effect Level (LEL). Sediment samples collected both above and below the discharge point show similar contaminant levels which would suggest that these contaminants are not specific to the site but a result of the general discharge of run-off from the local area.

Site contamination (VOCs) has also impacted the groundwater resource in both the overburden soils and bedrock aquifer, The groundwater resources are not suitable drinking water sources because of the insufficient quantity of water available. The local area is also served by a public water supply system which supplies drinking water to the public.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND THE PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The proposed future use for the Former Roblin Steel Site is commercial and/or industrial development.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to PCBs in surface soil, and debris and concrete in the area of the former transformer room, high levels of lead, cadmium and copper in surface soils in the area of the former emission dust area and SVOCs in surface soils in the Building 47 area.
- the release of chlorinated hydrocarbons such as trichloroethene and its degradation products (ie: dichloroethene and vinyl chloride) from soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from building sumps and drain sediment into Hyde Creek surface water and sediments through discharge of site storm water.

Groundwater

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards;
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater;
- Restore groundwater aquifer to pre-disposal/pre-release conditions;

- Prevent the discharge of site contaminants to surface waters; and
- Remove the sources of ground or surface water contamination.

Soil

- Prevent ingestion/direct contact with contaminated soil;
- Prevent inhalation of, or exposure to contaminated dust from site surface soils; and
- Prevent the release of contaminants of VOCs from subsurface soil under buildings into indoor air through soil vapor.

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

- Ambient groundwater quality standards; and
- Based on the projected future use scenario for industrial or commercial use, a set of site specific action levels (SSAL) were developed that reflect the industrial nature of the project location and the projected future use. The SSALs (see Table 2) have been determined to be protective of human health and the environment as long as institutional and engineering controls (IC/EC) are maintained and in place. The IC/ECs will be included in the site management plan which requires routine monitoring and reporting.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements. Potential remedial alternatives for the Former Roblin Steel Site were identified, screened and evaluated in the RA report which is available at the document repositories identified in Section 1.

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

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soils and groundwater at the site. The cost values for each alternative have been revised from the values presented in the Remedial Action Report to reflect the IRM activities performed by the USEPA.

Alternative 1: No Action

Present Worth: . . . . *{$93,720}*
Capital Cost: . . . . *{$6,250}*
Annual OM&M:
(Years 1-30): . . . . *{5,690}*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. Under this alternative no active measures would be instituted to remediate the site. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: Exposure Pathway Removal

Present Worth: . . . . *{$1,246,117}*
Capital Cost: . . . . *{$1,146,196}*
Annual OM&M:
(Years 1-30): . . . . *{$6,500}*

This "Exposure Pathway Removal" alternative combines institutional and access controls with the following general response actions to limit human and environmental exposure to the affected media: containment of the impacted surface and subsurface soils through the installation of a soil cover; removal of a portion of the sediment from the outfall pipe to Hyde Creek and closure of the pipe in place; removal of a portion of the sediment from the discharge location of the sewer line located along the southern portion of the building and closure of the pipe in place; limited abatement of ACMs (friable only); and containment of the PCB impacted concrete and surface soils through the installation of a minimum 12 inch soil cover over a demarcation layer.

Institutional and access controls combined with the imported cover soils would focus on preventing human and environmental exposure to the impacted media until the time that the potential for human exposure to site-derived contamination within these media is no longer present. While this alternative satisfies the human health and environmental RAOs for the current use scenario, and limits the potential for point discharges from the project site, it represents the minimal approach to addressing site contamination and is not supportive of the redevelopment of the project site.

Alternative 3: Containment

Present Worth: . . . . *{$1,954,902}*
Capital Cost: . . . . *{$1,632,829}*
Annual OM&M:
(Years 1-2): . . . . *{$19,165}*
(Years 3-30): . . . . *{$12,240}*

This alternative combines institutional controls with long term environmental monitoring and the following general response actions for the affected media: Elimination of contact with contaminated surface and subsurface soil and concrete through installation of a minimum 12 inch soil cover over a demarcation layer; in-situ treatment consisting of soil vapor extraction for soils under the building to address subsurface soil/fill impacted with chlorinated VOCs; removal of sediments from the sumps and closure in place; removal of a portion of the sediment from the outfall pipe to Hyde Creek and closure of the pipe in place; removal of a portion of the sediment from the discharge location of the sewer line along the southern portion of the building and closure of the pipe in place; removal and off site disposal of friable asbestos, non-friable asbestos and electrical components; and Engineering controls for groundwater consisting of a sub-slab vapor venting system for the existing building coupled with natural attenuation for the groundwater.

Long term monitoring would focus on site-wide groundwater quality and air monitoring within the building after redevelopment. Under this alternative, contaminated media would be largely contained with some treatment and removal. The remedial action would combine institutional controls such as a environmental easement with a soils management plan and long term monitoring to insure that site restrictions are complied with.

Alternative 4: Excavation

Present Worth: . . . . *{$4,472,351}*
Capital Cost: . . . . *{$4,449,890}*
Annual OM&M:
(Years 1-2): . . . . *{$3,020}*

This "Excavation" alternative combines institutional controls with complete removal or reduction of contaminants and short term environmental monitoring. This alternative is the most comprehensive, involving the removal and off-site disposal of contaminated media from the site as well as active remedial methods to address the contaminated groundwater. This alternative includes the following general response actions for the affected media: excavation and off-site disposal of contaminated surface soil/fill and debris piles; treatment of subsurface soil/fill impacted with chlorinated VOCs; complete removal of the sump sediments, and piping related to the sumps; removal of a portion of the sediment from the outfall pipe to Hyde Creek and closure of the pipe in place; removal of a portion of the sediment from discharge location of the sewer line along the southern portion of the building and closure of the pipe in place; removal and off site disposal of friable asbestos, non-friable asbestos and electrical components; excavation and off-site disposal of concrete and surface soils impacted with PCBs; and treatment through enhanced natural attenuation of groundwater (i.e. Hydrogen Releasing Compound or zero valent iron injection) coupled with engineering controls consisting of a sub-slab vapor venting system for the existing building.

Short term monitoring would focus on site-wide groundwater quality and air monitoring within the building after redevelopment. Under this alternative, contaminated media would be largely removed from the project site. An environmental easement restricting the potable use of site groundwater would be required to prohibit use until quality standards are met.

Alternative 5 - Limited Excavation

Present Worth: . . . . *{$2,143,353}*
Capital Cost: . . . . *{$2,280,139}*
Annual OM&M:
(Years 1-30): . . . . *{$7,130}*

This "Limited Excavation" alternative includes all the above remedial items of Alternative No. 4 but would limit removal of media to only those areas that exceeded site-specific action levels (SSALs). Because residual contamination would remain on the site, the property would be required to be covered with a minimum 12" inch soil cover with a demarcation layer or pavement to prevent incidental contact with remaining site soils. The removal action would combine institutional controls such as an environmental easement with a soils management plan and long term monitoring to insure that site restrictions are complied with.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of environmental restoration projects in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the RA report.

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

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

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

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

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

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that

permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

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

7. Cost-Effectiveness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 3.

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

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

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing Alternative #5, Limited Excavation as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the SI and the evaluation of alternatives presented in the RAR. Alternative 5 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing or treating in place the soils that create the most significant threat to public health and the environment, it would greatly reduce the source of contamination to groundwater, and it would create the conditions needed to restore groundwater quality to the extent practicable. It also best serves the future use of the property by restricting it to industrial/commercial use while providing a balance between required remediation to meet the needs for future development and use. It also necessitates requirements for the maintenance of a cover system and annual certification to insure the proper site restrictions are being adhered to. Alternatives 2 and 3 would also comply with the threshold selection criteria but to a lesser degree or with lower certainty. Alternative 4 would provide the greatest protection by the complete removal of all the contaminants on site but may be more difficult to implement.

Because Alternatives 2, 3, 4, and 5 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

SHORT TERM

Alternatives 2 (Exposure Pathway Removal), 3 (Containment), 4 (Excavation) and 5 (Limited Excavation) all have short-term impacts which can easily be controlled using standard engineering practices. The time needed to achieve the remediation goals would be longest for Alternative 2 and 3 and similar for Alternatives 4, and 5.

LONG TERM

Achieving long-term effectiveness would be best accomplished by excavation and removal of the contaminated overburden soils (Alternatives 4 and 5). Alternative 4 would be favorable because it would result in the removal of approximately 95% of the contaminated soil at the site and almost all of the contaminated soil above the watertable. Since the contamination lies within the site overburden soils which primarily consist of fill 1 to 10 feet in thickness, Alternative 4 would result in removal of almost all of the chemical contamination at the site. However the need for property use restrictions and long-term monitoring would still be required due to the residual contamination that would remain in the bedrock groundwater.

REDUCTION IN TOXICITY, MOBILITY & VOLUME

Alternatives 4 and 5 have been identified as the most effective alternatives. Alternative 4 would fully satisfy the RAOs developed for the project site, would have high degrees of short and long term effectiveness, would render the project site suitable for immediate redevelopment, and received the highest rating. However, this alternative will take a substantially longer time to implement and would be more that twice the cost of the other alternatives.

IMPLEMENTABILITY

While all alternatives are readily implementable, Alternative 4 requires the excavation of all the contaminated soil on site. This may prove more difficult due to the extensive and substantial building and structure foundations throughout the property. This may be more significant in the area of the VOC contamination because the contamination exists on both sides of the foundation wall. Therefore, Alternative 5's use of available technologies suitable for the in-situ treatment of the VOC in subsurface soils would have a greater degree of implementability since excavation of contaminated soils within the building and beneath foundations would prove difficult.

Alternative 4, excavation and removal, would reduce the volume of waste on-site. Approximately 100,000 cubic yards of material would be removed with Alternative 4. Although some contaminated soil would remain in the saturated zone, the overwhelming majority of contamination is in the top six feet of overburden and above the water table. Alternative 5 would require the excavation and removal of approximately 6,000 cubic yards of material. Although this would remove a large percentage of the contamination on-site, some of the soils that create a source of contamination would remain. Therefore, restrictions on the use of the property would be needed for either alternative.

Alternative 2 would greatly reduce the mobility of contaminants but this reduction would be dependent upon the long-term maintenance of the containment system. Only Alternative 3 would reduce the toxicity of contaminants by chemical/physical treatment.

COST EFFECTIVENESS

The cost of the alternatives varies significantly. Although exposure pathway removal and containment (Alternatives 2 and 3) would be less expensive than excavation (Alternatives 4 and 5), they are also not a permanent remedy. Alternative 4 would be very favorable because it would be a permanent remedy that will eliminate most of a continuing source of groundwater contamination at the site however it would be also the most costly remedy and its implementability and effectiveness are uncertain. The costs of Alternatives 4 and 5 are similar to each other in that the actual excavation and disposal of the material are not the largest costs associated with these remedies. Designing the remedy, mobilizing the equipment, preparing the site, and construction management are substantial costs associated with each of these remedies and do not change appreciably with the increase in soil to be excavated. By removing all of the overburden from the western yard and removing the soil to the water table in the east yard, most of the unsaturated overburden would be removed and restrictions on-site use would not be necessary. Although the capital costs for Alternative 4 are slightly higher than capital costs for Alternative 5, eliminating long term OM&M costs causes the present worth of Alternative 4 to be less than that of Alternative 5.}

The estimated present worth cost to implement the remedy is $2,180,240. The cost to construct the remedy is estimated to be $2,043,454 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is $ 7,130.

The elements of the proposed remedy are as follows:

1. Excavation and off-site disposal of surface soil and debris that exceed the SSALs. Cover remaining soil/fill that exceeds TAGM values through the installation of asphalt pavement or minimum 12 inch soil cover system;

2. Excavation and off-site disposal of subsurface soils that are impacted with chlorinated VOCs that exceed SSALs. Cover remaining soil/fill that exceeds TAGM values through the installation of asphalt pavement or minimum 12 inch soil cover system;

3. Cover of subsurface soil/fill with PAH, Metals that exceeds TAGM values, and Petroleum Nuisance Characteristics through the installation of asphalt pavement or minimum 12 inch soil cover system;

4. A minimum 12 inch soil cover with a demarcation layer would be constructed in all non-paved areas to prevent exposure to contaminated soils. The one foot thick cover would consist of clean soil of sufficient quality to support vegetation. Clean soil would constitute soil with no analytes in exceedance of NYSDEC TAGM 4046 soil cleanup objectives or local site background. Non-vegetated areas (buildings, roadways, parking lots, etc) would be covered by a paving system or concrete at least 6 inches in thickness;

5. Removal and off-site disposal of sediments from interior sumps that exceed the SSALs and closure of drainage features in place. Removal and off-site disposal of accessible sediment from catch basins and end of sewer pipe and closure of the outfall pipe to Hyde Creek in place;

6. Removal and off site disposal of non-friable asbestos within the building structure;

7. Installation of a sub-slab vapor venting system for the existing building combined with treatment through enhanced natural attenuation for the groundwater through chemical/nutrient addition;

8. Imposition of an institutional control in the form of an environmental easement that would: (a) require compliance with the approved site management plan (SMP); (b) limit the use and development of the property to commercial or industrial uses only; (c) restrict use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Chautauqua County Department of Health; and, (d) require the property owner to complete and submit to the NYSDEC I C/ EC certification on a periodic basis determined by the Department;

9. Since the remedy results in contamination above unrestricted levels remaining at the site, a site management plan (SMP) will be developed and implemented . The SMP will include the institutional controls and engineering controls to: (a) address residual contaminated soils that may be excavated from the site during future redevelopment.

The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) provide for the operation and maintenance of the components of the remedy; (d) monitor the groundwater; and (e) identify any use restrictions on site development or groundwater use; and

10. The SMP will require the property owner to provide an Institutional Control/ Engineering Control (IC/EC) certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department annually or for a period to be approved by the NYSDEC, which would certify that the institutional controls and engineering controls put in place, are unchanged from the previous certification and nothing has occurred that would impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation an maintenance or soil management plan.

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	2-Methylnaphthalene	33 - 0.45	36.4	0 of 10
	Acenaphthene	34 - 0.032	50	0 of 10
	Acenaphthylene	33 - 0.16	41	0 of 10
	Anthracene	59 - 0.087	50	1 of 10
	Benzo(a)anthracene	140 - 0.24	0.224	10 of 10
	Benzo(a)pyrene	98 - 0.38	0.061	10 of 10
	Benzo(b)fluoranthene	92 - 0.56	1.1	8 of 10
	Benzo(ghi)perylene	24 - 0.098	50	0 of 10
	Benzo(k)fluoranthene	40 - 0.39	1.1	9 of 10
	Bis(2-ethylhexyl)phthalate	33 - 0.32	50	0 of 10
	Butyl benzyl phthalate	33 - 0.16	50	0 of 10
	Carbazole	37 - 0.60	-	0 of 10
	Chrysene	130 - 0.43	0.4	9 of 10
	Dibenzo(a,h)anthracene	20 - 0.83	0.014	10 of 10
	Dibenzofuran	27 - 0.16	6.2	1 of 10
	Fluoranthene	340 - 0.61	50	2 of 10
	Fluorene	40 - 0.25	50	0 of 10
	Indeno(1,2,3-cd)pyrene	34 - 0.15	3.2	4 of 10
	Naphthalene	20 - 0.012	13	1 of 10
	Phenanthrene	280 - 0.28	50	2 of 10
	Pyrene	250 - 0.45	50	1 of 10
PCB/Pesticides	Aroclor 1260	0.32 - ND	10	0 of 9
Metals	Aluminum	24,400J - 6,360J	10,800 (1)	9 of 20
	Antimony	12.8J - 0.81J	0.94 (1)	of 20
	Arsenic	23.8 - 3.4J	12.70 (1)	13 of 20
	Barium	798J - 66.9J	300	8 of 20
	Beryllium	4.9 - 0.61J	0.56 (1)	18 of 20
	Cadmium	118 - 1.2J	10	20 of 20
	Calcium	153,000J - 6,690J	3,000 (1)	19 of 20
	Chromium	966J - 52.4J	29.4 (1)	20 of 20
	Cobalt	25.6J - 5.7J	30	0 of 20
	Copper	717J - 47.3J	25	20 of 20
	Cyanide	5.2 - ND	-	0 of 20

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Iron	272,000J - 25,000J	26,300 (1)	19 of 20
	Lead	5,940J - 91.6J	400	11 of 20
	Magnesium	33,000J - 2,540J	2,890 (1)	18 of 20
	Manganese	14,100J - 935J	430 (1)	20 of 20
	Mercury	2.4 - 0.06	0.10	16 of 20
	Nickel	482J - 38.7J	27.3 (1)	20 of 20
	Potassium	2,180J - 333J	1,100 (1)	10 of 20
	Selenium	6.9 - 1.7	2	16 of 20
	Silver	15.5 - 0.20B	0.14 (1)	20 of 20
	Sodium	5,620 - 109B	111 (1)	19 of 20
	Thallium	0.46J - ND	1 (1)	0 of 20
	Vanadium	45.1J - 9.2J	150 (1)	0 of 20
	Zinc	154,000J - 1,430J	274 (1)	20 of 20

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1- Dichloroethene	0.001 - ND	0.4	0 of 28
	1,2 - Dichloroethene (T)	280 - ND	0.3	4 of 28
	2-Butanone	0.010 - ND	0.3	0 of 28
	Benzene	0.031 - ND	0.06	0 of 28
	Ethylbenzene	0.019 - ND	5.5	0 of 28
	Toluene	0.001 - ND	1.5	0 of 28
	Xylenes(T)	0.068 - ND	1.2	0 of 28
	Trichloroethene	200 - ND	0.7	1 of 28
	Vinyl Chloride	0.28 - ND	0.2	0 of 28
Semi-volatile Organic Compounds (SVOCs)	2-Methylnaphthalene	9.9 - ND	36.4	0 of 28
	4-Nitroaniline	0.063 - ND	-	0 of 28
	Acenaphthene	0.630 - ND	50	0 of 28
	Acenaphthylene	0.630 - ND	41	0 of 28
	Anthracene	1.3 - ND	50	0 of 28
	Benzo(a)anthracene	4.5 - ND	0.224	9 of 28
	Benzo(a)pyrene	2.4 - ND	0.061	14 of 28
	Benzo(b)fluoranthene	3.6 - ND	1.1	3 of 28
	Benzo(ghi)perylene	2.7 - ND	50	0 of 28

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Benzo(k)fluoranthene	4.1 - ND	1.1	3 of 28
	Bis(2-ethylhexyl)phthalate	1.1 - ND	50	0 of 28
	Carbazole	0.45 - ND	-	0 of 28
	Chrysene	4.8 - 0.034	0.4	7 of 28
	Dibenzo(a,h)anthracene	1.3 - ND	0.014	13 of 28
	Dibenzofuran	0.51 - ND	6.2	0 of 28
	Fluoranthene	10 - 0.013	50	0 of 28
	Fluorene	1.0 - ND	50	0 of 28
	Indeno(1,2,3-cd)pyrene	2.9 - ND	3.2	0 of 28
	Naphthalene	3.4 - ND	13	0 of 28
	Phenanthrene	4.9 - ND	50	0 of 28
	Pyrene	8.7 - ND	50	0 of 28
PCB/Pesticides	4,4'-DDE	0.030	2.1	0 of 28
	4,4'-DDT	0.038	2.1	0 of 28
	Aroclor 1254	0.66	10	0 of 28
Metals	Aluminum	13,500J - 5,390J	10,800 (1)	13 of 28
	Antimony	13J - 0.31J	0.94 (1)	7 of 28
	Arsenic	23.4 - 5.4J	12.70 (1)	12 of 28
	Barium	5,860 - 51.4J	300	1 of 28
	Beryllium	2.60 - 0.24J	0.56 (1)	11 of 28
	Cadmium	2.8 - 0.18J	10	0 of 28
	Calcium	141,000J - 1,470J	3,000 (1)	22 of 28
	Chromium	630J - 13.3J	29.4 (1)	4 of 28
	Cobalt	18.3J - 5.3J	30	0 of 28
	Copper	291J - 18.1J	25	21 of 28
	Cyanide	0.88J - ND	-	0 of 28
	Iron	150,000J - 18,200J	26,300 (1)	15 of 28
	Lead	192J - 13J	400	0 of 28
	Magnesium	38,900J - 813J	2,890 (1)	20 of 28
	Manganese	10,300J - 155J	430 (1)	12 of 28
	Mercury	0.30 - ND	0.10	7 of 28
	Nickel	505J - 14J	27.3 (1)	23 of 28
	Potassium	2,400J - 645J	1,100 (1)	16 of 28

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Selenium	5.3 - 0.75J	2	7 of 28
	Silver	0.43 - ND	0.14 (1)	6 of 28
	Sodium	437 J- 59.7J	111 (1)	19 of 28
	Thallium	1.2J - ND	1 (1)	3 of 28
	Vanadium	48.1J - 8.5J	150 (1)	0 of 28
	Zinc	1090J - 62.8J	274 (1)	4 of 28

SEDIMENTS (Hyde Creek)	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[C] (ppm)[a]	Frequency of Exceeding SCG
Semi-volatile Organic Compounds (SVOCs)	2-Methylnaphthalene	ND - 0.026J	NA	0 of 2
	Acenaphthene	ND - 0.17J	140	0 of 2
	Acenaphthylene	ND - 0.011J	NA	0 of 2
	Anthracene	0.016J - 0.760	NA	0 of 2
	Benzo(a)anthracene	0.072J - 1.2	1.3	0 of 2
	Benzo(a)pyrene	0.065J - 0.82	1.3	0 of 2
	Benzo(b)fluoranthene	0.081J - 1.7	1.3	0 of 2
	Benzo(ghi)perylene	0.040J - 0.22J	1.3	0 of 2
	Benzo(k)fluoranthene	ND - 0.045J	1.3	0 of 2
	Carbazole	ND - 0.43	NA	0 of 2
	Chrysene	0.081J - 0.14	NA	0 of 2
	Dibenzo(a,h)anthracene	0.015J - 0.2J	NA	0 of 2
	Dibenzofuran	ND - 0.12	NA	0 of 2
	Fluoranthene	0.16J - 2.7	1020	0 of 2
	Fluorene	ND - 0.28J	NA	0 of 2
	Indeno(1,2,3-cd)pyrene	0.036J - 0.37J	1.3	0 of 2
	Naphthalene	ND - 0.012J	NA	0 of 2
	Phenanthrene	0.072J - 3.2	120	0 of 2
	Pyrene	0.130J - 2.4	NA	0 of 2
Pesticides	4,4'-DDT	ND - 0.0021J	1.0	0 of 2
Metals	Aluminum	14,800J - 23,700J	LEL -NA	0 of 2
			SEL -NA	0 of 2
	Arsenic	7.7J - 13.60 J	LEL - 6	2 of 2
			SEL - 33	0 of 2
	Barium	94.8J - 106J	LEL -NA	0 of 2

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SEDIMENTS (Hyde Creek)	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[c] (ppm)[a]	Frequency of Exceeding SCG
			SEL -NA	0 of 2
	Chromium	15J - 34J	LEL -26	1 of 2
			SEL -110	0 of 2
	Cobalt	10.4J - 11.9J	LEL - NA	0 of 2
			SEL - NA	0 of 2
	Copper	124J - 172J	LEL - 16	2 of 2
			SEL - 110	2 of 2
	Iron	28,200 - 57,500	LEL - 2%	0 of 2
			SEL - 4%	0 of 2
	Lead	40.8J - 47.9J	LEL -31	2 of 2
			SEL - 110	0 of 2
	Magnesium	3,240J - 3,680J	LEL - NA	0 of 2
			SEL - NA	0 of 2
	Manganese	305J - 816J	LEL - 460	1 of 2
			SEL - 1100	0 of 2
	Nickel	27.10J - 45.1J	LEL -16	2 of 2
			SEL - 50	0 of 2
	Potassium	947J - 1330J	LEL -NA	0 of 2
			SEL - NA	0 of 2
	Selenium	2.7 - 2.8	LEL - NA	0 of 2
			SEL - NA	0 of 2
	Vanadium	14.30J - 18.9J	LEL- NA	0 of 2
			SEL - NA	0 of 2
	Zinc	233J - 341J	LEL - 120	2 of 2
			SEL -270	1 of 2

UPPER (Interface) GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1- Dichloroethene	ND - 15	5	1 of 13
	1,2 - Dichloroethene (T)	ND - 41,000	5	6 of 13
	Benzene	ND - 72	5	5 of 13
	Ethylbenzene	ND - 15	5	3 of 13
	Toluene	ND - 99	5	5 of 13
	Xylenes(T)	ND - 75	5	6 of 13

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

UPPER (Interface) GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
	Trichloroethene	ND - 150,000	5	4 of 13
	Vinyl Chloride	ND - 9,800	5	6 of 13
Semi-volatile Organic Compounds (SVOCs)	Acenaphthene	ND - 1J	20	0 of 13
	Anthracene	ND - 1J	50	0 of 13
	Benzo(a) anthracene	ND - 1J	0.002	2 of 13
	Benzo(a)pyrene	ND - 1J	NA	0 of 13
	Benzo(b)fluoranthene	ND - 0.8J	0.002	2 of 13
	Benzo(ghi)perylene	ND - 0.6J	NA	0 of 13
	Benzo(k)fluoranthene	ND - 0.8J	0.002	2 of 13
	Carbazole	ND - 0.6J	NA	0 of 13
	Chrysene	ND - 1J	0.002	2 of 13
	Dibenzofuran	ND - 2J	NA	0 of 13
	Fluoranthene	ND - 3J	50	0 of 13
	Fluorene	ND - 2J	50	0 of 13
	Indeno(1,2,3-cd)pyrene	ND - 0.6J	0.002	1 of 13
	Naphthalene	ND - 3J	10	0 of 13
	Phenanthrene	ND - 5	50	0 of 13
	Pyrene	ND - 3J	50	0 of 13
Metals	Aluminum	ND - 751	100	3 of 13
	Arsenic	ND - 23.2	25	0 of 13
	Barium	ND - 350	1,000	0 of 13
	Iron	ND - 2,110	300	4 of 13
	Lead	ND - 4.20	25	0 of 13
	Magnesium	ND - 68,500	35,000	6 of 13
	Manganese	ND - 737	300	6 of 13
	Selenium	ND - 17.9	10	5 of 13

LOWER (Bedrock) GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	1 J - 73	5	1 of 2
	Chloroform	ND - 2 J	5	0 of 2
	Ethylbenzene	ND - 8 J	5	1 of 2
	Toluene	ND - 68	5	1 of 2
	Xylenes (T)	ND - 49	5	1 of 2

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

LOWER (Bedrock) GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
	Trichloroethene	ND - 8 J	5	0 of 2
Metals	Arsenic	13.0 J - 18.10	25	0 of 2
	Barium	308 - 318	1,000	0 of 2
	Iron	250 - 473	300	1 of 2
	Magnesium	8,970 - 9,630 J	35,000	0 of 2
	Manganese	64.6 - 80.6	300	0 of 2
	Selenium	ND - 16.6	10	1 of 2

SURFACE WATER (Hyde Creek)	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Semi-volatile Organic Compounds (SVOCs)	Di-n-butyl-phthalate	0.50 J - 0.40 J	50	0 of 2
	Di-n-octyl-phthalate	ND - 0.60 J	50	0 of 2
Metals	Iron	355 - 395	300	2 of 2
	Magnesium	15,500 - 15,700	35,000	0 of 2
	Manganese	81.10 - 81.90	300	0 of 2
	Potassium	8,530 - 8,620	NA	0 of 2
	Sodium	59,400 - 59,400	20,000	2 of 2

CONCRETE /SURFACE SOIL (Transformer Room Area)	Contaminants of Concern	Concentration Range Detected (ppm)	SCG[b] (ppm)	Frequency of Exceeding SCG
PCBs	Aroclor 1260	ND - 100J	1.0	1 of 13
	Aroclor 1254	ND - 3.8	1.0	1 of 13
	Aroclor 1221	ND - 36	1.0	2 of 13
	Aroclor 1232	ND - 31	1.0	1 of 13
	Aroclor 1248	ND - 4.8	1.0	3 of 13
	Aroclor 1016	ND - 58	1.0	1 of 13
	Aroclor 1242	ND - 1,000	1.0	1 of 13

SEDIMENTS/SOIL (Building Sumps/Drains)	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1-Dichloroethane	ND - 0.88J	0.2	1 of 6
	1,1-Dichloroethene	ND - 0.012J	0.4	0 of 6
	1,2-Dichloroethene(T)	ND - 15	0.3	2 0f 6

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SEDIMENTS/SOIL (Building Sumps/Drains)	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Carbon Disulfide	ND - 0.011J	2.7	0 of 6
	Trichloroethene	ND - 1.1J	0.7	1 of 6
	Vinyl Chloride	ND - 0.2	0.2	1 of 6
Semi-volatile Organic Compounds (SVOCs)	2-Methylnaphthalene	ND - 0.15J	36.4	0 of 6
	4-Chloroaniline	ND - 0.21J	0.22	0 of 6
	Acenaphthene	0.031J - 8.6J	50	0 of 6
	Acenaphthylene	ND - 0.45J	41	0 of 6
	Anthracene	0.079J - 10.0J	50	0 of 6
	Benzo(a)anthracene	0.31J - 46.0	0.224	6 of 6
	Benzo(a)pyrene	0.35J - 43.0	0.061	6 of 6
	Benzo(b)fluoranthene	0.92 - 52.0	1.1	5 of 6
	Benzo(ghi)perylene	0.13 J - 19.0J	50	0 of 6
	Benzo(k)fluoranthene	ND - 41.0	1.1	4 of 6
	Carbazole	0.07J - 69.0J	NA	0 of 6
	Chrysene	0.43- 60.0	0.4	6 of 6
	Dibenzo(a,h)anthracene	0.056J - 9.9J	0.014	6 of 6
	Dibenzofuran	0.023J - 3.6J	6.2	0 of 6
	Fluoranthene	0.079 - 100	50	2 of 6
	Fluorene	0.034J - 7.3J	50	0 of 6
	Indeno(1,2,3-cd)pyrene	0.14J - 20.0J	3.2	3 of 6
	Naphthalene	0.024J - 5.9J	13	0 of 6
	Phenanthrene	0.41J - 39.0	50	0 of 6
	Pyrene	0.82 - 65.0	60	1 of 6
PCB/Pesticides	4,4'-DDE	ND - 0.50	2.1	0 of 6
	4,4'-DDT	ND - 1.5J	2.1	0 of 6
	Endrin ketone	ND - 0.10	NA	0 of 6
	Arochlor 1242	ND - 0.03J	1	0 of 6
	Arochlor 1242	ND - 13	1	1 of 6
Metals	Aluminum	6,910J - 16,000J	10,800	3 of 6
	Antimony	6.7J - 48.7J	0.94	6 of 6
	Arsenic	18.10J - 44.2J	12.70	6 of 6
	Barium	162J - 1,880J	300	5 of 6
	Beryllium	0.64J - 2.4	0.56	6 of 6

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

SEDIMENTS/SOIL (Building Sumps/Drains)	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
	Cadmium	3.0 - 44.3	10	2 of 6
	Chromium	75.5J - 2,440J	29.4	6 of 6
	Cobalt	14J - 1,160J	30	2 of 6
	Copper	294J - 1,190J	25	6 of 6
	Cyanide	0.53J - 7.3J	NA	0 of 6
	Iron	60,700J - 273,000J	26,300	6 of 6
	Lead	91.2J - 18,300	188	5 of 6
	Magnesium	4,380J - 28,900	2,890	6 of 6
	Manganese	3,210J - 34,300J	430	6 of 6
	Mercury	0.01J - 2.5J	0.10	5 of 6
	Nickel	174J - 6,290J	27.30	5 of 6
	Potassium	876J - 2,170J	1,100	4 of 6
	Selenium	3.50 - 17.6	2	6 of 6
	Silver	ND - 19.7	0.14	2 of 6
	Thallium	ND	1	0 of 6
	Vanadium	21.4J - 47.2J	150	0 of 6
	Zinc	3,250J - 87,100J	274	6 of 6

Off-site Background (Surface Soil, 0-2") (Detected Parameters Only)	Contaminants of Concern	Sample #1	Sample#2	SCG[b] (ppm)[a]
Semi-volatile Organic Compounds (SVOCs)	2-Methylnaphthalene	0.088 J	0.024 J	36.4
	Acenaphthene	ND	0.010 J	50
	Acenaphthylene	0.05 J	0.025 J	41
	Anthracene	0.048 J	0.05 J	50
	Benzo(a)anthracene	0.25 J	0.28 J	0.224
	Benzo(a)pyrene	0.32 J	0.33 J	0.061
	Benzo(b)fluoranthene	0.46	0.43	1.1
	Benzo(ghi)perylene	0.18 J	0.16 J	50
	Benzo(k)fluoranthene	0.28 J	0.26 J	1.1
	Bis(2-ethylhexyl)phthalate	0.078 J	0.068 J	50
	Butyl benzyl phthalate	ND	0.012 J	50
	Carbazole	0.037 J	0.042 J	-
	Chrysene	0.34 J	0.38	0.4

TABLE 1
Nature and Extent of Contamination
October 2002 to January 2003

Off-site Background (Surface Soil, 0-2") (Detected Parameters Only)	Contaminants of Concern	Sample #1	Sample#2	SCG[b] (ppm)[a]
	Dibenzo(a,h)anthracene	0.8 J	0.073 J	0.014
	Dibenzofuran	0.038 J	0.014 J	6.2
	Fluoranthene	0.63	0.8	50
	Fluorene	0.015 J	0.021 J	50
	Indeno(1,2,3-cd)pyrene	0.18 J	0.16 J	3.2
	Naphthalene	0.054 J	0.015 J	13
	Phenanthrene	0.35 J	0.41	50
	Pyrene	0.45	0.56	50
Metals	Aluminum	10,800 J	9,470 J	SB
	Antimony	ND	ND	SB
	Arsenic	12.7 J	11.2 J	7.5 or SB
	Barium	66.9 J	126 J	300 or SB
	Beryllium	ND	0.56 J	0.16 or SB
	Cadmium	ND	0.67	10 or SB
	Calcium	3,000 J	2,690 J	SB
	Chromium	14.6 J	29.4 J	10 or SB
	Cobalt	ND	9.2 J	30 or SB
	Copper	24.4 J	56 J	25 or SB
	Iron	19,700 J	26,300 J	2,000 or SB
	Lead	127 J	188 J	SB
	Magnesium	1,330 J	2,890 J	SB
	Manganese	176 J	443 J	SB
	Mercury	0.12	0.96	0.1
	Nickel	16.5 J	27.3 J	13 or SB
	Potassium	479 J	1,100 J	SB
	Selenium	1.4	1.3	2 or SB
	Sodium	111 J	88.7 J	SB
	Vanadium	22.3 J	18.1 J	150 or SB
	Zinc	183 J	274 J	20 or SB

J - designation on analytical results signifies that result was detected at a level at or below the sample detection limit.
SB - Site Background
(T) - includes all analytes
(1) - Site Background value used as basis for guidance value

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values;
Sediments: NYSDEC Div. Fish & Wildlife, *Technical Guidance for Screening Contaminated Sediments* dated Jan. 1999.
Soil: NYSDEC - Div. Env. Remediation TAGM 4046 based on Site Background values
Water: NYSDEC - Div. Of Water TOGS 1.1.1

[c] LEL = Lowest Effects Level and SEL = Severe Effects Level. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is exceeded, the impact is considered to be moderate.

Table 2
Site Specific Action Levels (SSALs)

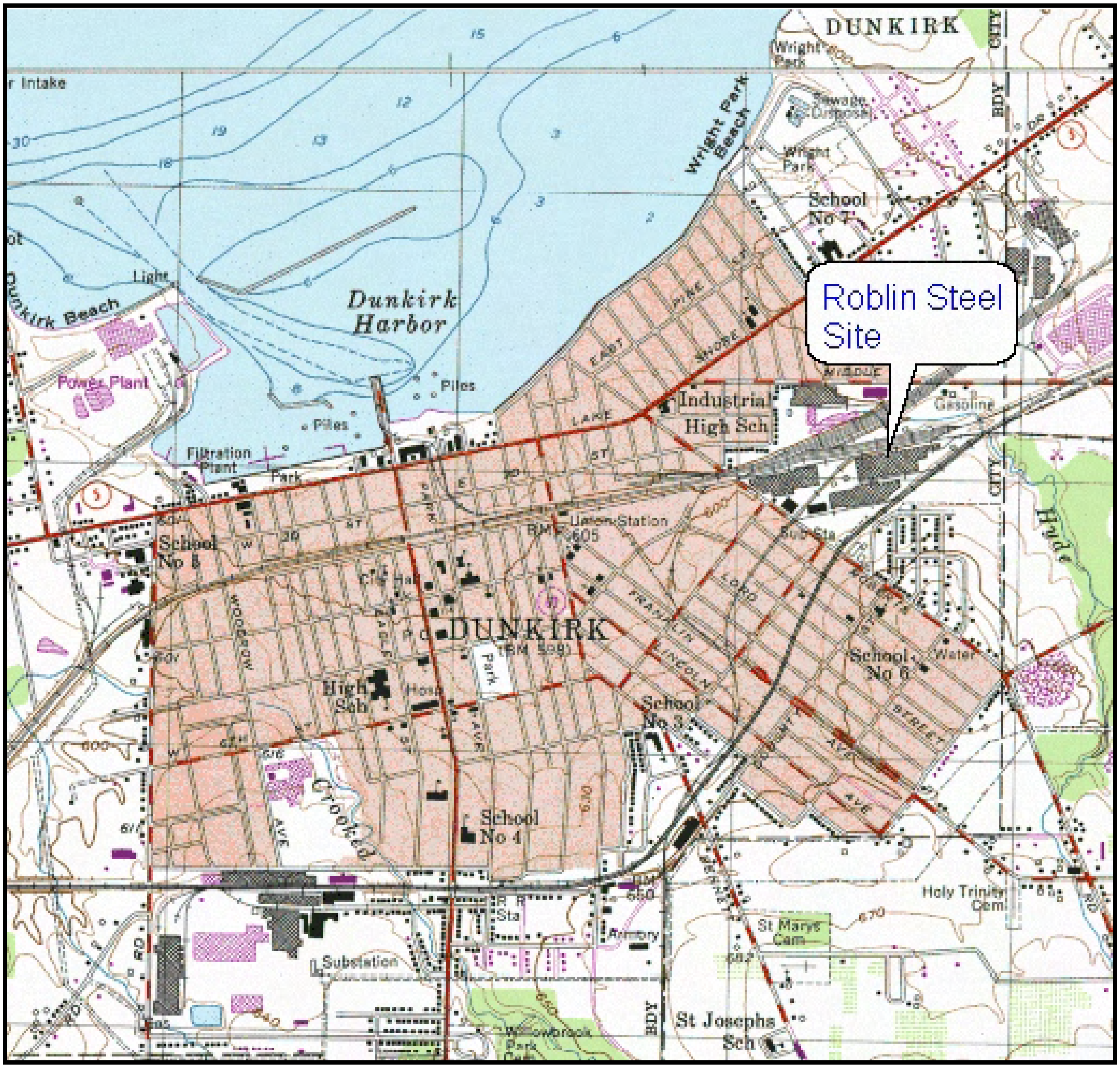
Note: Use of these limits requires the utilization of a site specific soil management plan and the application of a proper cover system (i.e. "clean" soil, pavement, building slab, etc.) to minimize direct contact.

Parameter	Maximum Concentration in Soil/Fill (mg/kg)[1,2]
Individual VOC	1
Total VOCs	10
Individual SVOCs	50
Total SVOCs[3]	500
Total cPAHs[4]	10
Arsenic	50
Barium	1000
Cadmium	20
Chromium	1000
Lead	1000
Zinc	15,000
Selenium	50
Silver	10
Beryllium	5
Copper	250
PCBs	10[5]

1. Off-site backfill material shall also meet recommended soil cleanup objectives for organic pesticides/herbicides and PCBs as defined in TAGM 4046.
2. Analyses shall be performed per NYSDEC Analytical Services Protocol (ASP), October 1995 methodology or other methods acceptable to NYSDEC.
3. Target Compound List (TCL) SVOCs per USEPA Method 8270
4. Carcinogenic Polyaromatic Hydrocarbons (i.e. benzo(a)anthracene, benzo(a)pyrene, dibenzo(b)fluoranthene, benzo(k)floranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene)
5. Subsurface soil limit set in TAGM 4046.

Table 3
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
Alt. 1 - No Action	$6,250	$5,690	$93,720
Alt. 2 - Exposure Pathway Removal	$1,146,196	$6,500	$1,246,117
Alt. 3 - Containment	$1,632,829	0-2 yr. $19,165 2-30 yr. $12,240	$1,954,902
Alt. 4 - Excavation	$4,449,890	$3,020	$4,472,351
Alt. 5 - Limited Excavation	$2,143,353	$7,130	$2,208,139



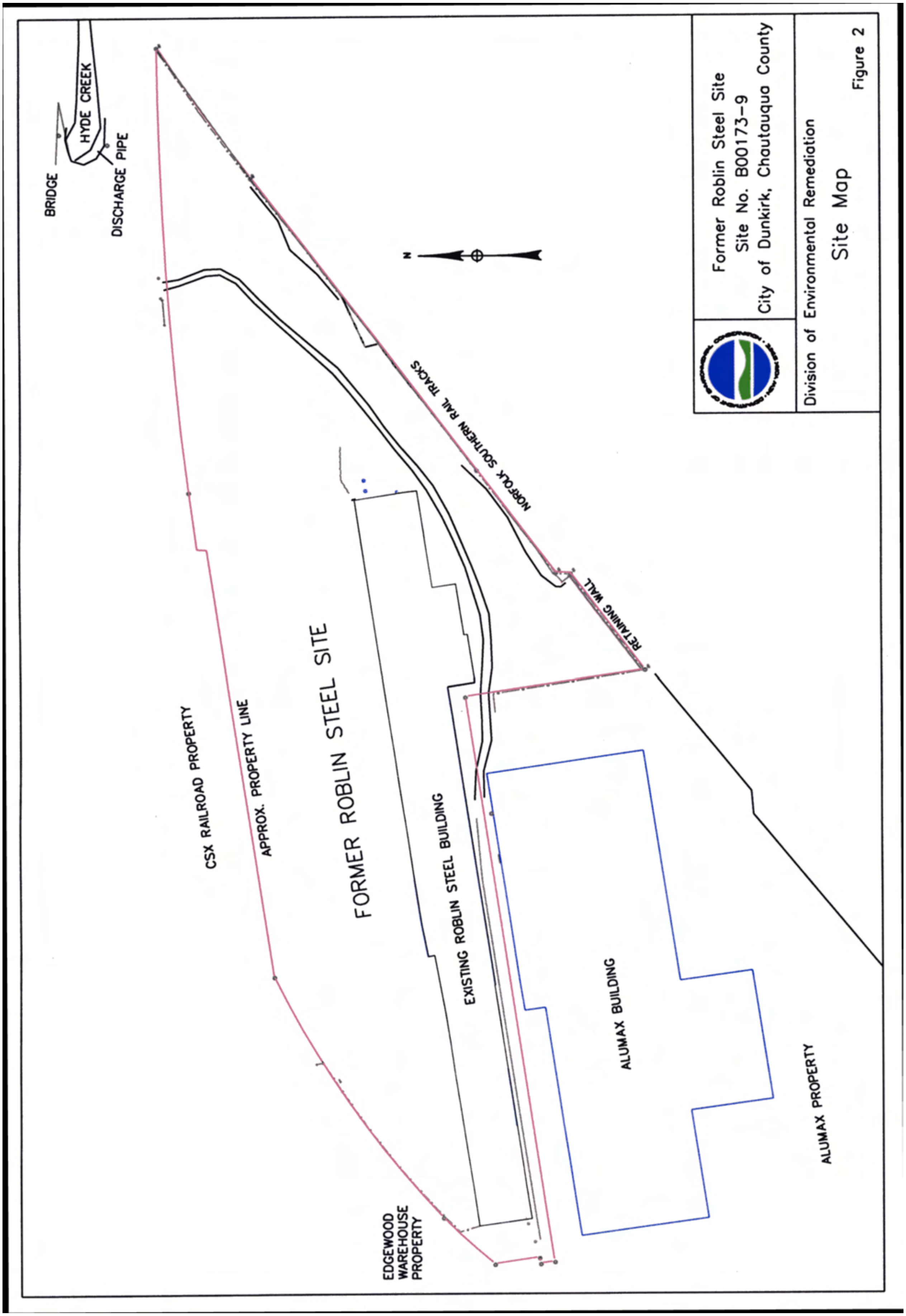
Source:
1982 Geologic Survey 7.5 x15 Minute Topographic Quadrangle
Dunkirk, New York

SITE LOCATION MAP
Former Roblin Steel Site
City of Dunkirk, Chautauqua County
Site No. B00173-9

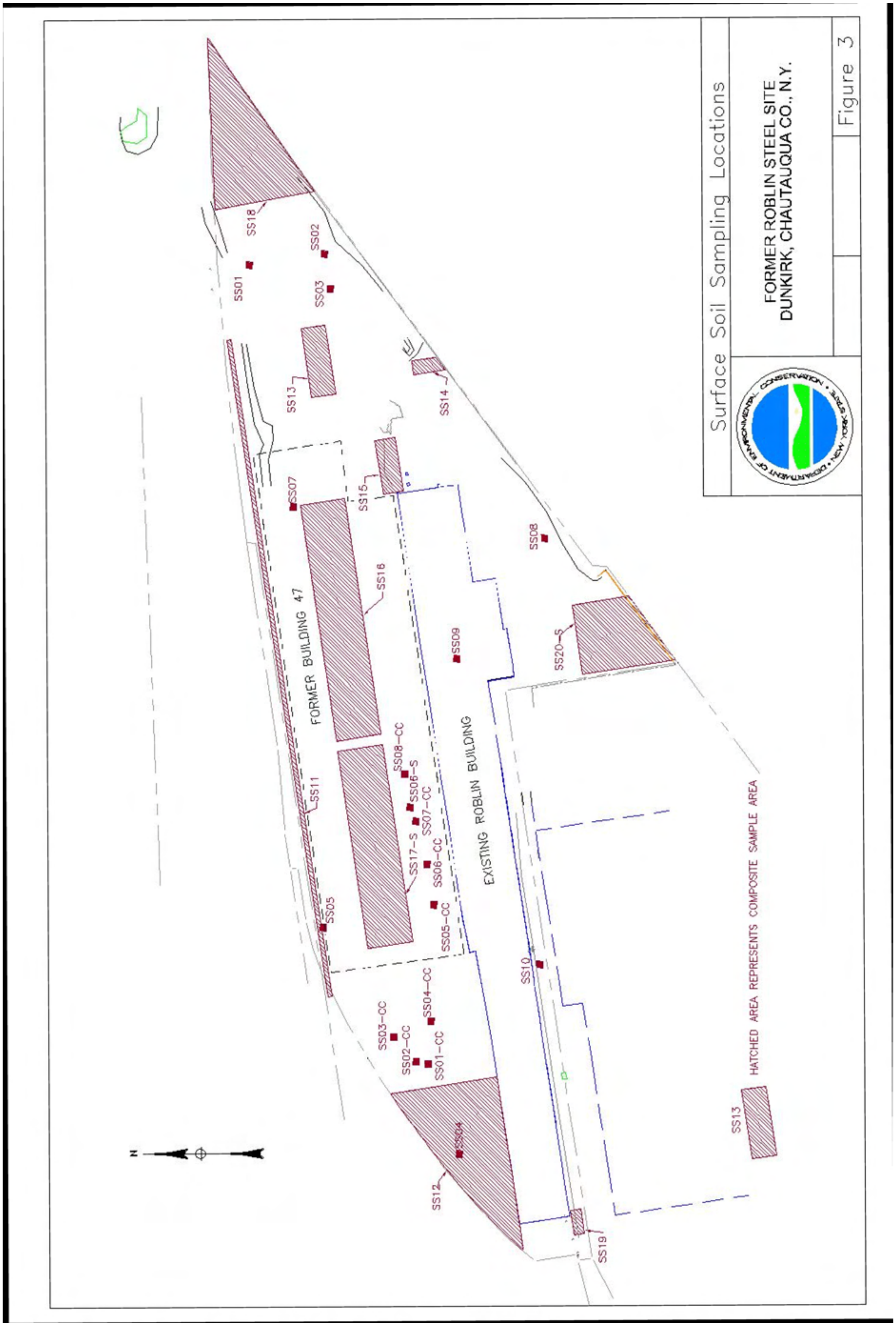
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Region 9 - Buffalo

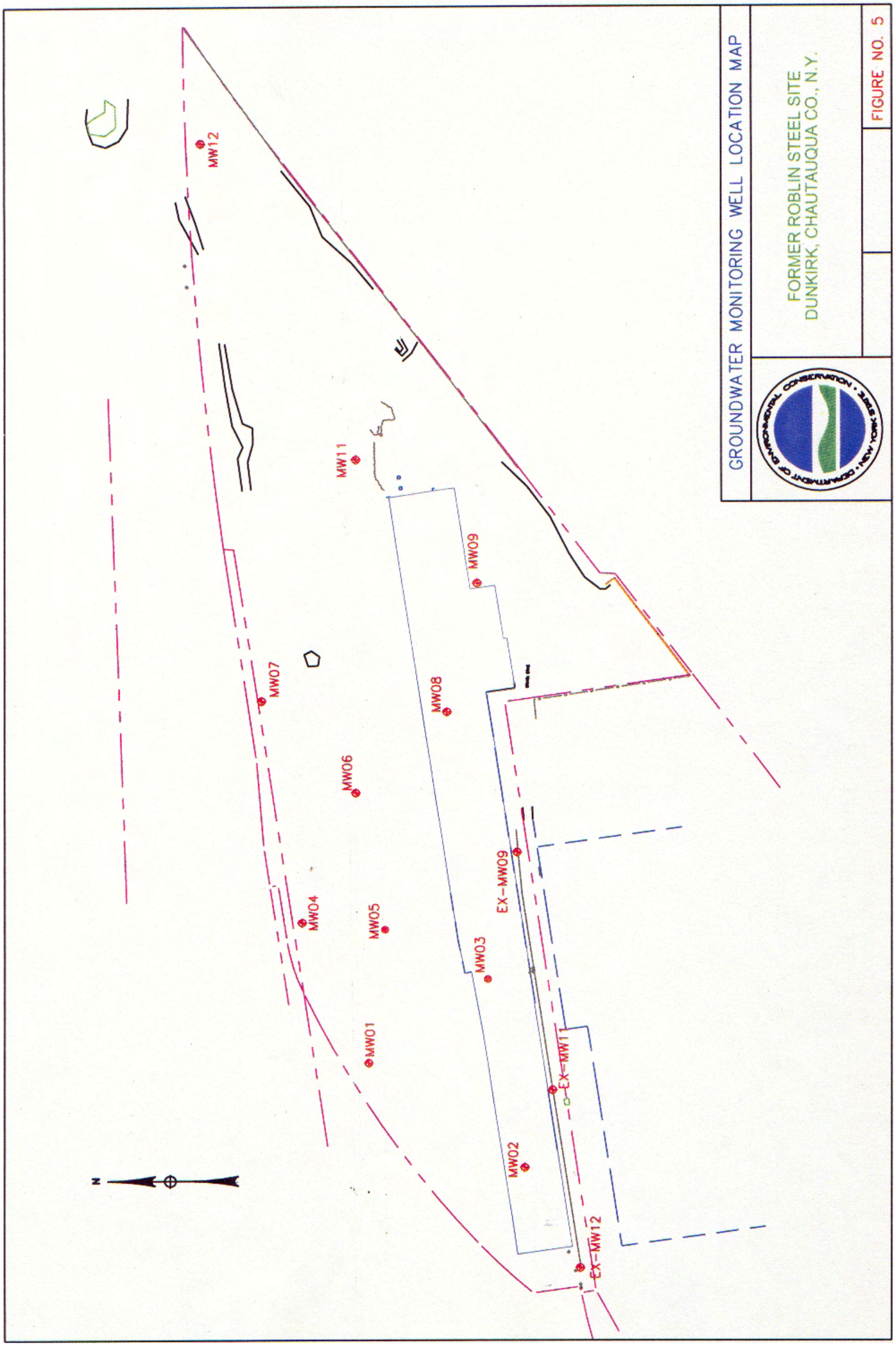
Figure 1

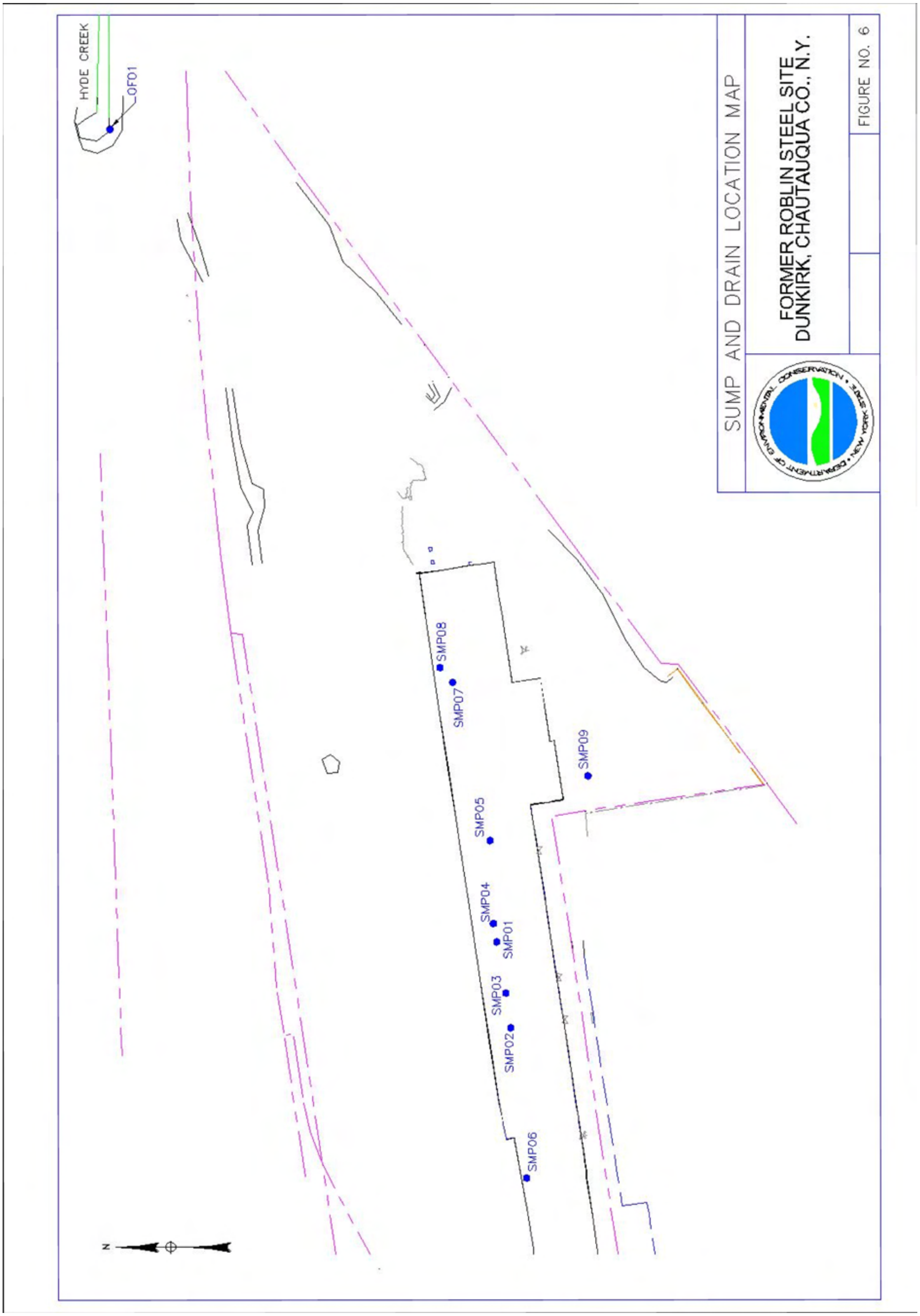


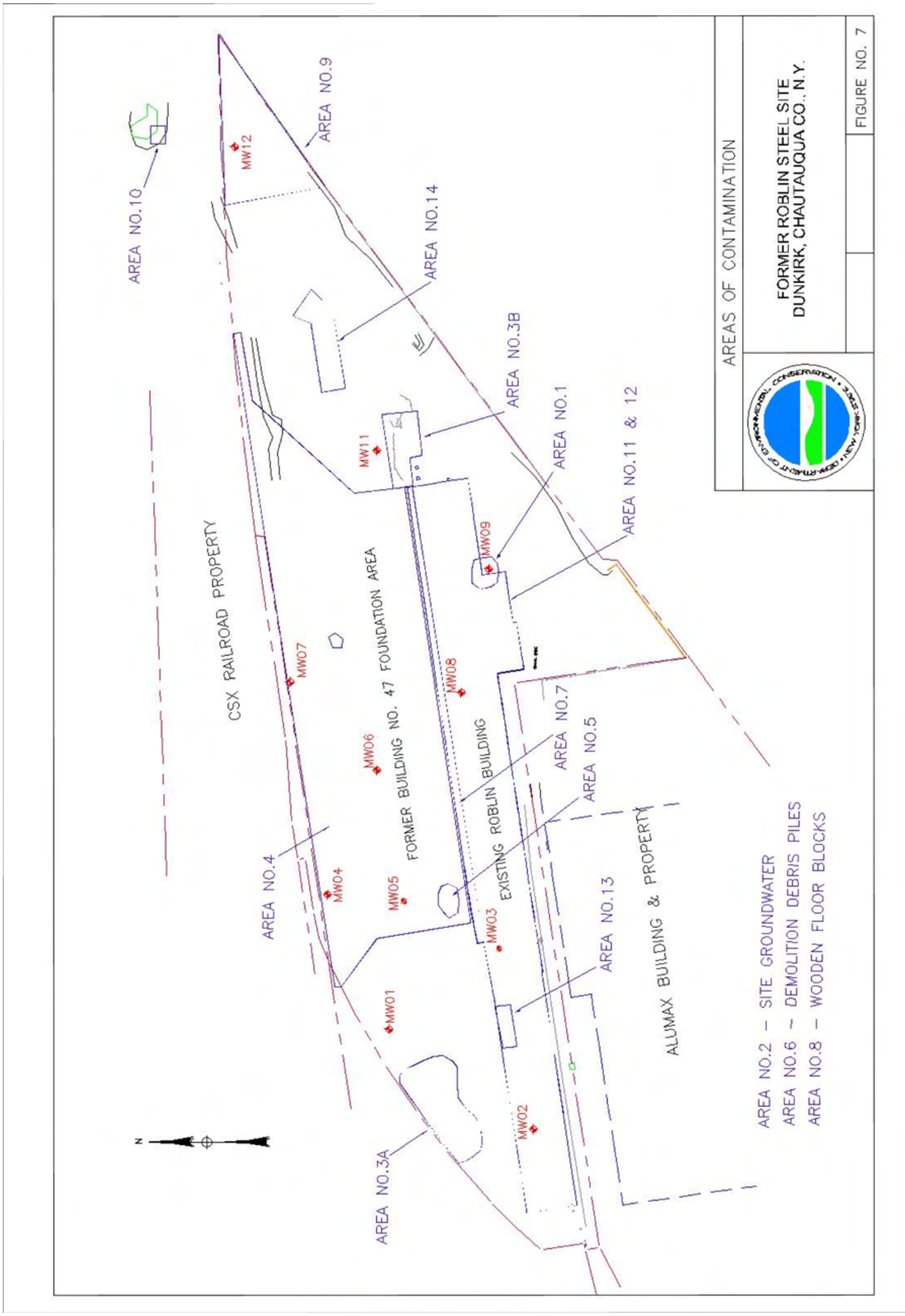
Former Roblin Steel Site
Site No. B00173-9
City of Dunkirk, Chautauqua County
Division of Environmental Remediation
Site Map
Figure 2
BRIDGE
HYDE CREEK
DISCHARGE PIPE
NORFOLK SOUTHERN RAIL TRACKS
RETAINING WALL
CSX RAILROAD PROPERTY
APPROX. PROPERTY LINE
FORMER ROBLIN STEEL SITE
EXISTING ROBLIN STEEL BUILDING
ALUMAX BUILDING
ALUMAX PROPERTY
EDGEWOOD WAREHOUSE PROPERTY

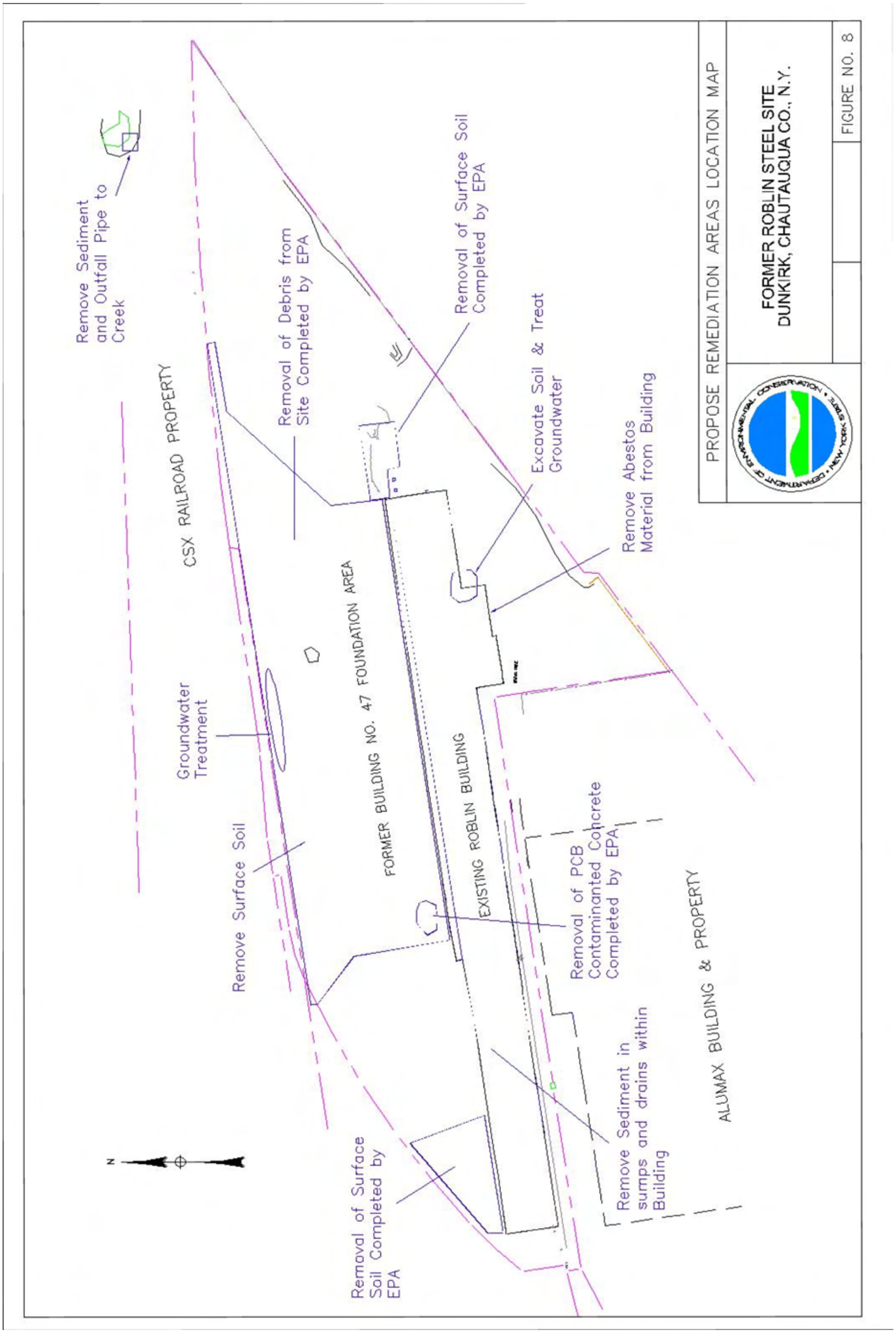

Surface Soil Sampling Locations
FORMER ROBLIN STEEL SITE
DUNKIRK, CHAUTAUQUA CO., N.Y.
Figure 3
FORMER BUILDING 47
EXISTING ROBLIN BUILDING
HATCHED AREA REPRESENTS COMPOSITE SAMPLE AREA
SS01
SS02
SS03
SS05
SS07
SS08
SS09
SS10
SS11
SS12
SS13
SS14
SS15
SS16
SS17-S
SS18
SS19
SS20-S
SS01-CC
SS02-CC
SS03-CC
SS04-CC
SS05-CC
SS06-CC
SS07-CC
SS08-CC
SS06-S
N


SOIL PROBE, TEST BORING AND TEST PIT LOCATION MAP
FORMER ROBLIN STEEL SITE
DUNKIRK, CHAUTAUQUA CO., N.Y.
FIGURE NO. 4


GROUNDWATER MONITORING WELL LOCATION MAP
FORMER ROBLIN STEEL SITE
DUNKIRK, CHAUTAUQUA CO., N.Y.
FIGURE NO. 5
N
MW12
MW11
MW09
MW07
MW08
MW06
EX-MW09
MW04
MW05
MW03
MW01
EX-MW11
MW02
EX-MW12


SUMP AND DRAIN LOCATION MAP
FORMER ROBLIN STEEL SITE
DUNKIRK, CHAUTAUQUA CO., N.Y.
FIGURE NO. 6
HYDE CREEK
OF01
SMP08
SMP07
SMP09
SMP05
SMP04
SMP01
SMP03
SMP02
SMP06
N


AREAS OF CONTAMINATION
FORMER ROBLIN STEEL SITE
DUNKIRK, CHAUTAUQUA CO., N.Y.
FIGURE NO. 7
AREA NO.10
AREA NO.9
MW12
AREA NO.14
AREA NO.3B
AREA NO.1
AREA NO.11 & 12
MW11
MW09
CSX RAILROAD PROPERTY
FORMER BUILDING NO. 47 FOUNDATION AREA
MW07
MW08
MW06
AREA NO.7
AREA NO.5
BUILDING
EXISTING ROBLIN
AREA NO.4
MW04
MW05
MW03
AREA NO.13
ALUMAX BUILDING & PROPERTY
MW01
MW02
AREA NO.3A
N
AREA NO.2 - SITE GROUNDWATER
AREA NO.6 - DEMOLITION DEBRIS PILES
AREA NO.8 - WOODEN FLOOR BLOCKS



Remove Sediment and Outfall Pipe to Creek
CSX RAILROAD PROPERTY
Removal of Debris from Site Completed by EPA
Removal of Surface Soil Completed by EPA
Excavate Soil & Treat Groundwater
Remove Abestos Material from Building
Groundwater Treatment
FORMER BUILDING NO. 47 FOUNDATION AREA
EXISTING ROBLIN BUILDING
Remove Surface Soil
Removal of PCB Contaminanted Concrete Completed by EPA
ALUMAX BUILDING & PROPERTY
Remove Sediment in sumps and drains within Building
Removal of Surface Soil Completed by EPA
N
PROPOSE REMEDIATION AREAS LOCATION MAP
FORMER ROBLIN STEEL SITE
DUNKIRK, CHAUTAUQUA CO., N.Y.
FIGURE NO. 8