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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PRELIMINARY SITE ASSESSMENT
Volume 1

Roblin Steel Site
Site Number 932059
City of North Tonawanda, Niagara County

February 1995

Prepared for:

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Langdon Marsh, Commissioner

Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., P.E., Director

Prepared by:

Ecology and Environment Engineering, P.C.

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EXECUTIVE SUMMARY

Under the New York State Department of Environmental Conservation (NYSDEC) Superfund Standby Contract, Ecology and Environment Engineering, P.C., (E & E) conducted a Preliminary Site Assessment (PSA) at the Roblin Steel site (site number 932059).

The Roblin Steel site is located at 101 East Avenue in the City of North Tonawanda, Niagara County, New York. The approximately 30-acre site was operated as a steel-processing facility from 1918 to approximately 1961 by Buffalo Bolt and then by Roblin Steel until its bankruptcy in 1987. Currently, Armstrong Pumps, Inc., and the Niagara County Industrial Development Agency own approximately 4.9 acres of former Roblin Steel property at the northwest corner of the site, on which Armstrong Pumps operates a manufacturing facility. Ownership of the majority of the remainder of the site is divided between the City of North Tonawanda and Banac Enterprises. A small parcel (0.32 acres) in the northeast corner of the site is owned by Kathleen L. Fike. Banac currently operates the Phoenix Auto Center, an automobile salvage yard, out of the south end of the rolling mill building. The City of North Tonawanda property and Kathleen L. Fike property are currently unused.

Roblin Steel is currently assigned the temporary classification of 2a. The PSA Task 1 report was submitted to NYSDEC in July 1992 (E & E 1992). Fieldwork for the PSA was conducted by E & E from July to November 1993. The fieldwork included a site inspection; a geophysical survey; installation of groundwater monitoring wells; a drum inventory; and collection and analysis of samples of various media, including surface water, sediment, oil, surface soil, waste, subsurface soil, and groundwater.

Hazardous wastes have been documented by this study to be present on site. These wastes include lead (above the EP Toxicity regulatory standard) in at least one surface soil sample, and PCB-contaminated soil (above 50 ppm) in soil adjacent to a former leaking transformer. Although PCB-contaminated soils were removed as part of a NYSDEC interim remedial measure (IRM), elevated PCB-contaminated soils still remain on site. In addition to the potential hazards to public health and the environment from the presence of these wastes, other potential hazardous include off-site migration pathways. One such pathway is groundwater. Groundwater beneath the site was determined to be contaminated with organics and inorganics exceeding Class GA drinking water standards. These contaminants can potentially affect the quality of the Niagara River, which is a principal drinking water source with an intake 6.5 miles downgradient of the site.

Hazardous wastes that have been generated at the site include spent pickle liquor and cadmium-laden dust. Disposal of wastes has been documented to be off site, except for the cadmium-laden dust for which disposal is unknown. Other hazardous wastes identified and removed by NYSDEC as part of the IRM include drums of flammable and corrosive liquid the leaking PCB oil transformer, and concrete scale milled from the pad supporting the former leaking transformer. Numerous drums and additional transformers remain on site.

Chlorinated compounds, including tetrachloroethene, trichloroethene, and 1,2-dichloroethene, were detected in surface soil and groundwater samples collected at the site.

Numerous other organic compounds were detected in the various media sampled, including acetone in groundwater and surface soils, polynuclear aromatic hydrocarbons (PAHs) in waste piles and surface and subsurface soils, PCBs in waste piles and surface soils, petroleum hydrocarbons in surface and subsurface soils, dibenzofuran in waste piles and surface soils, hexachlorobenzene in surface soil, and pesticides in groundwater, waste piles, and surface and subsurface soils. Many metals were detected at levels exceeding NYSDEC Class GA groundwater standards and expected background ranges in soil and waste piles samples. Of particular concern are cadmium, cobalt, copper, iron, and lead, which were detected at levels above standards and expected background ranges in numerous media.

Other concerns present at the site include above- and underground storage tanks, a cooling pond, asbestos-containing material, fire hazards, physical injury hazards, and oil-stained soils.

Based on the hazardous wastes present on site and potential contaminant migration pathways, it is recommended that Roblin Steel be reclassified to a Class 2 site on the Registry and that additional investigation be performed in support of remedial activities.

1. SITE ASSESSMENT SUMMARY

1.1 INTRODUCTION

Under the New York State Department of Environmental Conservation (NYSDEC) Superfund Standby Contract, Ecology and Environment Engineering, P.C., (E & E) conducted a Preliminary Site Assessment (PSA) at the Roblin Steel site (site number 932059). This report summarizes PSA activities conducted to date at the site.

1.2 PURPOSE

The purpose of the PSA is to provide NYSDEC with the information necessary to properly assess and classify the Roblin Steel site according to one of the following inactive hazardous waste disposal site categories pursuant to Section 27-1305 of the Environmental Conservation Law:

- **Class 1**: Causing or presenting an imminent danger or causing irreversible or irreparable damage to the public health or environment - immediate action required;
- **Class 2**: Significant threat to the public health or environment - action required;
- **Class 3**: Does not present a significant threat to the public health or environment - action may be deferred;
- **Class 4**: Site properly closed - requires continued management; or
- **Class 5**: Site properly closed, no evidence of present or potential adverse impact - no further action required.

If one of the above categories does not apply to the site, or if disposal of consequential amounts of hazardous waste was not documented, the site may be deleted from the Registry of Inactive Hazardous Waste Disposal Sites.

1.3 SITE DESCRIPTION

The Roblin Steel site is an inactive steel-processing facility located at 101 East Avenue in the City of North Tonawanda, Niagara County, New York. The site is bounded on the north by East Avenue, on the east by Oliver Street, on the south by Eighth Avenue, and on the west by Conrail-Erie Lackawanna railroad tracks (see Figure 1-1). Industrial areas are adjacent to the site on the north and west, and residential areas are located to the east and south. A school and park are located within 1,600 feet to the east. The site is located approximately 1,000 feet east of the Niagara River (waters index number 0-158), which is a Class A-Special stream (6 NYCRR 837.4), and approximately 1.5 miles north of Tonawanda Creek (Erie Canal, waters index number 0-158-12), a Class C stream. Area topography is essentially flat, and the site is at an elevation of 576 to 577 feet above mean sea level (MSL).

The Roblin Steel property was approximately 30 acres in size. It is currently divided among five owners: the City of North Tonawanda (12 acres); Banac Enterprises, Inc. (11.8 acres); Armstrong Pumps, Inc., and the Niagara County Industrial Development Agency (4.9 acres); and Kathleen L. Fike (0.32 acre). The majority of the parcel is owned by the City of North Tonawanda and Banac Enterprises, Inc. (see Table 1-1 and Figure 3-6).

The portions owned by the City of North Tonawanda and Kathleen L. Fike are currently inactive. Banac currently operates the Phoenix Auto Center, an automobile salvage yard, on its portion. The portion co-owned by the Niagara County Industrial Development Agency (NCIDA) and Armstrong Pumps has been an active facility since 1985.

A historical aerial photograph review was conducted in September 1994 in an attempt to define site boundaries by identifying potential disposal areas. This review included six photographs taken from 1938 to 1991. The review was inconclusive regarding the identification of on-site disposal areas. Therefore, for the purposes of this investigation, the site boundaries include all of the parcels formerly owned and occupied by Roblin Steel.

With the exception of the portion co-owned by Armstrong Pumps, the remaining portions of the former Roblin Steel property contain numerous buildings in various states of dilapidation (see Figure 1-2). The southern half of the rolling mill building is currently being used for auto storage by Phoenix Auto Center. All of the other buildings are essentially empty. Some equipment remains (cranes, pickling basins, etc.), and numerous wastes were observed in and outside of the buildings. These wastes include drums of oils, grease, acids, unknown liquids, broken bags of lime, oil-stained soils, steel scale piles, oil- and creosote-soaked wooden floor blocks, and piles of construction and demolition debris. Near the center of the site is an approximately 10,000-square-foot cooling (quench) pond containing approximately 4 feet of water with an oily sheen and steel scale sediments. A cement-lined trough runs from the rolling mill building to the east side of this pond. This trough was found to contain trash, water, and an approximately 3-inch-thick layer of floating oil and sludge. Other site features include seven transformers in three remaining areas, two underground storage tanks (USTs), and two aboveground pickle liquor storage tanks (see Figure 1-2).

Much of the site is enclosed by perimeter fencing; however, access is easily gained through gaps and unlocked gates. The inactive buildings are frequented by local children, teenagers, and homeless persons.

1.4 HAZARDOUS WASTE SITE DISCUSSION

During operation as a steel-processing facility, Roblin Steel generated many types of waste. A central storage yard was used for the temporary staging of phosphate tank sludge, iron oxide scale, lime, spent pickle liquor, waste oil, and trash. These wastes were reportedly disposed of off site (Niagara County Health Department [NCHD] 1982; NUS 1983). However, residue from the staging area(s) may remain due to improper containment and handling. Though not reported, degreasers (organic solvents) were likely used during facility operations as they were found in soils and groundwater on the site. In addition, lead was found in one surface soil sample collected on site during this investigation, at a concentration exceeding EP Toxic regulatory limits. Therefore, lead present on site in the surface soil is considered hazardous waste.

According to a 1979 Interagency Task Force (IATF) hazardous waste questionnaire completed by a Roblin Steel employee, approximately 1,049,127 gallons of spent sulfuric acid (pickle liquor) from Roblin Steel was land disposed at the Old Wickwire-Spencer Steel plant property (site number 915056) between 1969 and 1970. Between 1970 and 1972, approximately 780,560 gallons of pickle liquor were treated and land disposed by Chemtrol Pollution Services, Inc., of Blasdell, New York.

An "HKS Dust Collector" sample analyzed by Calspan Corporation in 1980 indicated that dust generated during facility operations contained cadmium at a level exceeding the regulatory limit when tested according to the extraction procedure toxicity (EP toxicity) method (Simmons 1980). No records were found on the amount of dust generated or its disposal location.

A transformer and surrounding soil were removed and properly disposed of by NYSDEC in 1992 because a soil sample collected from an oil-stained area beneath the transformer contained 37,700 ppm of the PCB Aroclor-1260. Seven remaining transformers in three separate areas at the site may also contain polychlorinated biphenyl (PCB) oil as indicated by the presence of PCBs in the surrounding soils.

In 1990, Sevenson Environmental Company and NYSDEC identified 162 drums at the site. Eighty-two of these drums were sampled and overpacked; seven of these drums were found to contain characteristic hazardous wastes, including waste corrosive liquid and waste flammable liquid. The remaining nonhazardous, overpacked drums are still staged on site. Numerous additional drums remain scattered throughout the site. Many contain unknown liquids and solids, and others contain liquids labeled as various oils, muriatic acid, and sulfuric acid (see Section 3.6 for drum inventory).

1.5 SUMMARY OF PSA WORK

The PSA Task 1 report was submitted to NYSDEC in July 1992 (E & E 1992). Based on the document review and site inspection performed as part of Task 1, this report concluded that hazardous waste had been disposed of on site and recommended reclassification of the site to Class 2. Significant threats were identified in regard to exposed wastes and physical hazards. Additional investigation was recommended in order to evaluate areas of concern identified during Task 1.

Additional PSA activities were performed in 1993 in accordance with NYSDEC's abbreviated workplan. The field tasks, included geophysical surveys; monitoring well installation; and sampling and analysis of various environmental media including surface soil, waste piles, sediment, surface water, oil, subsurface soil, and groundwater. Groundwater monitoring wells were installed to monitor two overburden water-bearing units.

Water samples collected from the cooling pond and a pickling basin were compared to NYSDEC Class D surface water standards. Only copper in the cooling pond sample and iron in both samples exceeded the standards. An oil sample collected from a trough in the rolling mill building contained PCBs, but it did not exhibit the characteristics of hazardous waste.

A sediment sample collected from the cooling pond and surface soils collected from stained or suspect areas on site were found to contain numerous volatile organic compounds (VOCs), including tetrachloroethene (PCE), acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, toluene, and xylenes. The sediment and surface soils also contained several semivolatile compounds, including polynuclear aromatic hydrocarbons (PAHs), dibenzofuran, hexachlorobenzene, bis(2-ethylhexyl)phthalate, pesticides, and a PCB. Numerous metals exceeded expected background concentrations in these samples, including arsenic, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, and zinc. One of the surface soil samples tested for metals according to the EP toxicity method exceed the regulatory level for lead. Waste pile samples, consisting primarily of steel scale, also contained elevated levels of the above metals. The waste samples also contained PCE, PAHs, bis(2-ethylhexyl)phthalate, a pesticide, and a PCB. None of the waste samples tested for hazardous waste characteristics exceeded regulatory levels.

Subsurface soil samples exhibited indications of petroleum product contamination including flame ionization detector (FID) readings, an odor, and a sheen, though no VOCs were detected. However, semivolatile compounds, including PAHS and the pesticide 4,4'-DDT, were detected in the samples.

Groundwater samples contained several VOCs, including acetone, total 1,2-dichloroethene (1,2-DCE), trichloroethene (TCE), and PCE, as well as 4,4'-DDT above NYSDEC Class GA groundwater standards. Many metals also contravened groundwater standards in the unfiltered samples, including cadmium, chromium, iron, lead, magnesium, manganese, sodium, and zinc.

Based on the contaminants detected in the various media sampled, the past identification of site-related hazardous wastes, and the areas of concern that remain at the site, it is recommended that the Roblin Steel site be reclassified as a Class 2 site and that additional investigation be performed in support of remedial activities. Areas of concern include the contaminated soil and water discussed above, transformers containing PCBs, leaking USTs, drums of potentially hazardous waste, asbestos, and many physical hazards.

In addition to the above sampling, a PA score was calculated. The PA score is intended to differentiate sites based on potential threats to human health and the environment. The Roblin Steel site received an overall PA score of 22.

1.6 NYSDEC SITE CLASSIFICATION FORMS

The NYSDEC Registry Site Classification Decision Form, Classification Worksheet, and Site Priority Ranking Worksheet are presented on pages 1-7 through 1-10. These forms provide information necessary to properly classify the site in accordance with 6 NYCRR 375.

CLASSIFICATION WORKSHEET

Site: Roblin Steel	County: Niagara		Region: 9
1. Hazardous waste disposed?	☒ Yes (to 2)	☐ No (Stop)	☐ Unknown (Stop)
2. Consequential amount of hazardous waste?	☒ Yes (to 3)	☐ No (Stop)	☐ Unknown (to 3)
3. Part 375-1.4(a)(1) applies?	☐ No (to 4)	☒ Unknown (to 4)	
	☐ Yes (as checked below; Class 2; to 5)		
☐ a. endangered or threatened species	☐ d. fish, shellfish, crustacea, or wildlife		
☐ b. streams, wetlands, or coastal zones	☐ e. fire, spill, explosion, or toxic reaction		
☐ c. bioaccumulation	☐ f. proximity to people or water supplies		

4. Part 375-1.4(a)(2) applies? ☐ No (Class 3; Stop) ☐ Unknown (Class 2a; Stop)

☒ Yes (Class 2; to 5)

PCB-laden transformers, drums containing potentially hazardous waste, and contamination of surface soil pose direct contact and dust inhalation threats to local population. Potentially leaking USTs and the presence of organic halogenated solvents are impacting groundwater quality.

5. Factor(s) considered in making this determination:

a. Lead in at least one soil sample on site failed EP Toxicity.
b. On-site transformers have leaked PCB-oil in the past; transformers remain; and PCBs in soils may still be present up to 2,000 ppm.
c. During operation, hazardous waste stored in unlined area on site. Drums of flammable and corrosive hazardous waste have been removed from the site. Many drums with unknown contents remain and some are damaged.
d. Groundwater is shallow at the site and present in an extensive silt/sand layer.
g. Contravention of groundwater standards, and high organic and metal concentrations in soils.
h. Close proximity to residential area; unrestricted site access.
g. VOCs in groundwater may be migrating off site.

SUMMARY

Consequential Hazardous Waste:	☒ Yes	☐ No	☐ Unknown
Significant Threat:	☒ Yes	☐ No	☐ Unknown
Proposed Classification: 2	Site Number 932059		

October 1994
Date

Signature and Title

NEW YORK STATE DEPARTMENTS OF ENVIRONMENTAL CONSERVATION AND HEALTH
INACTIVE HAZARDOUS WASTE DISPOSAL, SITE PRIORITY RANKING WORKSHEET

SITE I.D. 932059 **SITE NAME** Roblin Steel

Priority I - Sites for which remediation should supersede all other Class 2 sites. Priority I can be assigned if any one of the following questions can be answered affirmatively:

a) Has a public or private water supply which is currently in use been contaminated or threatened? . . . ☐

b) Has human exposure to contaminants (or the potential for exposure) been identified which represents a significant health risk as determined by DOH? . . . ☐

c) Has bioaccumulation of site contaminants in flora or fauna resulted in a health advisory? . . . ☐

d) Are site contaminants present at levels that are acutely toxic to fish or wildlife or that have caused documented fish or wildlife mortality? . . . ☐

☐(1) (If 1 or more boxes are checked, check this box)

Priority II - Important Sites. Priority II will be assigned if any of the following questions can be answered affirmatively.

a) Has a Class A or AA surface water body, or a primary or principal aquifer been contaminated or threatened without affecting an existing water supply? . . . ☐

b) Has bioaccumulation of site contaminants in flora or fauna resulted in actionable levels (but not a health advisory)? . . . ☐

c) Are contaminants at levels chronically toxic to fish/wildlife? . . . ☐

d) Have endangered, threatened or rare species, significant habitats, designated coastal zone, or regulated wetlands been impacted by releases from the site? . . . ☐

☐(2) (If 1 or more boxes are checked, check this box)

Priority III - will be assigned unless one or more of the site prioritization criteria, specified above, apply to a site. After remedial needs for Priority I and II sites have been accommodated, remediation of sites under this category can be considered. If Priority III, check box 3. ☒(3)

Enter the number of the priority box checked (1, 2, or 3) here . . . [3](4)
This is the site's priority rank.

FACTORS

IJC Factor - If the site has been identified by the International Joint Commission (IJC) as a component in a remedial action plan, subtract (1) from the value in box 4 and enter the result in box 5 . . . ☐(5)

EDZ Factor - If the site is within a New York State designated Economic Development Zone (EDZ) should this fact cause the site priority to be raised? . . . Yes ☐ No ☒

Community Support Factor - If the site has been targeted for local government-supported development by a developer willing to sign a consent order with DEC to finance investigation and remediation should this fact cause the site priority to be raised? . . . Yes ☐ No ☒

If either "yes" box is checked, subtract 1 from the value in box 4 and enter the result into box 6. If "no" is checked, the value in box 6 equals box 4 (or box 5 if applicable). If both IJC and EDZ/Community Support factors apply, only 1 (not 2) will be subtracted from the value in box 4. The resultant value in box 6 will never be less than 1 . . . [3] (6)

IRM NOTE: Should this site be considered a candidate for an Interim Remedial Measure (IRM) as defined by 6 NYCRR Part 375-1.3n? . . . Yes ☒ No ☐

If "yes" please explain why: Site access is unrestricted, and hazardous and industrial wastes and physical hazards exist at the site.

Preparer: ______ Date: April 1994

New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation

REGISTRY SITE CLASSIFICATION DECISION

1. Site Name Roblin Steel	2. Site No. 932059	3. Town/City/Village North Tonawanda	4. County Niagara
5. Region 9	6. Classification Current: 2a Proposed: 2 Modify:		

7. Location of Site (see Figure 1-1 for site location)
a. Quadrangle: Tonawanda West
b. Site Latitude: 43°02'35" Longitude: 78°53'04"
c. Tax Map Number: See attached list.

8. Briefly Describe the Site (see Figure 1-2 for site plan)

The site operated as a steel processing facility from 1918 to 1987. Currently the site is inactive except for two commercial facilities (Armstrong Pumps, Inc. and Phoenix Auto Center) which utilize the northwest and southeast corners of the site. Access to the site is unrestricted and the inactive buildings are in various states of disrepair and contain exposed wastes and numerous physical hazards.

a. Area: 30 acres b. EPA ID Number NYD002135807
c. Completed: ☒ Phase I ☐ Phase II ☒ PSA ☐ RI/FS ☒ PA/SI ☐ Other

9. Hazardous Wastes Disposed

Hazardous wastes on site have been documented by the presence of EP Toxic lead (D008) above regulatory standards in an on-site soil sample, and PCBs greater than 50 ppm in soil samples (B007) near the former location of a leaking PCB-oil transformer (B006). Although the transformer was removed from the site, and an extensive soil removal was performed, PCB-contaminated soils remain on site. The generation of spent pickle liquor (K062) and cadmium-laden dust (D006) was documented; however, the method of disposal is unknown. Organic solvents (F001/F002) may also be present in on-site soils and groundwater, based on the nature of the facility's former operational practices. Drums of ignitable (D001) and corrosive (D002) waste have been found on site and removed during a NYSDEC IRM.

10. Analytical Data Available (see Figure 3-1 for sample locations)
a. ☐ Air ☒ Groundwater ☒ Surface Water ☒ Soil ☒ Waste ☒ EPTox ☒ TCLP

b. Contravention of Standards or Guidance Values

Surface water: copper and iron exceeded Class D standards.
Surface soil: lead exceeded EP toxicity level.
Groundwater: 1,2-DCE, TCE, PCE, acetone, DDT, cadmium, chromium, iron, lead, magnesium, manganese, sodium, and zinc exceeded Class GA Standards in one or more samples.
Plus relatively high organics and metals in sediment, surface soil, and waste.

11. JUSTIFICATION FOR CLASSIFICATION DECISION

Justified by generation and identification of wastes discussed in number 9 above, and due to existing physical and chemical threats posed by on-site structures and remaining wastes.

12. Site Impact Data
a. Nearest surface water: Distance 1,000 ft. Direction West Classification A-Special
b. Nearest groundwater: Depth 3 ft. Flow Direction northwest ☐ Sole Source ☐ Primary ☐ Principal
c. Nearest water supply: Distance 4,000 ft. Direction north (upstream) Active? ☒ Yes ☐ No
d. Nearest building: Distance 0 ft. Direction On site Use Commercial and vacant
e. In State Economic Development Zone? ☐ Yes ☒ No
f. Crops or livestock on site? ☐ Yes ☒ No
g. Documented fish or wildlife mortality? ☐ Yes ☒ No
h. Impact on special status fish or wildlife resource? ☐ Yes ☒ No
i. Controlled site access? ☐ Yes ☒ No
j. Exposed hazardous waste? ☒ Yes ☐ No
k. PA Score 22
l. For Class 2: Priority Category 3

13. Site Owner's Name See attached list	14. Address See attached list	15. Telephone Number

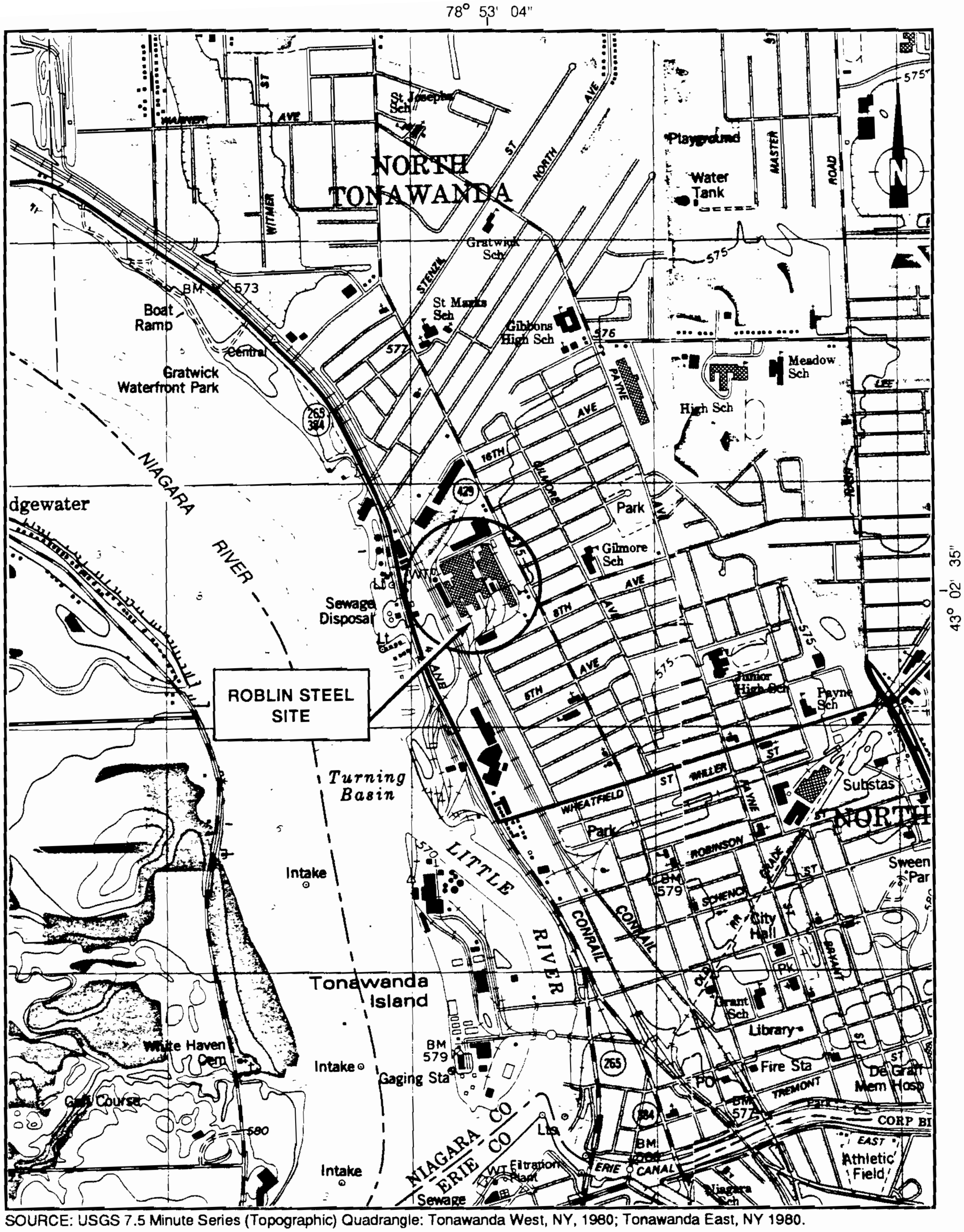
16. Preparer Signature Date Name, Title, Organization	17. Approved Signature Date Name, Title, Organization

02:YS3900_D4513-RSC-02/07/95-D1

Table 1-1

Registry Site Classification Decision
Sections 13 and 14
Tax Map Number and Site Property Owner List

Tax Map Parcel No.	Property Owner	Owner Address
181.12-1-9	Kathleen L. Fike	303 Homestead Drive, North Tonawanda, New York 14120
181.12-1-14.11	City of North Tonawanda	216 Payne Avenue, City Hall North Tonawanda, New York 14120
181.12-1-14.12	Banac Enterprises	192 Grant Street Buffalo, New York 14213
181.12-1-14.21	Armstrong Pumps, Inc.	93 East Avenue North Tonawanda, New York 14120
181.12-1-14.22	N.C.-County of Niagara, Armstrong Pumps, Inc., NIDA RPTS Agency	Courthouse Lockport, New York 14094



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle: Tonawanda West, NY, 1980; Tonawanda East, NY 1980.

SCALE 1:24,000

0 ½ 1 Mile

0 .5 1 Kilometer

Figure 1-1
LOCATION MAP, ROBLIN STEEL SITE

2. SITE HISTORY

The site was initially owned by Buffalo Bolt Company, which began operations in 1918. The plant was purchased from Buffalo Bolt in 1959 (E & E 1992) or 1961. According to a 1979 Interagency Task Force (IATF) questionnaire, the purchasing company was founded in January 1961 as Roblin-Seaway Industries, Inc. In 1965 it was renamed Roblin Steel Corporation, and in 1968 it was renamed Roblin Steel Company, a Division of Roblin Industries, Inc. Between 1977 and 1987, two buildings on the west side of the site were leased to Confer Plastics. In 1985, a 4.9-acre parcel of the Roblin Steel property was sold to Armstrong Pumps, Inc., of which 4.5 acres is under a bond with NCIDA. Armstrong Pumps still occupies the building near the northwest corner of the site at 93 East Avenue, North Tonawanda.

Roblin Industries declared bankruptcy in early 1987, and all Roblin Steel activities ceased at the site. At the time of bankruptcy, the law firm of Aaron, Pautch, Sternberg & Lawson was assigned as trustee of the site for Roblin Steel. In 1989, the property, with the exception of the portion owned by NCIDA/Armstrong Pumps, was the subject of a partition action. As a result, approximately 12 acres in the northern portion became the property of Plum Tree Group Ltd., and approximately 11.8 acres in the southern portion was procured by Banac Enterprises, Inc. In October 1990, Banac Enterprises took possession from the Plum Tree Group of a 0.32-acre parcel located in the northeast corner of the original Roblin Steel Property. This was later sold to Kathleen L. Fike in April 1992. As the result of a foreclosure for back taxes, the City of North Tonawanda was forced to assume ownership of the remaining portion of Plum Tree Group's property on March 17, 1992 (Sondel 1993).

During ownership by Roblin Steel, facility operations included hot rolling of steel rods and bars, sulfuric acid pickling of steel coils, lime and oil coating of steel coils, annealing of steel coils, wire drawing and melting, and casting of nickel (NCHD 1982). A waste storage area was located near the center of the site. Sludge was removed from a phosphate tank once or twice per year and temporarily staged in this area pending off-site disposal. Other wastes generated and temporarily staged on site included iron oxide scale, lime, pickle liquor, waste oil, and trash. The pickle liquor reportedly consisted of 16% to 18% sulfuric acid, lime, and water. These wastes were reportedly removed for off-site disposal (NCHD 1982; NUS 1983).

The portion of the site owned by the City of North Tonawanda has been inactive since 1987. The Banac Enterprises property is currently being used as an automobile salvage yard by Phoenix Auto Center, a subsidiary of Banac Enterprises.

On August 18, 1980, Roblin Steel submitted a sample of lime and phosphate sludge and a sample from an "HKS Dust Collector" to Calspan Corporation for metals analysis according to the EP toxicity method (Simmons 1980). Cadmium exceeded the regulatory level in the dust collector sample. The location and method of disposal of this waste are unknown.

In 1983, NUS Corporation conducted a preliminary assessment and site inspection for the United States Environmental Protection Agency (EPA). NUS found that all of the wastes listed above were disposed of off site and recommended no further action.

In June 1989, E & E submitted the final Phase I Investigation report to NYSDEC (E & E 1989). The report indicated that significant wastes remained on site. Areas of concern identified included piles of oily steel scale, oil-stained soils, the cooling pond containing steel scale sediments and a floating oil layer, torn bags of lime, oil- and creosote-soaked wooden floor blocks, foundry slag, numerous drums in various conditions, and transformers. Since no environmental samples were collected, the Phase I Investigation report concluded that adequate data did not exist to properly assess the site. The report recommended additional investigation, including sample collection and analysis.

Numerous fires have occurred at the site, including a fire on July 5, 1988, that destroyed three buildings along the west and northwest sides of the site, including those formerly leased by Confer Plastics (E & E 1992). On May 18, 1991, a fire destroyed the building immediately north of the cooling pond (North Tonawanda Fire Department 1981). While fighting this fire, water drained into the cooling pond, causing accumulated material to overflow from the pond. The material was visually identified as hydraulic oil (NCHD 1991).

In February 1990, NYSDEC and NCHD were informed of a transformer leak and received a complaint regarding the presence of drums on site (Hyden 1991b). NYSDEC began interim remedial measures (IRM) at the site in September 1990, and contracted Sevenson Environmental Company to overpack and sample all drums deemed potentially hazardous. One hundred sixty two drums were identified, and 82 of these were overpacked and sampled. The sampling results indicated that one drum contained flammable liquid with a high toluene and xylene content, and six drums contained corrosive liquids. In addition, samples of the soil surrounding two transformers were collected. The soil near transformer "A" contained 37,700 ppm of the PCB Aroclor 1260. The soil near transformer "B" contained 4.15 ppm of the same PCB (Hyden 1991a). The transformer locations are indicated on Figure 1-2.

On June 15, 1992, Environmental Products and Services, Inc. (EPS), under contract to NYSDEC, removed transformer "A." The transformer was staged on site, drained, and flushed numerous times with diesel fuel and hexane. All fluids were containerized in 55-gallon drums. On July 6, 1992, a sample of water from the cooling pond was collected by NYSDEC. Analyses indicated that only nonhazardous waste oils were present (Hyden 1992b). On July 10, 1992, EPS collected three core samples from the concrete pad where the transformer was formerly mounted. Only the surface of the pad was determined to be contaminated. Therefore, 1 inch of the surface of the pad was scaled off using a milling machine, and the cuttings were containerized. On August 6, 1992, EPS began hand digging contaminated soils adjacent to the concrete pad. Five soil samples were collected in the excavated area, and were determined to contain up to 16,900 parts per million (ppm) of Aroclor 1260. Later that month, on August 28, 1992, after additional excavation, three more soil samples were collected from the excavated area. This time, up to 4,200 ppm of Aroclor 1260 was detected.

A major removal action began on site in September 1992. The removal was conducted by EPS, still under contract to NYSDEC. All wastes were sent to CWM Chemical Services in Model City, New York, for disposal. This removal action included the disposal of six of the seven drums containing hazardous wastes identified by Sevenson in 1990 (the seventh drum was determined to be empty at that time); transformer "A" and the PCB-contaminated oil from the transformer; hand-dug soils from the transformer area; and the scale from the concrete pad. EPS then collected five additional soil samples from the same sample locations as the August 6, 1992, sampling event. These soils were found to contain up to 4,400 ppm of Aroclor 1260. During these removal activities, a buried vat (underground storage tank) was encountered adjacent to the transformer "A" concrete pad. This vat contained 4 feet of liquid, which was sampled in October 1992 and found to contain 62 parts per billion (ppb) of Aroclor 1260.

Due to the remaining presence of high levels of PCBs in the excavated area, removal activities continued until October 14, 1992. These activities included the removal of 37 tons of soil from the transformer area; confirmation soil sampling revealing the presence of up to 3,400 ppm of Aroclor 1260 in the excavation; and additional excavation of 21 tons of soil. Following removal of the final 21 tons of soil, EPS collected soil samples 3 feet outside of the excavation area. Subsequent analysis indicated the presence of 67 ppm of Aroclor 1260. There was no mention in the records of final confirmation sampling within the excavated area. Therefore, it is unknown at this time whether the removal was complete. However, thousands of ppm were noted to be present in the transformer area, according to a memorandum (Hyden 1992) and the New York State Registry of Inactive Hazardous Waste Sites.

In addition to the soil removal and sampling, EPS also collected a water sample from the quench pond. This sample was found to contain nonhazardous oils. At the completion of the removal action on October 15, 1992, 41 drums containing the diesel and hexane used to flush the transformer were left on site.

On January 28, 1993, EPS collected two samples from the liquids used in June 1992 to flush the transformer. The results indicated the presence of up to 12 ppm of Aroclor 1260. Eighteen drums of these liquids were removed from the site on March 18, 1993, and disposed of at Aptus, Inc., in Coffeyville, Kansas. Based on available file information, the remaining 23 drums of flush liquid are unaccounted for.

3. PSA TASK DISCUSSION

Task 1 of the PSA, data records search and assessment, was performed in 1991 by E & E under contract to NYSDEC. The PSA was continued by E & E with fieldwork performed from July to November 1993. The scope of work for the PSA was prepared by NYSDEC, and all field tasks were performed in accordance with NYSDEC's abbreviated work plan. Variations from the work plan, resulting from judgements made in the field, were made with the concurrence of NYSDEC representatives. These variations include the abandonment of three proposed deep wells due to insufficient groundwater; the drilling of four additional shallow wells to monitor a shallow silt and sand layer; and the changing of some sample analyses to better characterize the media sampled. These changes are discussed in the appropriate sections below.

3.1 PSA TASK 1 REPORT

Task 1 of the PSA for the Roblin Steel site included a file review, site inspection, and preparation of a report. The file review and data search were conducted utilizing state, county, municipal, and site-specific sources. This information was compiled from existing data in addition to new sources. A preliminary characterization plan for the site was developed after the file review was conducted.

A site inspection was conducted on May 7, 1991, to assess site conditions, observe evidence, if any, of hazardous substances or wastes present, photograph the site, conduct preliminary air monitoring using a photoionization detector (PID) and a radiation meter, and confirm information obtained from the file review and data search.

During the site inspection, no readings above background were obtained on site with the air monitoring equipment. With the exception of Armstrong Pumps, the site was largely inactive, and there were signs of vandalism. In addition to the features described in Section 1.3, slag on the south side of the site, stressed vegetation at the pickle liquor tanks and in areas of stained soil, and suspected asbestos were observed.

The Task 1 report concluded that hazardous waste was present on site, including drums identified as characteristic hazardous waste and leaking PCB transformers. Six drums of hazardous waste and one transformer and the surrounding PCB-contaminated soil have since been removed. Significant threats identified included direct contact with exposed wastes and physical hazards posed by the dilapidated buildings, trenches, and debris. The report recommended reclassification of the site to Class 2 and additional investigation, including sampling and analysis in the areas where transformers are stored, testing of UST integrity, inspection and testing of the aboveground pickle liquor tanks, and sampling of the cooling pond.

3.2 PRE-FIELD INVESTIGATION

Continuation of the PSA for the Roblin Steel site involved several field activities, which are described in the following sections. Prior to initiating field activities, E & E performed several other tasks. In June 1993, E & E submitted the Project Management Work Plan to NYSDEC for approval. This document included the abbreviated technical work plan prepared by NYSDEC for the site, in addition to a technical approach for management and performance of field tasks, laboratory analyses, and report preparation.

In June 1993, E & E also submitted the General Health and Safety Plan (HASP) and a Quality Assurance Project Plan (QAPjP) to NYSDEC for review. The HASP outlined the health and safety procedures and protocols to be followed during site characterization sampling and field activities. Information gathered during Task 1 of the PSA was used to generate a site-specific safety plan.

In August 1993, E & E submitted the final QAPjP to NYSDEC for approval. The QAPjP presents the policies, organization, objectives, functional activities, and specific quality assurance (QA) and quality control (QC) activities implemented for this project. The QAPjP was developed in accordance with NYSDEC and EPA guidance documents to ensure that all technical data generated by E & E's Analytical Services Center (ASC) meet specified data quality objectives.

In addition to preparation of these documents, tax maps were reviewed and a site reconnaissance was performed. The site reconnaissance was conducted by E & E on July 15, 1993. During the site reconnaissance, a PID and FID were used for air monitoring. The only readings observed above background were at sample location SS-3 (see Figure 3-1). The stained soil at this location emitted a motor oil odor and exhibited a maximum FID reading of 15 ppm. No vapors were detected with the PID.

The site was observed to be in the same general condition as during the Task 1 site inspection and as described in Section 1.3. Armstrong Pumps and Phoenix Auto Center were operational. Phoenix was utilizing the southern end of the rolling mill building and the areas south and west of the building for the storage of junked cars. Small containers of an unknown oil product were found in the electrical control building located on the east side of the site. The cooling pond contained approximately 4 feet of water with an oil sheen and a submerged drum. Signs of human intrusion were apparent in many abandoned buildings, and the perimeter fence was found to be incomplete. Some of the NYSDEC overpacked drums stored on site had been knocked over and tampered with by vandals.

3.3 GEOPHYSICAL INVESTIGATION

E & E performed a geophysical survey of the site on August 4, 5, and 6, 1993. The results of this investigation are included in Appendix B. The survey was performed to aid in safely locating the proposed monitoring wells. Grids (40 feet by 40 feet, with 10-foot data station spacings) were established at eight of the nine proposed well locations and at two additional well locations. The proposed location of well GW-5 was moved to the center of the site near the UST and pickle liquor tanks. The location of GW-4 was moved to compensate for the relocation of GW-5. The grid at GW-8 was reduced in size to 40 feet by 20 feet due to the narrow corridor between buildings at that location.

The geophysical survey was performed using an EG&G Geometrics Model G-856 proton precession magnetometer and a Geonics Limited Model EM31 ground conductivity meter. One reading was recorded with the magnetometer at each grid station, and four readings were recorded with the conductivity meter, one in each instrument orientation.

Several contour maps of each survey grid were generated to illustrate the geophysical results. Several anomalies were detected in each grid by both the EM31 and the magnetometer. Anomalies were caused by known surface objects as well as unknown subsurface objects. Based on the contour maps, locations free of suspected subsurface debris were chosen for the monitoring wells. Details pertaining to each survey grid are presented in the geophysical report, which is included as Appendix B.

3.4 GROUNDWATER MONITORING WELLS

3.4.1 Well Installation

Ten monitoring wells were installed at the Roblin Steel site between October 6 and 26, 1993. All wells were drilled and constructed by Buffalo Drilling Company under the guidance of an E & E geologist and health and safety coordinator. The wells were drilled to characterize the subsurface by collecting soil samples from well borings, to assess the hydrogeology of the site, and to provide locations for the collection of groundwater samples for chemical analysis.

Monitoring well locations were based on NYSDEC's abbreviated work plan for the site. However, during the geophysical survey, wells GW-4 and GW-5 were relocated with NYSDEC's concurrence (see Section 3.3). Single monitoring wells were drilled at eight locations, and one well pair was installed. The locations of these 10 wells are shown in Figure 3-1.

Initially, nine deep overburden wells (approximately 30 feet deep) were proposed for the site. However, based on the subsurface conditions encountered, the construction of three wells was altered and one additional well was installed. At locations GW-3, GW-4, and GW-7, sufficient groundwater was not encountered in the deep overburden for well completion. Therefore, these borings were backfilled, and shallow overburden wells GW-3S, GW-4S, and GW-7S were installed adjacent to these borings. Well GW-8 was drilled and constructed as a deep overburden well. However, after completion, the well was dry. Therefore, a shallow overburden well, GW-8S, was drilled adjacent to GW-8. Two days after completion of GW-8S, water was found in GW-8, resulting in a usable well pair.

Well construction and elevation data are presented in Table 3-1. In general, deep overburden wells GW-1, GW-2, GW-5, GW-6, GW-8, and GW-9, were drilled to monitor the clay/till interface (see Section 3.4.2). Screen bottom depths in these wells ranged from 27.5 to 37.5 feet BGS. Shallow overburden wells GW-3S, GW-4S, GW-7S, and GW-8S were set to monitor a silt and very fine sand layer. Screen bottom depths in these wells ranged from 9.5 to 11.5 feet BGS.

All wells were drilled with 4.25-inch inside diameter (ID) hollow-stem augers and were completed in the overburden. In addition to augering, HX-sized (nominal 4-inch diameter) rock coring was performed in GW-1 due to the presence of a boulder. Well diagrams and construction details are included on the logs presented in Appendix C. All wells were constructed with a 2-inch ID polyvinyl chloride (PVC) screen and riser. All screens had 0.010-inch slots. A filter pack, consisting of appropriately sized sand, was placed around the screens, and the wells were sealed with bentonite and cement/bentonite grout. Each well was completed with a concrete drainage pad and 4-inch ID, locked, aboveground, protective steel casing, with the exceptions of GW-8 and GW-3S, which utilized flush-mount casings.

During augering of each well, subsurface soil samples were collected with a 2-foot-long split-spoon sampler according to the methods described in American Society for Testing and Materials (ASTM) designation D-1586. Split-spoon samples were collected at 5-foot intervals throughout each boring, and, in several instances, continuously within and close to the screened intervals. Logs for each well are included in Appendix C. Each soil sample was screened with a FID and PID for volatile organic vapors and visually classified by an E & E geologist. FID readings up to 80 ppm above background were observed in soil samples from four well borings (see Appendix C). From each of these wells, one subsurface soil sample was collected for chemical analysis. The collection and analysis of these samples is discussed below in Section 3.5.5.

In addition to the samples discussed above, 17 subsurface soil samples were collected for geotechnical analyses. Due to insufficient sample recoveries, all requested tests could not be performed. Seventeen soil samples were subject to grain-size distribution analysis (ASTM D-422), six to Atterberg limits testing (ASTM D-4318), and 10 to natural moisture content analysis (ASTM D-2216). All geotechnical analyses were performed by Atlantic Testing Laboratories Ltd. of Canton, New York. The geotechnical results, including the gradation curves and a summary table, are presented in Appendix D.

All well drilling equipment was decontaminated before and after use by high-pressure steam cleaning. The water used for decontamination purposes, rock coring, and well construction activities was obtained from an on-site hydrant. A sample of this water was collected on October 13, 1993, and found to contain the trihalomethanes chloroform, bromodichloromethane, and dibromochloromethane at a total concentration of 16 μg/L. This sample contained carbon disulfide and bis(2-ethylhexyl)phthalate at concentrations of 2 μg/L and 1 μg/L, respectively, but both compounds are suspected to be field/laboratory contaminants. The drilling water also contained total xylenes (26 μg/L), toluene (22 μg/L), and ethylbenzene (5 μg/L). Eleven metals were detected in the drilling water sample. Of these, only iron (736 μg/L) exceeded the New York State Department of Health (NYSDOH) maximum contaminant levels for public water supplies (10 NYCRR 5-1).

Following completion, all wells were developed to restore the natural hydraulic properties of the aquifer material immediately adjacent to the boreholes and to enhance flow into the wells. Development occurred on October 25 and 26, 1993. Well recharge rates were very low, and only a limited amount of water could be removed from the wells. Therefore, in addition to water evacuation, PVC bailers were used to surge the well water. In the six deep overburden wells, 1.5 to 2.3 standing well volumes of water were removed, and pH, conductivity, and turbidity readings stabilized. The final pHs in these six wells ranged from 7.47 to 8.83, and final conductivities ranged from 556 to 3,660 microSiemens per centimeter (μS/cm). Due to the high clay and silt content of the overburden, all turbidities remained over 200 nephelometric turbidity units (NTUs). In the four shallow overburden wells, 3.7 to 6.5 well volumes of water were removed. Final pHs in these wells ranged from 6.72 to 8.83, and final conductivities ranged from 446 to 895 μS/cm. Turbidity of the water in these wells also remained above 200 NTUs.

3.4.2 Geology

The United States Department of Agriculture (USDA) soil survey for Niagara County (1972) indicates that the North Tonawanda area is underlain by soils of the Canandaigua-Raynham-Rhinebeck Association, which formed in lake-laid silts and very fine sands. Detailed soil mapping has not been performed in the vicinity of the site, but site surface soils would likely be described as urban land. In general, the shallow subsoil beneath the fill and disturbed surface soil encountered during well drilling was consistent with the USDA's description of lacustrine silt and sand.

Detailed descriptions of site soils site are provided on the well logs in Appendix C. Based on these logs, two geologic cross sections were created. The locations of these cross sections are shown on Figure 3-1, and the cross sections are included as Figures 3-2 and 3-3. As shown on both figures, the top 1 to 2.5 feet consists of fill, with occasional concrete, slag, wood, etc., as well as disturbed and stained soil. One sample of disturbed surface soil was collected from GW-6 for grain-size distribution analysis. This sample was described as dark gray, coarse-, medium-, and fine-grained sand, with traces of silt, clay, and fine gravel (see Appendix D).

Lacustrine silt was encountered beneath the surface layer, and sand with clay was present in some areas. In general, this layer extended to depths of 9 to 10 feet BGS. Five samples were collected between 4 and 8 feet BGS for grain-size analysis. Each sample consisted primarily of light brown to dark gray, very fine to coarse-grained sand and silt. Some clay and a trace of fine gravel were also present in some samples.

Beneath the lacustrine silt and sand layer, but not shown on Figure 3-2 and Figure 3-3, is a layer consisting primarily of gravel. This layer is not shown because of its thin, discontinuous nature. A sample that included this soil was collected from 10 to 12 feet BGS in GW-3. This sample also contained some overlying sand and silt and underlying clay, but was described as brown silt with some fine- to coarse-grained sand, fine to medium gravel, and a trace of clay.

Underlying the silt and sand and/or gravel-rich layers is a lacustrine clay ranging in color from reddish brown to light gray. This clay is varved and contains thin layers of silt to very fine sand. This unit was encountered to depths of approximately 25 to 30 feet, except in GW-6 where it was encountered only to a depth of approximately 19 feet. In most well borings, the clay was dry between approximately 9 and 13 feet BGS and saturated below this depth. Five samples from this clay unit were submitted for grain-size distribution and Atterberg limits testing. Two shallower samples from this unit, collected at 9 to 11 feet BGS and 14 to 16 feet BGS, were described as light gray and grayish brown clay with little silt. A trace of fine sand was also present in the sample from 14 to 16 feet BGS. The three remaining samples, collected between 20 and 26 feet BGS, consisted of reddish brown clay with little to some silt, and a trace of fine- to medium-grained sand. In these five samples, the liquid limits ranged from 37 to 49, and the plastic limits ranged from 13 to 22. The corresponding plasticity indices ranged from 22 to 29.

Beneath the lacustrine clay is a glacial till layer consisting of gravel and sand in a reddish brown matrix of silt and clay. The upper portion of the till is soft, and it is distinguishable from the lacustrine clay by its gravel and sand content. The lower portion is much denser and contains occasional cobbles and boulders. Five till samples were submitted for grain-size analysis. Each of these samples contained a wide range of grain sizes, but consisted primarily of reddish brown silt and/or sand with lesser amounts of clay and gravel. The finest-grained sample, collected from 22 to 24 feet BGS in GW-4, was subjected to Atterberg limits testing, and had a liquid limit of 19, a plastic limit of 12, and a plasticity index of 7.

Underlying the till unit is the Camillus Shale of the Salina Group. This Upper Silurian shale was encountered at a depth of 45.5 feet BGS, only in the well boring of GW-2. It was described as black, soft, fissile shale with horizontal bedding.

3.4.3 Hydrogeology

On November 9, 1993, water level measurements were recorded for each well prior to groundwater sampling. These water levels are presented in Table 3-2. In the four shallow overburden wells, water levels ranged from 3.17 to 5.13 feet BGS. In the six deep overburden wells, water levels ranged from 6.08 to 11.72 feet BGS.

A second complete set of water level measurements was recorded on February 28, 1994 (see Table 3-2). On this date, water levels ranged from 2.54 to 6.37 feet BGS in the shallow overburden wells. In the deep overburden wells, water levels ranged from 5.61 to 11.58 feet BGS.

Potentiometric surface contour maps were generated from both data sets to determine groundwater flow directions and gradients. The contour maps were similar; therefore, only the February 28, 1994, maps are presented (see Figures 3-4 and 3-5). The November 9, 1993, groundwater contour map for the shallow overburden wells showed a nearly flat potentiometric surface (low horizontal hydraulic gradient). Flow was primarily to the northwest, from GW-4S towards GW-8S; however, a flow divide trended nearly north/south through GW-4S, with a component of flow to the east towards GW-3S. The deep overburden wells showed a generalized flow direction of west to east from a high point at GW-6 to a low point at GW-2. The horizontal hydraulic gradient between these two wells was low (0.5%). Groundwater at the site was expected to flow east to west towards the Niagara River, located less than 0.25 mile to the west. Therefore, the second set of water level measurements was recorded to verify the observed flow direction.

The water level data collected on February 28, 1994, are expected to more closely represent actual groundwater flow because water in the wells had a longer time to stabilize.

As shown on Figure 3-4, groundwater flow in the shallow overburden is primarily to the northwest, but with a northeast/southwest trending divide present near GW-4S. As on November 9, 1993, GW-4S had the highest water level, with a component of flow to the northwest and to the east toward GW-3S. The data indicate that the cooling pond is hydraulically connected to the groundwater and is recharging the shallow overburden. Groundwater flow emanates radially from this recharge area, but the ultimate flow direction should be to the northwest toward the Niagara River.

Potentiometric surface contours for the deep overburden wells on February 28, 1994, indicate the presence of a north-northeast/south-southwest trending flow divide near GW-5 and GW-6 (see Figure 3-5). Groundwater flow from this divide is both to the west-northwest and east-southeast. The horizontal hydraulic gradient between wells GW-6 and GW-2 was very similar to that on November 9, 1993.

Barring any man-made interference, the Niagara River represents the local sink for all shallow groundwater. Therefore, groundwater flow beneath the site should be to the west or northwest. Man-made controls such as sewers along Oliver Street are not likely to have an impact on groundwater flow in the deep wells because these wells are screened below 20 feet BGS. In addition, no industries or groundwater remediation sites, which often pump large quantities of groundwater, are known to exist nearby to the east of the site. GW-2 was the only well to encounter bedrock. Although bentonite was used to seal off the bedrock, and the screen was set at a similar depth to the other wells, some leakage may be occurring around the seal into the bedrock, influencing groundwater flow. It appears probable that the Camillus Shale, which is known to contain significant gypsum deposits, and has been mined for gypsum within Erie County, is acting as a moderately permeable regional aquifer, and connecting the overburden groundwater directly to the river via the bedrock.

The lower water level in GW-2 (564.85 above MSL) is very close to but above the surface water elevation of the Niagara River close to the site. U.S. Geological Survey gauges give the river elevation at Anderson Park, Buffalo, as ranging from 572.72 to 564.81 feet above MSL, and at Black Rock (2 miles downstream), as ranging from 571.15 to 563.34 feet above MSL (USGS 1992). Since Roblin Steel is six miles further downstream from Black Rock an average elevation of 563 feet above MSL is a reasonable assumption. Because the Camillus Shale can be quite permeable as a result of abundant solution cavities left by the dissolution of gypsum, the shale can be the path of least resistance for groundwater flowing from the site to the river. Fluctuations in the elevation of the Niagara River may have an effect on groundwater flow beneath the site. Because hydrological study was not performed at the site, the magnitude of this effect cannot be determined at this time.

None of the shallow overburden wells is representative of background conditions because all are downgradient of a significant portion of the site. In addition, because none of the deep overburden wells is hydraulically upgradient of the site, none can be considered as truly representative of background conditions. However, GW-1 is not directly impacted by any known sources of site-related pollution (e.g., USTs, cooling pond) and was used for background comparison.

3.5 SAMPLING

Surface water, sediment, surface soil, waste, subsurface soil, and groundwater samples were collected at and around the site by E & E between July 15 and November 11, 1993 (see Figure 3-1). Sample locations were chosen with the concurrence of the NYSDEC field representative and were based on information provided in NYSDEC's abbreviated work plan for the site. All sample collection, shipping, handling, and analytical procedures were performed in accordance with the QAPjP (E & E 1993c). Additionally, field and sampling procedures were performed in accordance with the work plan (E & E 1993a), and HASP (E & E 1993b). Sample analysis was performed by E & E's ASC in accordance with NYSDEC's 1991 Analytical Services Protocol. All analytical data pertaining to the Roblin Steel site have been third-party validated by ChemWorld Environmental, Inc. Table 3-3 summarizes the samples collected and analyses performed.

Data summary forms are provided in Appendix E. Tables 3-4 through 3-19 present the compounds and analytes detected in each media sampled. Tentatively identified compounds (TICs) are presented with the data summary forms in Appendix E.

3.5.1 Surface Water and Oil

Three samples of liquid media were collected at the site on July 15, 1993. The sample locations are shown on Figure 3-1. Sample SW-1 consisted of water from the surface of the cooling pond. Sample SW-3 consisted of water from a cement-lined pickling basin located in the wire mill building. This elongated basin extended through a wall at a right angle to three smaller pickling basins at the north end of the wire mill building. Samples

SW-1 and SW-3 were submitted for Target Compound List (TCL) organic and inorganic analyses. Sample SW-2 consisted of oil and sludge from a cement-lined trough in the rolling mill building (see Figure 3-1). The trough contained trash and debris, including engine and machine parts, and less than 1 foot of water. The sample was collected from an approximately 3-inch-thick layer of oil and sludge that was floating on the water. Sample SW-2 was analyzed for hazardous waste characteristics, including reactivity (total sulfide and cyanide), corrosivity (pH), and ignitability (flash point); PCBs in liquid; petroleum products; and toxicity characteristic leaching procedure (TCLP) volatile and semivolatile compounds and metals. One matrix spike/matrix spike duplicate (MS/MSD) sample set and one trip blank were analyzed with these samples for QA/QC purposes.

Table 3-4 summarizes the inorganic analytes detected in samples SW-1 and SW-3. Fourteen inorganic analytes were detected in SW-1, and 12 were detected in SW-3. Though not NYSDEC-listed waterbodies, the results were compared to NYSDEC Class D surface water standards and guidance values for screening purposes. Several of the Class D surface water standards are based on hardness (NYSDEC 1993). Therefore, the hardness of these samples was calculated based on the individual concentrations of Mg^{2+} and Ca^{2+} and an equation provided in Freeze and Cherry (1979). Hardness results are included in Table 3-4. Copper in SW-1 and iron in both samples were the only analytes to exceed the Class D standards. Cyanide was not detected in either sample. No organic compounds, with the exception of common laboratory contaminants, were detected in either surface water sample.

The analytical results for the oil/sludge sample (SW-2) are presented in Table 3-5. All hazardous waste characteristics were within regulatory limits (6 NYCRR 371.3). The only PCB detected was Aroclor 1254 at an estimated concentration of 1.1 mg/kg. No TCLP organics were detected. The only TCLP metals detected were barium and lead at concentrations below regulatory levels. The presence of gasoline, diesel fuel, kerosene, lube oil, and fuel oil was tested for in the petroleum products analysis. Lube oil was the only petroleum product identified, and it was present below quantitation limits.

3.5.2 Sediment

A sediment sample (SED-1) was collected on July 15, 1993, from the bottom of the cooling pond to aid in characterizing the contents of the pond (see Figure 3-1). This sample was analyzed for full TCL parameters. While NYSDEC's work plan called for the collection of sediment at each surface water sample location, sediment was not present at the location of SW-2 or SW-3.

The organic compounds detected in SED-1 are listed in Table 3-6. VOCs detected include carbon disulfide at an estimated 6 μg/kg, 2-butanone at 25 μg/kg, and toluene at 42 μg/kg. The only semivolatile compound detected was bis(2-ethylhexyl)phthalate at an estimated 1,700 μg/kg. Phthalate esters are common contaminants from the gloves used in handling samples, both in the field and in the laboratory. The level detected in SED-1 is likely the result of field/laboratory contamination.

The inorganic analytes detected in SED-1 are listed in Table 3-7. The results were compared to background concentrations in eastern United States soils and other surficial materials (Shacklette and Boerngen 1984). The results were compared to both the observed range and the upper limit of the 90th percentile, which represents the statistical concentration below which 90% of the study's (Shacklette and Boerngen 1984) samples fell. Fourteen of the 24 inorganics analyzed for were detected in SED-1. Arsenic, chromium, manganese, and nickel exceeded the upper limits of the 90th percentile, but not the observed range. Cadmium, cobalt, copper, iron, and lead were detected above the observed ranges. No cyanide was detected in SED-1.

3.5.3 Surface Soil

Eight surface soil samples (SS-1 to SS-8) were collected at the site on July 15, 1993 (see Figure 3-1). A description of the sample locations are as follows:

- SS-1: Collected on the west side of three transformers, which were suspended approximately 4 feet above a concrete pad. Approximately 6 inches of gravel was removed adjacent to the pad, and the soil was sampled at a depth of 6 to 12 inches.

- SS-2: Collected from the top 4 inches of oil-stained soil and steel scale adjacent to the cooling pond.

- SS-3: Collected from the top 8 inches of oil-stained soil adjacent to the salvage yard. The soil had a motor oil odor.

- SS-4: Collected from the top 6 inches of soil beneath the valves of the pickling liquor tanks. The portion collected for VOC analysis was a grab sample from the eastern end of the southern tank. The remaining portion was composited from the north end of the northern tank and the east and west ends of the southern tank.

- SS-5: Collected from the top 4 inches of soil at the base of six empty drums along the south-central border of the site.

- SS-6: Collected from the top 4 inches of oil-stained soil forming the floor of the rolling mill building.

- SS-7: Collected from the top 8 inches at the base of three transformers near the southeast corner of the rolling mill building.

- SS-8: Collected from the top 2 inches of oil-stained soil in an area of the wire mill building where the wooden block floor had heaved up exposing the soil beneath.

All sample locations were monitored with a FID and PID. No PID readings were observed, but a FID reading of 15 ppm above background was observed at sample location SS-3. All eight samples were analyzed for full TCL parameters and for metals according to the EP toxicity method. Sample SS-3 was also analyzed for total recoverable petroleum hydrocarbons (TRPH) because of the FID reading and motor oil odor. One MS/MSD sample set was collected at location SS-7 for QA/QC purposes.

The organic compounds detected in the surface soil samples are listed in Table 3-6. No VOCs other than laboratory-related contaminants were detected in samples SS-1, SS-2, SS-4, SS-6, and SS-7. Acetone was detected at low levels in SS-1 and SS-2, but its presence is considered suspect due to laboratory contamination. Acetone was detected in samples SS-3, SS-5, and SS-8 at levels that were not directly attributable to laboratory contamination. In addition, 2-butanone, 2-hexanone, and toluene were each detected in SS-3 and SS-8. Sample SS-8 also contained 4-methyl-2-pentanone, PCE, and xylenes (see Table 3-6).

PAHs were detected in all surface soil samples except SS-3 and SS-6. As shown on Table 3-6, total PAH concentrations in the remaining samples ranged from an estimated 520 μg/kg in SS-7 to an estimated 1,100,000 μg/kg in SS-8. Seventeen individual PAHs were detected in one or more samples; therefore, only total PAHs appear on Table 3-6. The individual compounds and their concentrations are included in Appendix E.

Other semivolatile organics detected include dibenzofuran, which is closely related to PAHs, in SS-1 at an estimated 160 μg/kg and in SS-8 at an estimated 16,000 μg/kg. Carbazole, a combustion by-product like PAHs and dibenzofuran, was detected at estimated concentrations of 350 μg/kg in SS-5 and 31,000 μg/kg in SS-8. Additionally, hexachlorobenzene was detected in SS-4 at 9,600 μg/kg. Bis(2-ethylhexyl)phthalate was detected in SS-1 at an estimated 57 μg/kg and in SS-6 at an estimated 160 μg/kg. As previously discussed, such phthalate levels are likely not the result of site-related contamination. Low concentrations of the pesticides heptachlor epoxide, 4,4'-DDT, and gamma-chlordane were detected in SS-7, and low concentrations of 4,4'-DDE and 4,4'-DDT were detected in SS-5. Aroclor 1260, a PCB, was detected at 390 μg/kg in sample SS-7. In addition, the TRPH content of SS-3 was found to be 82,000 mg/kg, which is a high value but consistent with the observation of waste oil in this area.

Twenty-one of the 24 inorganic analytes tested for were detected in one or more of the surface soil samples (see Table 3-8). Most of the results were compared to background concentrations in eastern United States soils and other surficial materials (Shacklette and Boerngen 1984), except for cadmium, which was compared to an observed range published by Dragun (1988). Of those detected, the following metals exceeded the upper limit of the 90th percentile but not the observed range: Cadmium in samples SS-1, SS-2, and SS-3; cobalt in SS-2; iron in SS-2, SS-3, and SS-6; and lead in SS-1. Although a common range for cyanide is not available, cyanide was detected at 1.1 mg/kg in samples SS-7 and SS-8.

The surface soil samples were also subjected to EP toxicity metals analysis. As shown in Table 3-8, barium, cadmium, chromium, lead, and selenium were detected in the extract prepared for one or more samples. The only metal found to exceed regulatory levels was lead at 16,200 μg/L in SS-1. Therefore, the soil associated with this sample location is considered a characteristic hazardous waste.

3.5.4 Waste

Five waste samples (W-1 to W-5) were collected from waste piles at the site on July 15, 1993 (see Figure 3-1). Sample W-1 consisted of soil (gravel with some sand and silt) mixed with construction and demolition debris such as concrete and asphalt fragments. Samples W-2 through W-5 were collected from piles of steel scale (iron oxide) scattered about the site. This material had a fine, ash-like consistency. All five samples were analyzed for full TCL parameters and for metals according to the EP toxicity method. In addition, samples W-3, W-4, and W-5 were analyzed for reactivity (total sulfide and cyanide), corrosivity (pH), and ignitability (flash point).

Table 3-9 summarizes the organic compounds detected in the waste samples. The only VOC detected in the waste samples was PCE in W-4 at an estimated 10 μg/kg. The only semivolatile compounds detected in the steel scale samples (W-2 to W-5) were bis(2-ethylhexyl)phthalate in W-2 (250 μg/kg), W-3 (920 μg/kg), and W-5 (510 μg/kg), and Aroclor 1260 in W-5 at 140 μg/kg. As previously discussed, the presence of bis(2-ethylhexyl)phthalate at these concentrations is likely not the result of site-related contamination. Sample W-1 contained the pesticide endosulfan sulfate at approximately 110 μg/kg, dibenzofuran at an estimated 55,000 μg/kg, carbazole at an estimated 110,000 μg/kg, and 16 individual PAHs at an estimated total of 3,800,000 μg/kg.

Table 3-10 summarizes the inorganic analytes detected in the waste samples. Most of the results were compared to background concentrations in eastern United States soils and other surficial materials (Shacklette and Boerngen 1984), except for cadmium, which was compared to an observed range published by Dragun (1988). Twenty-one of the 24 inorganics analyzed for were detected in one or more samples. Of these, the following metals were detected above the observed range: cadmium in W-2, W-4, and W-5; cobalt in W-2; and iron in W-2, W-3, W-4, and W-5. Cyanide was not detected in any of the samples.

Table 3-11 summarizes the hazardous waste characteristics results for the waste samples. None of the parameters tested for exceeded the regulatory levels (6 NYCRR 371.3); therefore, none of the samples is considered hazardous waste.

3.5.5 Subsurface Soil

During monitoring well installation, four subsurface soil samples were collected for chemical analysis. A summary of the samples collected is presented in Table 3-12. MS/MSD sample sets were collected with soil samples GW-5A and GW-7A for QA/QC purposes.

Table 3-13 summarizes the organic compounds detected in the subsurface soil samples. No VOCs were detected in any of the samples with the exception of low concentrations of acetone in GW-2A and GW-5A. While not directly attributable to laboratory contamination, these results are considered suspect. Sample GW-2A contained 220 μg/kg of the pesticide 4,4'-DDT. GW-5A contained an estimated 49 μg/kg of di-n-octylphthalate and PAHs at an estimated total concentration of 600 μg/kg. For reasons stated previously, this low level of a phthalate ester should not be considered actual site contamination. GW-7A contained PAHs at an estimated total concentration of 560 μg/kg. Sample GW-4SYS3 was not analyzed for semivolatiles or inorganics.

Table 3-14 summarizes the inorganic analytes detected in the subsurface soil samples. Twenty of the 24 analytes tested for were detected in one or more of the samples. The results were compared to background concentrations in eastern United States soils and other surficial materials (Shacklette and Boerngen 1984). Calcium in GW-5A and copper in GW-7A exceeded the upper limit of the 90th percentile, but neither exceeded the observed range.

3.5.6 Groundwater

Groundwater samples were collected from the 10 monitoring wells at the site. Prior to sample collection, water level and total depth measurements were recorded for each well, and each well was purged of three standing volumes or until dry. The wells were then allowed to recharge prior to sample collection. All wells were sampled on November 9, 10 and 11, 1993, and the groundwater samples were analyzed for full TCL parameters. The organic sample portion was collected on the same day as purging. Samples for inorganic analyses were collected the day after purging to allow time for suspended sediment in the wells to settle, yielding a sample with a relatively low turbidity. Although the wells were sampled a day later, the groundwater in these wells remained above 50 NTU, with the exception of GW-2. This was due to the high clay content of the soil and the relatively slow recharge rates of the wells. For QA/QC purposes, an MS/MSD sample set was collected from well GW-3S, and two trip blanks were analyzed.

Table 3-15 summarizes the organic compounds detected in the groundwater samples collected from the shallow overburden wells. Sample GW-3S contained several VOCs, including 70 μg/L of total 1,2-dichloroethene (1,2-DCE); 86 μg/kg of trichloroethene (TCE); and 180 μg/kg of PCE. These compounds exceeded NYSDEC Class GA groundwater standards. In addition, samples GW-3S and GW-4S each contained low concentrations of 1,2-dichloroethane (1,2-DCA). VOCs were not detected in samples GW-7S and GW-8S. The semivolatile compound bis(2-ethylhexyl)phthalate was detected at very low concentrations in samples GW-3S, GW-4S, and GW-8S. This compound, at low concentrations, is commonly a result of field and/or laboratory contamination due to the use of rubber gloves that contain phthalate esters. Thus, it should not be considered site-related contamination. Pesticides were detected in two shallow well groundwater samples. Endosulfan sulfate, for which there is no groundwater standard, was detected at an estimated 0.19 μg/L in GW-3S.

4,4'-DDT was detected at an estimated 0.11 μg/L in GW-4S, exceeding the Class GA groundwater standard.

Table 3-16 summarizes the organic compounds detected in the samples from the six deep overburden wells. Acetone was detected in GW-2 and GW-6 at levels (630 μg/L and 390 μg/L, respectively) greater than 10 times that detected in the associated method blank, and therefore could not be attributed to laboratory contamination. In both samples, acetone exceeded the NYSDEC Class GA groundwater guidance value (50 μg/L). TCE was detected at the Class GA standard (5 μg/L) in GW-8, and total-1,2-DCE was detected at 4 μg/L below the standard (5 μg/L) in GW-6. 1,2-DCA was detected at 6 μg/L in three of the six samples above the Class GA standard of 5 μg/L. However, because it was detected above the standard in GW-1, the most representative background sample, its presence is not believed to be site related.

The semivolatile compound bis(2-ethylhexyl)phthalate was detected at very low concentrations (1 to 2 μg/L) in four of the six samples, including GW-1. As discussed previously, its presence is likely due to field and/or laboratory contamination. The pesticide endosulfan sulfate, for which there is no Class GA standard, was detected at an estimated 0.15 μg/L in GW-9.

The inorganic analytes detected in the shallow overburden groundwater samples are listed in Table 3-17. Seventeen of the 24 analytes tested for were detected in one or more of the samples. The metals that exceeded NYSDEC Class GA groundwater standards or guidance values include: iron in all four samples; magnesium in GW-3S and GW-8S; manganese in GW-3S, GW-7S, and GW-8S; sodium in GW-8S; and zinc in GW-8S. No cyanide was detected.

Table 3-18 lists the inorganic analytes detected in the deep overburden groundwater samples. Twenty of the 24 analytes tested for were detected in one or more of the samples. Metals that exceeded Class GA standards or guidance values include: cadmium in GW-8; chromium, lead, and zinc in GW-5, GW-6, and GW-8; iron, magnesium, and sodium in all six samples; and manganese in GW-1, GW-5, GW-6, and GW-8.

3.6 DRUM INVENTORY

On October 26, 1993, a drum inventory was performed in the rolling mill and wire mill buildings. Drums were identified in 10 locations (see Figure 3-1). A total of 60 55-gallon drums and 14 smaller drums and containers were found (see Table 3-19).

3.7 SURVEYING

Following completion of the sampling activities, the site was surveyed by a licensed surveyor to a vertical accuracy of 0.05 feet and a horizontal precision of 1/10,000. The vertical datum used was National Geodetic Survey benchmark NGS D412. This benchmark is located at the base of a water tower on the west side of River Road in North Tonawanda. The elevation of this benchmark is 574.14 feet above mean sea level (MSL). The horizontal datum was magnetic north, with assumed coordinates. The physical features of the site and all PSA sampling locations were surveyed. The survey data were used to create all figures in this report. Property lines were not surveyed. City of North Tonawanda tax map numbers 181.12 and 181.52 were used to approximate the property boundaries shown on the figures. For the purpose of property owner identification, Figure 3-6 shows the property lines and corresponding parcel numbers.

3.8 PA SCORE

The purpose of the PA score is to assist in differentiating sites that pose little or no potential threat to human health and the environment from sites that warrant further investigation based on their potential threat.

The PA score is a screening-level compilation of existing information about a site and its surrounding environment, with emphasis on obtaining comprehensive information on targets (i.e., populations and resources that might be threatened by a potential release from the site). The PA score is a simplified version of the Hazard Ranking System (HRS) and can be used to quantitatively assess a limited number of factors. A site with an HRS score of 28.5 or greater is eligible for proposal to the National Priorities List.

The factors used to determine the PA score are likelihood of release, targets, and waste characteristics. Likelihood of release is the relative potential for a hazardous substance to migrate from the site. Targets include people, physical resources (drinking water wells or intakes), and environmental resources (sensitive environments) that may be threatened by a release from the site. Waste characteristics are an estimation of the type and quantity of hazardous waste at the site. These factors are then applied to the various exposure pathways (groundwater, surface water, soil, and air) to derive an overall site score.

The results of PA scoring (out of 100) for the Roblin Steel site are as follows:

- Overall site score: 21
- Groundwater pathway score: 1
- Surface water pathway score: 3
- Soil pathway score: 35
- Air pathway score: 24

A release to groundwater has been confirmed as evidenced by analytical results from groundwater samples collected from on-site monitoring wells. The groundwater route is not considered a major exposure pathway because area residents obtain drinking water from municipal supplies and no known drinking water wells exist within the 4-mile-radius target distance limit. Because no off-site surface water samples have been collected, it is unknown whether a release to surface water has occurred. However, surface water runoff is diverted via storm sewers to a treatment plant, which ultimately discharges to the Niagara River. In addition, there is a potential for groundwater discharge to the Niagara River. The river is a principal source of drinking water, with an intake 6.5 miles downgradient of the site.

There is no documentation of a release of hazardous substances to the air. However, residential areas exist near the site. Additionally, several homes are present at the southeast corner of the site within 200 feet of detected surface soil and groundwater contamination and three PCB-containing oil transformers. The southern portion of the site is also used by Phoenix Auto Center. Therefore, resident population and workers were identified as potential targets for the soil exposure pathway.

Air is not considered to be a major exposure pathway because there has been no documented release. However, due to the proximity of the residential area, a secondary target population was included in the air pathway score.

Table 3-1

MONITORING WELL CONSTRUCTION DATA
ROBLIN STEEL SITE

Well	Date Completed	Total Depth Drilled (feet BGS)	Screened Interval (feet BGS)	Inner Casing Elevation (feet AMSL)	Outer Casing Elevation (feet AMSL)	Ground Elevation (feet AMSL)
GW-1	10-07-93	39.0	27.5 - 37.5	578.95	579.27	576.52
GW-2	10-13-93	45.9	23.5 - 33.5	578.80	578.96	576.57
GW-3S	10-22-93	12.0	5.5 - 11.5	NA	576.85	576.78
GW-4S	10-25-93	10.0	4.5 - 9.5	579.49	579.61	576.46
GW-5	10-15-93	32.2	21.7 - 31.7	579.20	579.43	576.82
GW-6	10-21-93	28.0	17.5 - 27.5	578.27	578.56	576.05
GW-7S	10-25-93	10.0	4.5 - 9.5	579.59	579.85	576.79
GW-8	10-18-93	31.0	20.5 - 30.5	NA	577.36	577.11
GW-8S	10-25-93	10.0	4.5 - 9.5	580.07	580.23	577.00
GW-9	10-18-93	31.0	20.0 - 30.0	579.23	579.38	576.66

Key:

BGS = Below ground surface.
AMSL = Above mean sea level. Vertical datum reference: benchmark NGS D4212 (elevation 574.14 feet).
NA = Not acquired.

Table 3-2

WATER LEVEL DATA
ROBLIN STEEL SITE

Well	November 9, 1993		February 28, 1994	
	Depth (feet BGS)	Elevation (feet AMSL)	Depth (feet BGS)	Elevation (feet AMSL)
GW-1	10.76	565.76	7.07	569.45
GW-2	11.72	564.85	11.58	564.99
GW-3S	4.20	572.58	4.64	572.14
GW-4S	3.17	573.29	2.54	573.92
GW-5	9.30	567.52	6.31	570.51
GW-6	6.08	569.97	5.61	570.44
GW-7S	4.47	572.32	4.68	572.11
GW-8	8.10	569.01	7.42	569.69
GW-8S	5.13	571.87	6.37	570.63
GW-9	7.87	568.79	7.62	569.04

Key:

AMSL = Above mean sea level. Vertical datum reference: benchmark NGS D412 (elevation 574.14 feet)
BGS = Below ground surface.

Table 3-3

SAMPLE ANALYSIS SUMMARY
ROBLIN STEEL SITE

Samples	Target Compound List (TCL)				EP Tox Metals	RCRA	TRPH	PCBs in Liquid	TCLP	Petroleum Products
	VOCs	BNA	PCB/ Pest	Inorganics						
Surface Soil										
SS-1, -2, and -4 to -8	X	X	X	X	X	—	—	—	—	—
SS-3	X	X	X	X	X	—	X	—	—	—
Waste										
W-1 and -2	X	X	X	X	X	—	—	—	—	—
W-3 to -5	X	X	X	X	X	X	—	—	—	—
Sediment										
SED-1	X	X	X	X	—	—	—	—	—	—
Surface Water										
SW-1 and -3	X	X	X	X	—	—	—	—	—	—
Oil/Sludge										
SW-2	—	—	—	—	—	X	—	X	X	X
Subsurface Soil										
GW-2A, -5A, and -7A	X	X	X	X	—	—	—	—	—	—
GW-4SYS3	X	—	—	—	—	—	—	—	—	—
Groundwater										
GW-1, -2, -5, -6, -8, and -9; GW-3S, -4S, -7S, and -8S	X	X	X	X	—	—	—	—	—	—
Drilling Water										
DWYS3101393	X	X	X	X	—	—	—	—	—	—

Key:

BNA = TCL Base/Neutral and Acid Extractable Compounds.
EP Tox = Extraction Procedure Toxicity.
Inorganics = TCL Metals and Cyanide.
PCB = TCL Polychlorinated Biphenyls.
Pest = TCL Pesticides.
RCRA = Hazardous Waste Characteristics.
TCLP = Toxicity Characteristics Leaching Procedure Purgeables, BNA, and Metals.
TRPH = Total Recoverable Petroleum Hydrocarbons.
VOCs = TCL Volatile Organic Compounds.
X = Analysis performed.

Table 3-4

INORGANIC ANALYTES DETECTED IN SURFACE WATER SAMPLES ROBLIN STEEL SITE (all values reported in μg/L except as noted)

Analyte	SW-1 Cooling Pond	SW-3 Pickling Basin	NYSDEC Class D Surface Water Standards and Guidance Values[a]
Aluminum	278	100	NA
Arsenic	6.0	ND	360
Barium	37.8	18.0	NA
Calcium	47,700	90,100	NA
Cobalt	4.1	ND	110 G
Copper	90.7	13.8	26/41[b]
Iron	17,800 J	2,860 J	300
Lead	40.1 J	14.7 J	138/258[b]
Magnesium	7,380	5,010	NA
Manganese	248 J	155 J	NA
Nickel	85.5	25.2	2,510/3,660[b]
Potassium	3,410	6,910	NA
Sodium	6,270 J	33,100 J	NA
Zinc	230	323	450/678[b]
Hardness (mg/L as $CaCO_3$)	150	246	NA

Note: Shaded values exceed Class D Standards. Samples collected July 15, 1993.

[a] NYSDEC 1993.
[b] Standard is a function of hardness as respectively shown.

Key:

J = Reported value is estimated.
G = Guidance value.
NA = No applicable standard or guidance value.
ND = Not detected.

Table 3-5

ANALYTICAL RESULTS SUMMARY FOR OIL/SLUDGE SAMPLE SW-2 ROBLIN STEEL SITE

.Analysis	Result	Regulatory Level (6NYCRR 371.3)
Reactivity		
• Total sulfide (mg/L)	18 J	500
• Total cyanide (mg/L)	ND	250
Corrosivity (pH)	7.0	2 < pH < 12.5
Ignitability	No flash @ 140°F	No flash below 140°F
PCBs in liquid (mg/kg)		
• Aroclor-1254	1.1 J	50 mg/kg
Petroleum Products (μg/sample)		
• Lube oil	L	—
TCLP Purgeables (mg/L)	ND	—
TCLP BNA (mg/L)	ND	—
TCLP Metals (mg/L)		
• Barium	2.8	100
• Lead	0.098	5

Note: Sample collected July 15, 1993. SW-2 was an oil/sludge sample collected from a trough in the rolling mill building.

Key:

BNA = Base/neutral and acid extractables.
J = Reported value is estimated.
L = Present below quantitation limit (1,000 μg/sample).
ND = Not detected.
TCLP = Toxicity characteristic leaching procedure.

Table 3-6

ORGANIC COMPOUNDS DETECTED IN SEDIMENT AND SURFACE SOIL SAMPLES ROBLIN STEEL SITE (all values reported in μg/kg except as noted)

Compound	SED-1	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
Volatiles									
Acetone	ND	6 J	ND	180 J	ND	110 J	ND	6 J	1,900 E
Carbon disulfide	6 J	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	25	ND	ND	56 J	ND	ND	ND	ND	480 E
2-Hexanone	ND	ND	ND	40 J	ND	ND	ND	ND	280 E
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	120
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	380 E
Toluene	42	ND	ND	8 J	ND	ND	ND	ND	9 J
Total xylenes	ND	ND	ND	ND	ND	ND	ND	ND	13 J
Semivolatiles									
Total PAHs	ND	20,000 J	3,300 J	ND	5,700 J	44,000 J	ND	520 J	1,100,000 J
Dibenzofuran	ND	160 J	ND	ND	ND	ND	ND	ND	16,000 J
Carbazole	ND	ND	ND	ND	ND	350 J	ND	ND	31,000 J
Hexachlorobenzene	ND	ND	ND	ND	9,600 J	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	1,700 J	57 J	ND	ND	ND	ND	160 J	ND	ND
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND	2.4 J	ND
4,4'-DDE	ND	ND	ND	ND	ND	4.6 J	ND	ND	ND

Key at end of table.

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Table 3-6

ORGANIC COMPOUNDS DETECTED IN SEDIMENT AND SURFACE SOIL SAMPLES
ROBLIN STEEL SITE
(all values reported in μg/kg except as noted)

Compound	SED-1	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
4,4'-DDT	ND	ND	ND	ND	ND	9.4 J	ND	13 J	ND
gamma-Chlordane	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	390	ND
TRPH (mg/kg)	NA	NA	NA	82,000	NA	NA	NA	NA	NA

Note: Samples collected July 15, 1993.

Key:

E = Reported value is estimated due to quantification above the instrument calibration range.
J = Reported value is estimated.
NA = Not analyzed.
ND = Not detected.
TRPH = Total recoverable petroleum hydrocarbons.

Key at end of table.

Table 3-7

INORGANIC ANALYTES DETECTED IN SEDIMENT AND SURFACE SOIL SAMPLES ROBLIN STEEL SITE (mg/kg)

Analyte	SED-1	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	Background Concentrations in Eastern U.S. Soils[a]	
										Upper Limit of the 90th Percentile	Observed Range
Aluminum	327	4,860	471	415	2,340	3,730	784	5,860	4,230	128,000	7,000 - >100,000
Arsenic	34.4 J	11.9 J	35.6 J	36.8 J	3.5 J	16.2 J	22.0 J	4.3	J6.8	16	<0.1 73
Barium	17.6	60.7	19.5	16.2	58.1	143	16.9	61.8	264	867	10 1,500
Beryllium	ND	0.49	ND	ND	ND	0.64	ND	0.43	0.34	1.81	<1 - 7
Cadmium	21.3	26.7	12.9	8.0	ND	1.3	5.1	1.4	4.1	NA	0.01 - 7[b]
Calcium	2,550 J	24,500 J	4,400 J	1,390 J	124,000 J	9,980 J	3,320 J	7,120 J	75,300 J	14,400	100 - 280,000
Chromium	705	31.5	576	445	19.9	60.8	543	20.8	42.3	112	1 - 1,000
Cobalt	92.6 J	17.5	71.3 J	59.1 J	4.0	20.4	48.2 J	8.8	8.3	19.8	<0.3 - 70
Copper	948	324	569	624	8.1	104	343	41.5	172	48.7	<1 - 700
Iron	442,000 J	48,500 J	307,000 J	245,000 J	15,000 J	60,900 J	202,000 J	20,300 J	22,200 J	54,100	100 - >100,000
Lead	308 J	3,920 J	248 J	270 J	25.3	115 J	125 J	229 J	103 J	33	<10 - 300
Magnesium	305 J	2,670 J	1,040 J	265 J	1,200 J	1,660 J	83.2 J	3,580 J	25,300 J	10,700	50 - 50,000
Manganese	4,090 J	445 J	2,900 J	2,350 J	95.6 J	1,090 J	1,850 J	252 J	478 J	1,450	<2 - 7,000
Mercury	ND	0.38 J	ND	ND	0.42 J	0.40 J	0.13 J	ND	0.34 J	0.265	0.01 - 3.4
Nickel	644 J	45.7	452 J	440 J	9.2	67.7	372 J	22.5	59.5	38.2	<5 - 700

Key at end of table.

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Table 3-7

INORGANIC ANALYTES DETECTED IN SEDIMENT AND SURFACE SOIL SAMPLES
ROBLIN STEEL SITE
(mg/kg)

Analyte	SED-1	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	Background Concentrations in Eastern U.S. Soils[a]	
										Upper Limit of the 90th Percentile	Observed Range
Potassium	ND	ND	ND	ND	ND	693	ND	521	2,950	23,500	50 - 37,000
Selenium	ND	0.51 J	ND	0.29 J	ND	0.76 J	ND	0.26 J	ND	0.941	<0.1 - 3.9
Sodium	ND	103	ND	ND	131	ND	ND	ND	2,240	17,400	<500 - 50,000
Vanadium	ND	19.6	ND	ND	4.1	19.9	ND	18.9	ND	140	<7 - 300
Zinc	84.1 J	404 J	67.5 J	90.4 J	53.1 J	188 J	16.4 J	153 J	605 J	104	<5 - 2,900
Cyanide	ND	ND	ND	ND	ND	ND	ND	1.1	1.1	NA	NA

Note: Shaded values exceed upper limit of the 90th percentile and/or the observed range. Samples collected July 15, 1993.

[a] Shacklette and Boerngen 1984, except as noted.
[b] Dragun 1988.

Key:

J = Reported value is estimated.
NA = No applicable value.
ND = Not detected.

Table 3-8

EP TOXICITY METALS RESULTS FOR SURFACE SOIL SAMPLES ROBLIN STEEL SITE (μg/L)

Analyte	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	Regulatory Level[a]
Barium	563	78	94.8	211	259	170	530	79.1	100,000
Cadmium	345	6.9	4.3	ND	3.1	ND	ND	60.5	1,000
Chromium	ND	8.4	13.1	5.2	10.1	98.2	ND	23.7	5,000
Lead	16,200	107	99	ND	ND	135	291	89.8	5,000
Selenium	ND	ND	ND	ND	564	ND	ND	ND	1,000

Note: Shaded value exceeds regulatory level. Samples collected July 15, 1993.

[a] 6 NYCRR 371.3.

Key:

ND = Not detected.

Table 3-9

**ORGANIC COMPOUNDS DETECTED IN WASTE SAMPLES
ROBLIN STEEL SITE
(μg/kg)**

Compound	W-1	W-2	W-3	W-4	W-5
Volatiles					
Tetrachloroethene	ND	ND	ND	10 J	ND
Semivolatiles					
Total PAHs	3,800,000 J	ND	ND	ND	ND
Dibenzofuran	55,000 J	ND	ND	ND	ND
Carbazole	110,000 J	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ND	250 J	920 J	ND	510 J
Endosulfan sulfate	110 J	ND	ND	R	ND
Aroclor-1260 (PCB)	ND	ND	ND	R	140

Note: Samples collected July 15, 1993.

Key:

J = Reported value is estimated.
ND = Not detected.
R = Rejected.

Table 3-10

INORGANIC ANALYTES DETECTED IN WASTE SAMPLES
ROBLIN STEEL SITE
(mg/kg)

Analyte	W-1	W-2	W-3	W-4	W-5	Background Concentrations in Eastern U.S. Soils[a]	
						Upper Limit of the 90th Percentile	Observed Range
Aluminum	10,500	125	147	275	238	128,000	7,000 - >100,000
Arsenic	36.3 J	14.8 J	15.3 J	34.6 J	6.3 J	16.0	<0.1 - 73
Barium	293	12.7	9.0	15.5	27.5	867	10 - 1,500
Beryllium	2.6	ND	ND	ND	ND	1.81	<1 - 7
Cadmium	3.4	15.1	5.7	9.3	7.9	NA	0.01 - 7[b]
Calcium	26,300 J	547	5,310 J	706	447	14,400	100 - 280,000
Chromium	136	769	524	581	290	112	1 - 1,000
Cobalt	32.5	70.2 J	47.9 J	63.2 J	47.2 J	19.8	<0.3 - 70
Copper	98.8	435	391	596	254	48.7	<1 - 700
Iron	49,300 J	357,000 J	210,000 J	270,000 J	230,000 J	54,100	100 - >100,000
Lead	209 J	79.5 J	94.7 J	225 J	65.2 J	33.0	<10 - 300
Magnesium	4,510 J	ND	2,510 J	ND	ND	10,700	50 - 50,000
Manganese	1,300 J	3,510 J	1,980 J	2,560 J	1,920 J	1,450	<2 - 7,000
Mercury	0.45 J	ND	ND	ND	0.11 J	0.265	0.01 - 3.4
Nickel	92.4	321 J	313 J	425 J	133 J	38.2	<5 - 700
Potassium	1,150	ND	ND	ND	39.8	23,500	50 - 37,000
Selenium	0.99 J	ND	ND	ND	ND	0.941	<0.1 - 3.9
Sodium	313	ND	ND	ND	113	17,400	<500 - 50,000
Thallium	0.71	ND	ND	ND	ND	13.8	22 - 23
Vanadium	60.9	ND	ND	ND	ND	140	<7 - 300
Zinc	516 J	22.1 J	21.0 J	64.1 J	411 J	104	<5 - 2,900

Note: Shaded values exceed upper limit of the 90th percentile and/or the observed range.
Samples collected July 15, 1993.

[a] Shacklette and Boerngen 1984, except as noted.
[b] Dragun 1988.

Key:

J = Reported value is estimated.
NA = No applicable value.
ND = Not detected.

Table 3-11

HAZARDOUS WASTE CHARACTERISTICS RESULTS FOR WASTE SAMPLES ROBLIN STEEL SITE

Analyte	W-1	W-2	W-3	W-4	W-5	Regulatory Level[a]
EP Toxicity Metals (μg/L)						
Barium	990	64.2	65.1	42.1	103	100,000
Cadmium	4.6	ND	ND	ND	8.1	1,000
Chromium	10.3	10.4	14.0	7.7	11.2	5,000
Lead	61.3	ND	25.1	42.4	46.3	5,000
Reactivity (mg/kg)						
• Total sulfide	NA	NA	67 J	155 J	100 J	500
• Total cyanide	ND	ND	ND	ND	ND	250
Corrosivity (pH)	NA	NA	6.8	6.3	7.4	$2 < pH < 12.5$
Ignitability	NA	NA	No flash at 140°F	No flash at 140°F	No flash at 140°F	No flash below 140°F

Note: Samples collected July 15, 1993.

[a] 6 NYCRR 371.3.

Key:

J = Reported value is estimated.
NA = Not analyzed.
ND = Not detected.

Table 3-12

SUBSURFACE SOIL SAMPLING SUMMARY
ROBLIN STEEL SITE

Well	Sample I.D.	Sample Depth (feet BGS)	Sample Date	Analysis	FID Reading (ppm)	Comments
GW-2	GW-2A	4.0 - 5.4	10-8-93	Full TCL	5.2	
GW-4S	GW-4SYS3	8 - 10	10-25-93	TCL VOCs	6.0	
G-5	GW-5A	4.0 - 5.9	10-14-93	Full TCL	6.0	
GW-7S	GW-7A	4.0 - 6.0	10-19-93	Full TCL	38	Diesel fuel odor and sheen.

Key:

BGS = Below ground surface.
FID = Flame ionization detector (organic vapor analyzer).
TCL = Target compound list.
VOCs = Volatile organic compounds.

Table 3-13

ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES ROBLIN STEEL SITE (μg/kg)

Compound	GW-2A (4-6 feet)	GW-4SYS3 (8-10 feet)	GW-5A (4-6 feet)	GW-7A (4-6 feet)
Volatiles				
Acetone	8 J	17 J	ND	ND
Semivolatiles				
Total PAHs	ND	NA	600 J	560 J
Di-n-octylphthalate	ND	NA	49 J	ND
4,4'-DDT	220	NA	ND	ND

Note: See Table 3-12 for sample collection dates.

Key:

J = Reported value is estimated.
NA = Sample not analyzed for semivolatiles.
ND = Not detected.

Table 3-14

INORGANIC ANALYTES DETECTED IN SUBSURFACE SOIL SAMPLES ROBLIN STEEL SITE (mg/kg)

Analyte	GW-2A (4-6 feet)	GW-5A (4-6 feet)	GW-7A (4-6 feet)	Background Concentrations in Eastern U.S. Soils[a]	
				Upper Limit of the 90th Percentile	Observed Range
Aluminum	14,800	8,890	8,800	128,000	7,000 - >100,000
Arsenic	0.98	3.3	6.2	16.0	<0.1 - 73
Barium	93.1	63.9	40.3	867	10 - 1,500
Beryllium	0.55	0.51	0.92	1.81	<1 - 7
Cadmium	1.2	2.3	3.0	NA	0.01 - 7[b]
Calcium	3,190 J	18,500 J	1,120	14,400	100 - 280,000
Chromium	17.5	16.4	15.1	112	1 - 1,000
Cobalt	6.6	14.0	14.0	19.8	<0.3 - 70
Copper	14.8	23.1	73.7	48.7	<1 - 700
Iron	9,490	21,200	26,600	54,100	100 - >100,000
Lead	11.1 J	7.1 J	10.7	33.0	<10 - 300
Magnesium	2,350 J	3,930 J	1,600	10,700	50 - 50,000
Manganese	102	295	101	1,450	<2 - 7,000
Nickel	14.4	25.6	25.3	38.2	<5 - 700
Potassium	1,450	826	730	23,500	50 - 37,000
Selenium	0.41 J	ND	ND	0.941	<0.1 - 3.9
Sodium	ND	152	ND	17,400	<500 - 50,000
Thallium	0.25	ND	ND	13.8	2.2 - 23
Vanadium	17.9	23.3	26.0	140	<7 - 300
Zinc	91.8	78.9	67.4	104	<5 - 2,900

Note: Shaded values exceed upper limit of the 90th percentile but not the observed range.
See Table 3-13 for sample collection dates.

[a] Shacklette and Boerngen 1984, except as noted.
[b] Dragun 1988.

Key:

J = Reported value is estimated.
NA = No applicable value.
ND = Not detected.

Table 3-15

ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES FROM SHALLOW WELLS ROBLIN STEEL SITE (μg/L)

Compound	GW-3S	GW-4S	GW-7S	GW-8S	NYSDEC Class GA Groundwater Standards[a]
Volatiles					
Total 1,2-Dichloroethene	70	ND	ND	ND	5[b]
1,2-Dichloroethane	5 J	6 J	ND	ND	5
Trichloroethene	86	ND	ND	ND	5
Tetrachloroethene	180	ND	ND	ND	5
Semivolatiles					
bis(2-Ethylhexyl)phthalate	1 J	1 J	ND	3 J	50
Endosulfan sulfate	0.19 J	ND	ND	ND	NA
4,4'-DDT	ND	0.11 J	ND	ND	NDC

Note: Shaded values exceed the NYSDEC Class GA Standard.
Samples collected November 9 and 10, 1993.

a NYSDEC 1993.
b Applies to individual cis- and trans- isomers.

Key:

J = Reported value is estimated.
NA = No applicable standard or guidance value.
ND = Not detected.
NDC = Standard is no detectable concentration.

Table 3-16

ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES FROM DEEP WELLS ROBLIN STEEL SITE (μg/L)

Compound	GW-1	GW-2	GW-5	GW-6	GW-8	GW-9	NYSDEC Class GA Groundwater Standards[a]
Volatiles							
Acetone	ND	630	ND	390 E	ND	ND	50 G
Total 1,2-Dichloroethene	ND	ND	ND	4 J	ND	ND	5[b]
1,2-Dichloroethane	6 J	6 J	ND	6 J	ND	4 J	5
Trichloroethene	ND	ND	ND	ND	5 J	ND	5
Semivolatiles							
bis(2-Ethylhexyl)phthalate	2 J	ND	2 J	1 J	1 J	ND	50
Endosulfan sulfate	ND	ND	ND	ND	ND	0.15 J	NA

Note: Shaded values exceed the NYSDEC Class GA Standard.
Samples collected November 9 and 10, 1993.

a NYSDEC 1993.
b Applies to individual cis- and trans- isomers.

Key:

E = Reported value is considered estimated due to quantitation above the instrument calibration range.
G = Guidance value.
J = Reported value is estimated.
NA = No applicable standard or guidance value.
ND = Not detected.

Table 3-17

INORGANIC ANALYTES DETECTED IN GROUNDWATER SAMPLES FROM SHALLOW WELLS ROBLIN STEEL SITE

(all values reported in μg/L except as noted)

Analyte	GW-3S	GW-4S	GW-7S	GW-8S	NYSDEC Class GA Groundwater Standards and Guidance Values[a]
Turbidity (NTUs):	>200	>50	21	>50	
Aluminum	22,500	4,460	461	2,820	NA
Arsenic	14.6	3.2	11.8	ND	25
Barium	17.3	61.8	44.7	57.8	1,000
Beryllium	1.2	0.30	ND	ND	3 G
Calcium	245,000	111,000	86,100	264,000	NA
Chromium	36.7	10.0	ND	5.9	50
Cobalt	26.2	ND	ND	ND	NA
Copper	55.6	15.1	ND	22.1	200
Iron	40,500	7,280	1,820	5,680	300
Lead	23.6	14.9	3.5	5.7	25
Magnesium	44,000	32,000	18,200	51,400	35,000 G
Manganese	2,200	250	725	978	300
Nickel	48.7	10.9	ND	11.8	NA
Potassium	5,930	3,140	ND	1,640	NA

Key at end of table.

Table 3-17

INORGANIC ANALYTES DETECTED IN GROUNDWATER SAMPLES FROM SHALLOW WELLS ROBLIN STEEL SITE (all values reported in μg/L except as noted)

	GW-3S	GW-4S	GW-7S	GW-8S	NYSDEC Class GA Groundwater Standards and Guidance Values[a]
Analyte **Turbidity (NTUs):**	**>200**	**>50**	**21**	**>50**	
Sodium	4,060	19,800	18,200	49,400	20,000
Vanadium	45.9	79.9	ND	9.3	NA
Zinc	148	79.9	146	342	300

Note: Shaded values exceed NYSDEC Class GA standards or guidance values.
Samples collected November 10 and 11, 1993.
Turbidities were measured in the field at the time of sample collection.

a NYSDEC 1993.

Key:

G = Guidance value.
J = Reported value is estimated.
NA = No applicable standard or guidance value.
ND = Not detected.
NTUs = Nephelometric Turbidity Units.

Table 3-18

INORGANIC ANALYTES DETECTED IN GROUNDWATER SAMPLES FROM DEEP WELLS ROBLIN STEEL SITE (μg/L)

Analyte	GW-1	GW-2	GW-5	GW-6	GW-8	GW-9	NYSDEC Class GA Groundwater Standards and Guidance Values[a]
Turbidity (NTUs):	>50	<50	>200	>200	>50	101	
Aluminum	7,140	788	39,100	49,700	62,900	1,730	NA
Arsenic	3.7	14	15.6	21.6	19.8	3.0	25
Barium	131	22.7	392	434	580	77.7	1,000
Beryllium	0.35	ND	1.9	2.5	2.9	ND	3 G
Cadmium	ND	ND	3.8	8.9	11.2	ND	10
Calcium	98,400	397,000	444,000	359,000	487,000	58,600	NA
Chromium	13.7	ND	63.0	74.6	89.5	ND	50
Cobalt	7.7	ND	45.5	57.2	59.1	ND	NA
Copper	35.0	ND	96.8	110 J	131 J	3.5 J	200
Iron	11,000	986	60,800	77,100	87,200	2,400	300
Lead	18.6	1.7	75.2	76.6	84.3	ND	25
Magnesium	52,400	130,000	166,000	123,000	174,000	38,900	35,000 G
Manganese	444	121	2,340	2,560	3,140	98.0	300
Mercury	ND	ND	ND	ND	0.23	ND	2

Key at end of table.

Table 3-18

INORGANIC ANALYTES DETECTED IN GROUNDWATER SAMPLES FROM DEEP WELLS ROBLIN STEEL SITE (μg/L)

Analyte	GW-1	GW-2	GW-5	GW-6	GW-8	GW-9	NYSDEC Class GA Groundwater Standards and Guidance Values[a]
Turbidity (NTUs):	>50	<50	>200	>200	>50	101	
Nickel	14.2	ND	74.3	103	109	ND	NA
Potassium	25,500	17,800	20,800	14,700	23,700	11,300	NA
Selenium	1.3	ND	ND	ND	ND	1.1	10
Sodium	87,800	120,000	68,900	111,000	85,400	60,700	20,000
Vanadium	11.0	ND	70.7	91.8	114	ND	NA
Zinc	82.6	39.9	679	381 J	433 J	26.0 J	300

Note: Shaded values exceed NYSDEC Class GA standards or guidance values.
Samples collected November 10 and 11, 1993.

[a] NYSDEC 1993.

Key:

G = Guidance value.
J = Reported value is estimated.
NA = No applicable standard or guidance value.
ND = Not detected.
NTUs = Nephelometric turbidity units.

Table 3-19

DRUM INVENTORY
OCTOBER 26, 1993

Location	Number of Drums and Contents
Area A	31 55-gallon drums as follows: Eight empty Two 50% full from "Niagara Lubricant Company" One 10% full from "Niagara Lubricant Company" One full, liquid, "U.S. Polychemical Corp." One 50% full, liquid, "The State Chemical Manufacturing Co." Four partially full of garbage and oil Three of burnt garbage 11 unknown contents
	Two 25-gallon drums as follows: One empty One 50% full of garbage
Area B	10 55-gallon drums as follows: Four empty from "Niagara Lubricant Company" Three empty Three unknown liquids, 10, 75, and 100% full
Area C	Five 55-gallon drums as follows: Two empty Two nearly empty, unknown liquid One 25% full, unknown liquid from "Mobil Oil Corp"
Area D	Three 55-gallon drums as follows: One empty Two unknown (in pit and not easily accessible)
Area E	Seven 55-gallon drums as follows: One full, "Mobiltac E" One full, "No. (H) Col, Neck Shield, 50-60-PEN" grease Three empty One 50% full of tar, "Fiske, Ferroll Econo 13" One 50% full of heavy oil
	Five 20-gallon drums as follows: Three empty One 50% full, "multipurpose grease, type MPG-2, by Dubois Chemicals" One 10% full, unknown liquid, "Kano Laboratories, Inc., Nashville, TN" Six 5-gallon buckets and coffee cans of oil and tar
Area F	One 55-gallon drum, "Mobil Oil Corp., DTE oil, light"

Table 3-19

DRUM INVENTORY
OCTOBER 26, 1993

Location	Number of Drums and Contents
Area G	One 55-gallon drum, 33% full of unknown liquid
	Four 25-gallon drums as follows: Three empty One 50% full of waste oil
Area H	Two 15-gallon drums, empty, "muriatic acid (31.45% HCl)"
Area I	One 15-gallon drum, 10% full, "muriatic acid"
Area J	Two 55-gallon drums as follows: One empty One 5% full, "sulfuric acid"

Note: The drums in the above inventory were located in the rolling and wire mill buildings, and are in addition to those overpacked as part of NYSDEC's IRM performed in 1990.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

File searches and environmental sampling performed during this investigation of the Roblin Steel site have documented the presence of hazardous wastes at the site. These wastes include lead (above the EP Toxicity regulatory standard) in at least one surface soil sample collected adjacent to transformers located in the eastern portion of the site, and PCB-contaminated soil (above 50 ppm) near a former leaking transformer in the central portion of the site. Although a removal action was performed in 1992 by NYSDEC as part of an IRM to cleanup the leaking transformer and surrounding soils, soils sampled 3 feet outside the excavated area at the completion of the removal action contained 66.7 ppm of Aroclor 1260. Records of the removal action did not indicate final confirmation sampling and analysis within the excavated area.

The removal was performed in several stages, whereby 37 tons of soil was removed and high concentrations of Aroclor 1260 (3,000 to 4,000 ppm) still remained after each stage. The concentration of Aroclor 1260 ranged from 0.822 ppm to 3,360 ppm prior to the last soil removal effort which consisted of the removal of another 21 tons of soil. High concentrations of PCBs (i.e., thousands of ppm) may still remain on site based on this information, a NYSDEC memorandum (Hyden 1992c), and the New York State Registry of Inactive Hazardous Waste Sites. This IRM also included the draining and removal of the leaking transformer, removal of the concrete pad housing this transformer, and removal of six of the seven drums containing corrosive and ignitable wastes overpacked during a 1990 investigation. One of the overpacked drums originally containing corrosive wastes was found to be empty at the time of disposal. Therefore, it is likely that contents of the overpacked drum leaked between 1990 and 1992. Forty-one drums containing the transformer fluid and liquids (i.e., diesel fuel and hexane) used to flush the transformer remained on site until 1993, when 18 drums were removed. Based on available file information, the whereabouts of the remaining 23 drums is unknown.

During facility operations, many types of industrial wastes were generated, including phosphate sludge, lime, HKS dust, and waste oil. Some of these wastes are classified as hazardous, including spent pickle liquor and HKS dust containing cadmium at a level exceeding the EP toxicity regulatory levels. However, disposal of these wastes, except the HKS dust, was determined to be off site. HKS dust disposal practices are unknown.

Other potentially hazardous wastes remain on site. Drums with unknown contents, drums labeled muriatic acid and sulfuric acid, and drums containing various types of oil remain on site and are potentially hazardous. Additional transformers remain in three areas and are suspected to contain PCB oils, because low concentrations of PCBs were detected in soil samples collected from each area.

The site also poses threats to public health and the environment from off site migration pathways. For example, shallow and deep overburden groundwater quality has been impacted. Although groundwater is not used as a drinking water source in this area, contaminants may migrate to the Niagara River which is a principal public water source (i.e., there is a drinking water intake approximately 6.5 miles downgradient of the site). Chlorinated solvents and their degradation products (PCE, TCE, and 1,2-DCE) exceeded NYSDEC Class GA standards in on-site well GW-3S and were present below standards in GW-6 and GW-8. Acetone was also present above the groundwater standard in GW-2 and GW-6. The source of these compounds could not be determined during this investigation, however, they may be due to on site disposal, or poor handling practices. In addition, pesticides were detected in three on-site wells, and several metals exceeded groundwater standards in all wells. However, the presence of metals may have been due to the high turbidities of the groundwater samples. Samples with higher turbidities contained more metals (e.g. chromium, lead, manganese, and zinc) exceeding standards than samples with lower turbidities. These samples with higher turbidities also had much higher aluminum and iron concentrations which are good indications of the effect of particulates on sample analyses.

Metals were detected at high levels in sediment, surface soil, and waste samples relative to background ranges in eastern U.S. soils. Many of these metals exceeded the upper limits of the 90th percentile. However, cadmium, cobalt, copper, iron, and lead are of particular concern because their concentrations exceeded the observed ranges in one or more media. Several organic compounds were also detected in sediment and surface soil samples. PCE was detected in a sample from the wire mill building floor (SS-8), indicating that organic solvents and degreasers were probably used on site. The relatively high concentrations of PAHs, dibenzofuran, and TRPH detected in surface soil samples and waste samples indicate that waste oils may have been spilled on site or possibly used for dust suppression. Waste oil was also present in the trough inside the rolling mill building.

Other site-related hazards include the presence of asbestos and USTs; the threat of fire; and physical safety hazards. The unrestricted access to the site, deteriorated condition of the buildings, and presence of overhead equipment, debris piles, broken glass, below-grade pits, and troughs pose many physical hazards to individuals entering the site.

Two USTs that have not been properly decommissioned remain at the site and may have impacted or may be impacting groundwater quality at the site. In addition, the detection of an oil sheen and high flame ionization detector (FID) readings in the soil from well boring GW-7S and the presence of a vent or fill pipe observed in the immediate area may indicate that a UST may exist along the west-central border of the site.

4.2 RECOMMENDATIONS

Based on the presence of hazardous wastes at the site (i.e., lead- and PCB-contaminated soil), it is recommended that the Roblin Steel site be reclassified as a Class 2 site. The presence of these hazardous wastes at the site poses significant threats to public health and the environment, especially via direct contact to individuals on site. In order to mitigate this threat and control access to the site, it is recommended that the perimeter fencing be repaired and maintained. Groundwater contamination migration pathways also pose a threat to public health and the environment. Both organic and inorganic contaminants exceeded Class GA drinking water standards, and groundwater flow to the Niagara River may impact drinking water intakes.

Further investigation in support of future remedial activities is also recommended. Areas of concern include waste piles, surface soil containing high levels of metals and petroleum hydrocarbons, drums, USTs, transformers, asbestos, and the cooling pond. Future investigations should include an extensive soil sampling program in support of surface soil and waste pile remediation, which may include removal and/or capping. Soil sampling in the former shipping/receiving area on the south side of the site may be useful in identifying any additional areas of contamination.

The remaining drums and other containers on site should be thoroughly inventoried, sampled, and properly disposed of. Because the transformers and cooling pond are possible sources of contamination, they should be properly drained and removed.

The USTs are suspected contamination sources and should be closed in accordance with 6 NYCRR 613.9. To locate additional USTs, geophysical surveys should be employed in suspect areas. In addition, passive or active soil gas sampling may be useful in determining the presence or absence of petroleum hydrocarbons and chlorinated compounds in the subsurface soils.

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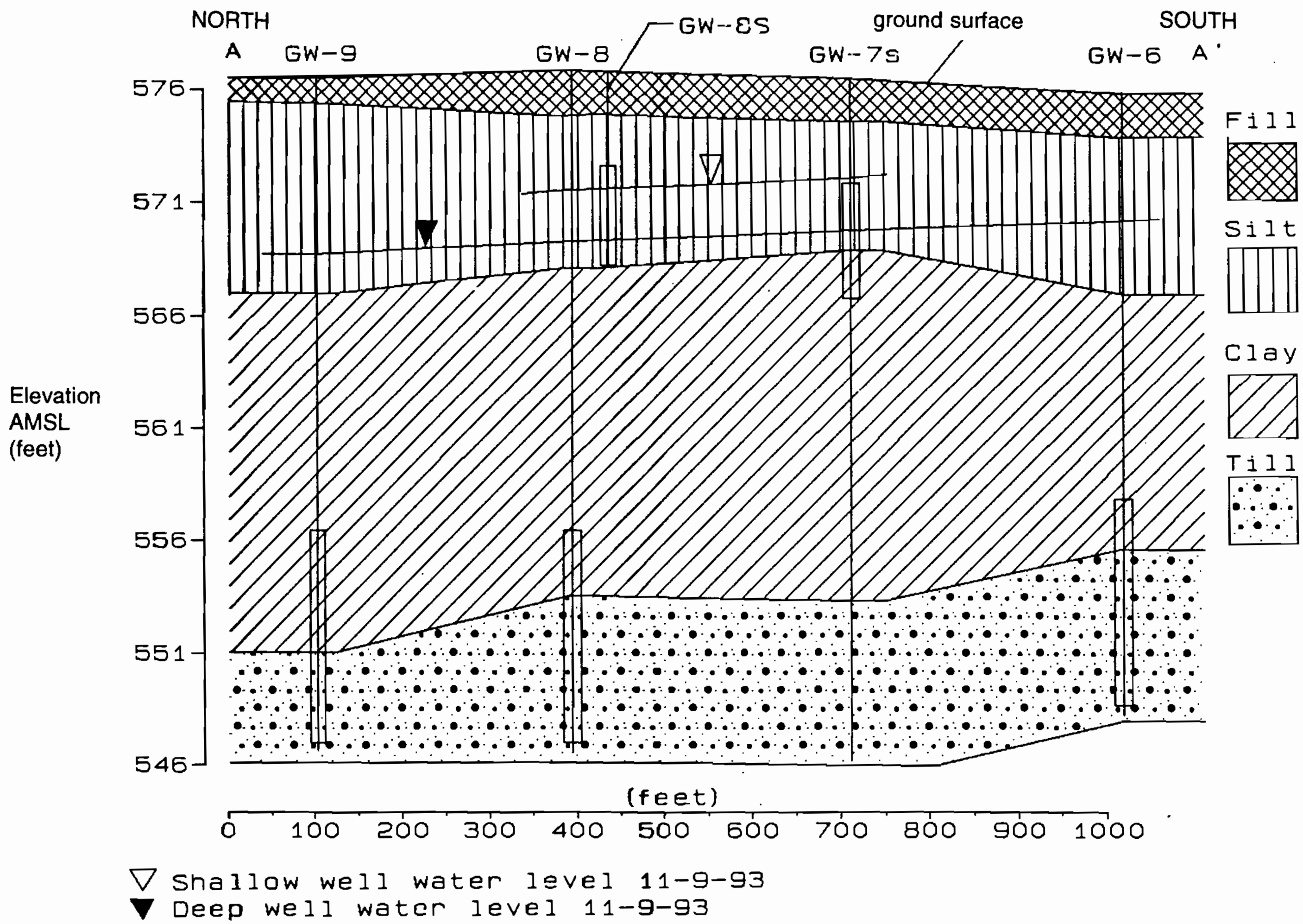


Figure 3-2 GEOLOGIC CROSS SECTION A-A', ROBLIN STEEL

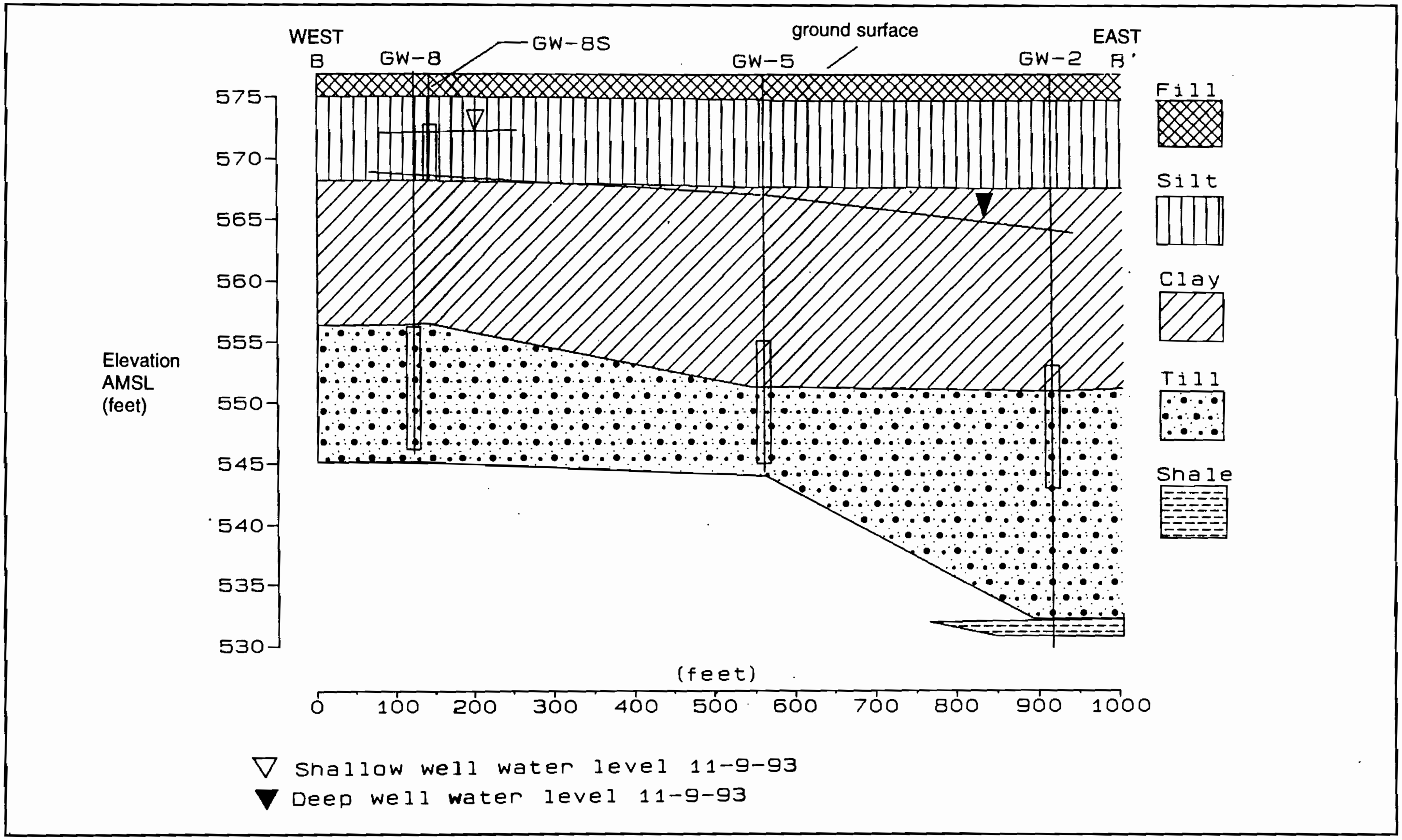
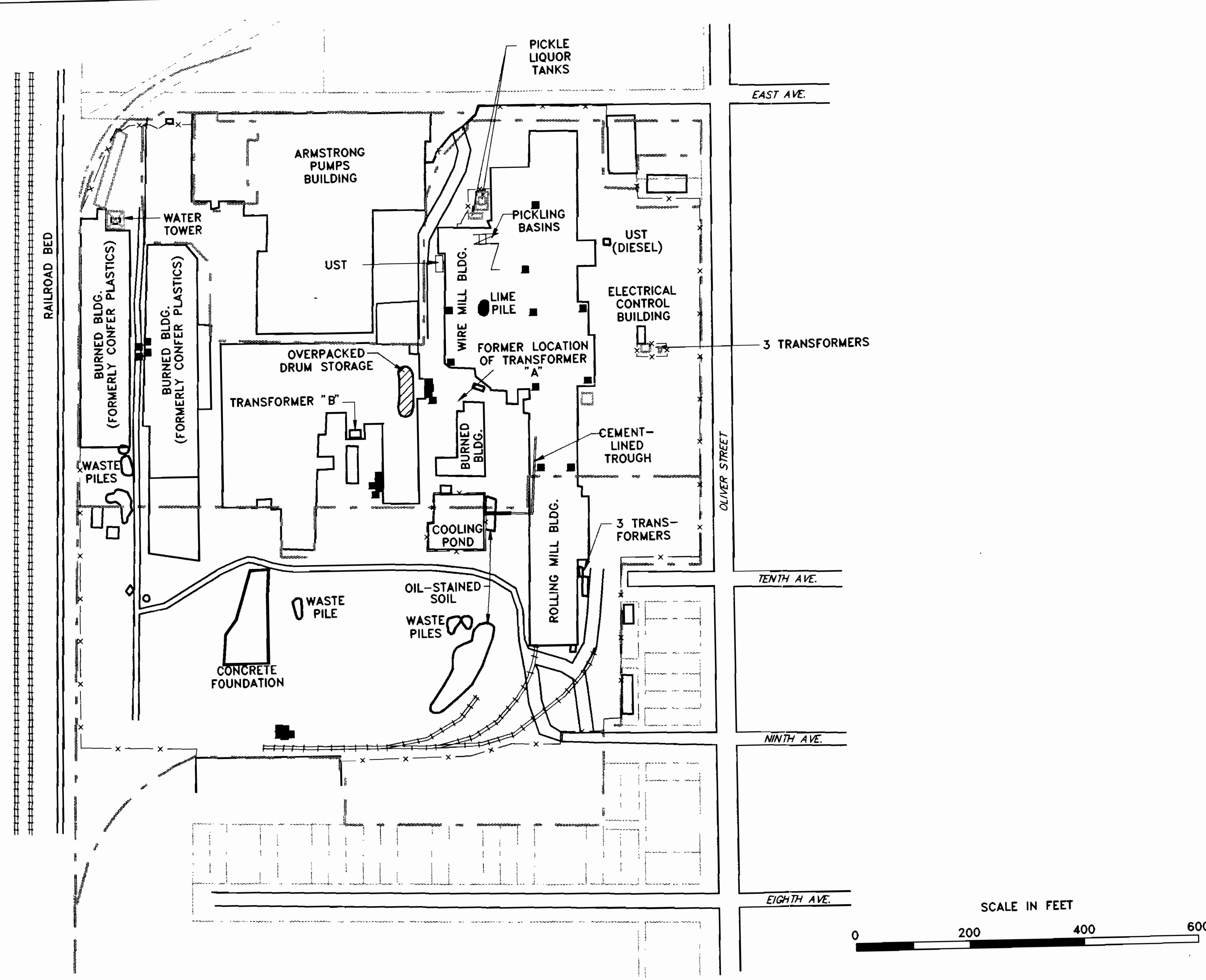


Figure 3-3 GEOLOGIC CROSS SECTION B-B', ROBLIN STEEL

YS3S002B



NOTE:

ALL HORIZONTAL COORDINATES ARE ON AN ASSUMED SYSTEM.

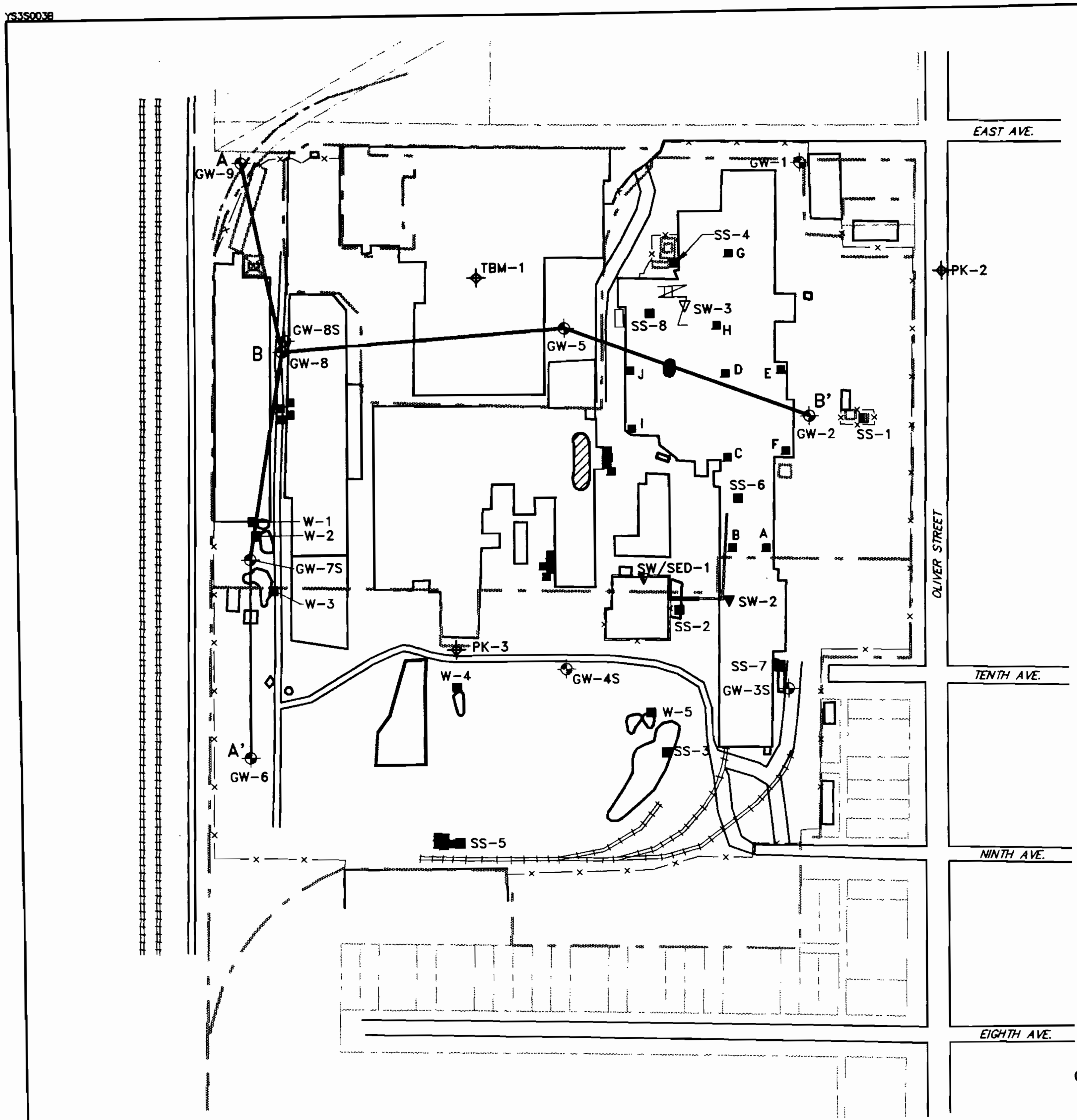
VERTICAL DATUM REFERENCE BENCHMARK NGS D412 (A STANDARD DISK SET IN THE BASE OF A RADIO TOWER 150 FEET HIGH, PAINTED ORANGE AND WHITE ON THE WEST SIDE OF 900 RIVER ROAD. ELEV. ≈ 574.14 FT.)

PROPERTY LINES SHOWN ARE BASED ON TAX MAP NUMBERS 181.12 & 181.52 AND ARE APPROX. ONLY

LEGEND

- ⊠ APPROXIMATE LOCATION OF DRUM(S)
- —×— FENCE
- APPROXIMATE R.O.W./PROPERTY LINE
- EDGE OF PAVEMENT/FOUNDATION

Figure 1-2 SITE MAP ROBLIN STEEL



ROBLIN STEEL POINT COORDINATES		
LOCATION	NORTH COORDINATE	EAST COORDINATE
WELLS		
GW-1	9941.9940	10789.2424
GW-2	9480.8103	10770.9932
GW-3S	9119.5482	10756.4794
GW-4S	9155.9900	10410.5649
GW-5	9687.4503	10416.2706
GW-6	9024.4422	9911.4937
GW-7S	9334.2657	9916.8692
GW-8	9659.7725	9972.9654
GW-8S	9669.5112	9977.7066
GW-9	9954.1179	9913.6647
SAMPLES		
SW/SED-1	9300.0617	10528.9610
SW-2	9260.2971	10656.7206
SW-3	9739.2110	10604.3199
SS-1	9542.9502	10884.0449
SS-2	9246.6530	10585.9092
SS-3	9024.0627	10558.4948
SS-4	9779.5909	10580.7917
SS-5	8887.1541	10240.9626
SS-6	9418.1843	10683.4095
SS-7	9157.5827	10742.6836
SS-8	9702.8898	10561.8110
W-1	9382.8629	9937.4081
W-2	9375.8606	9935.2908
W-3	9291.2715	9948.8862
W-4	9111.7327	10243.0762
W-5	9077.9805	10533.8373
REFERENCE POINTS		
TBM-1	10,000.00	10,000.00
PK-2	10,000.00	10,727.54
PK-3	9419.38	9958.74

NOTE:
SEE TABLE 3-1 FOR WELL ELEVATIONS.

SCALE IN FEET
0 200 400 600

LEGEND

- ■SS — SURFACE SOIL SAMPLE
- GW — MONITORING WELL
- ▽SW — SURFACE WATER SAMPLE
- SW/SED — SURFACE WATER AND SEDIMENT SAMPLE
- ▼SW — OIL/SLUDGE SAMPLE
- APPROXIMATE LOCATION OF DRUM(S) (LETTERS CORRESPOND TO TO AREAS LISTED ON TABLE 3-20)
- SURVEY REFERENCE POINT
- —x— FENCE
- APPROXIMATE R.O.W./PROPERTY LINE
- EDGE OF PAVEMENT/FOUNDATION
- A———A' LOCATION OF GEOLOGIC CROSS-SECTION

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Figure 3-1 SAMPLE LOCATION MAP
ROBLIN STEEL

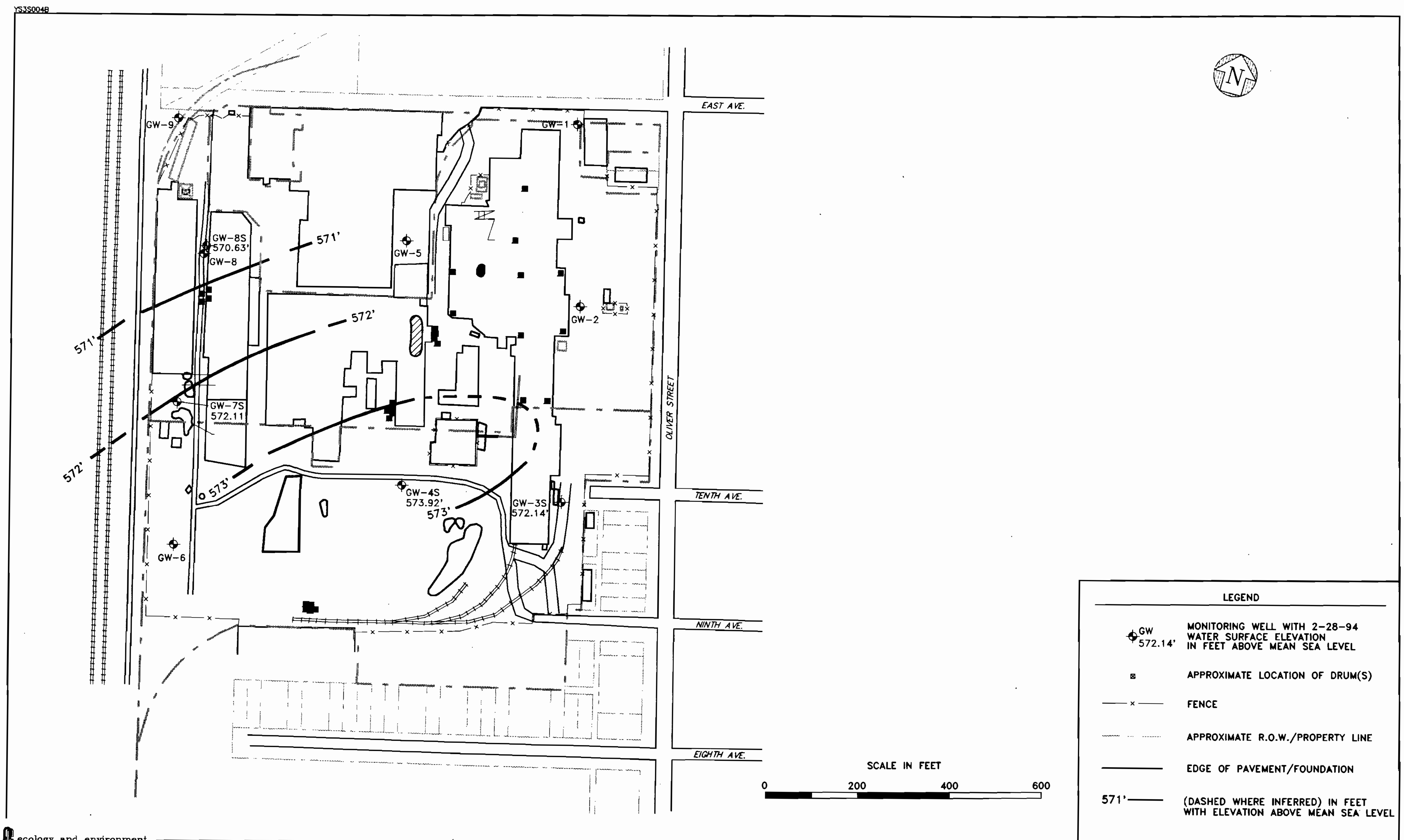

Figure 3-4 POTENTIOMETRIC SURFACE CONTOUR MAP
SHALLOW OVERBURDEN WELLS
FEBRUARY 28, 1994
ROBLIN STEEL SITE

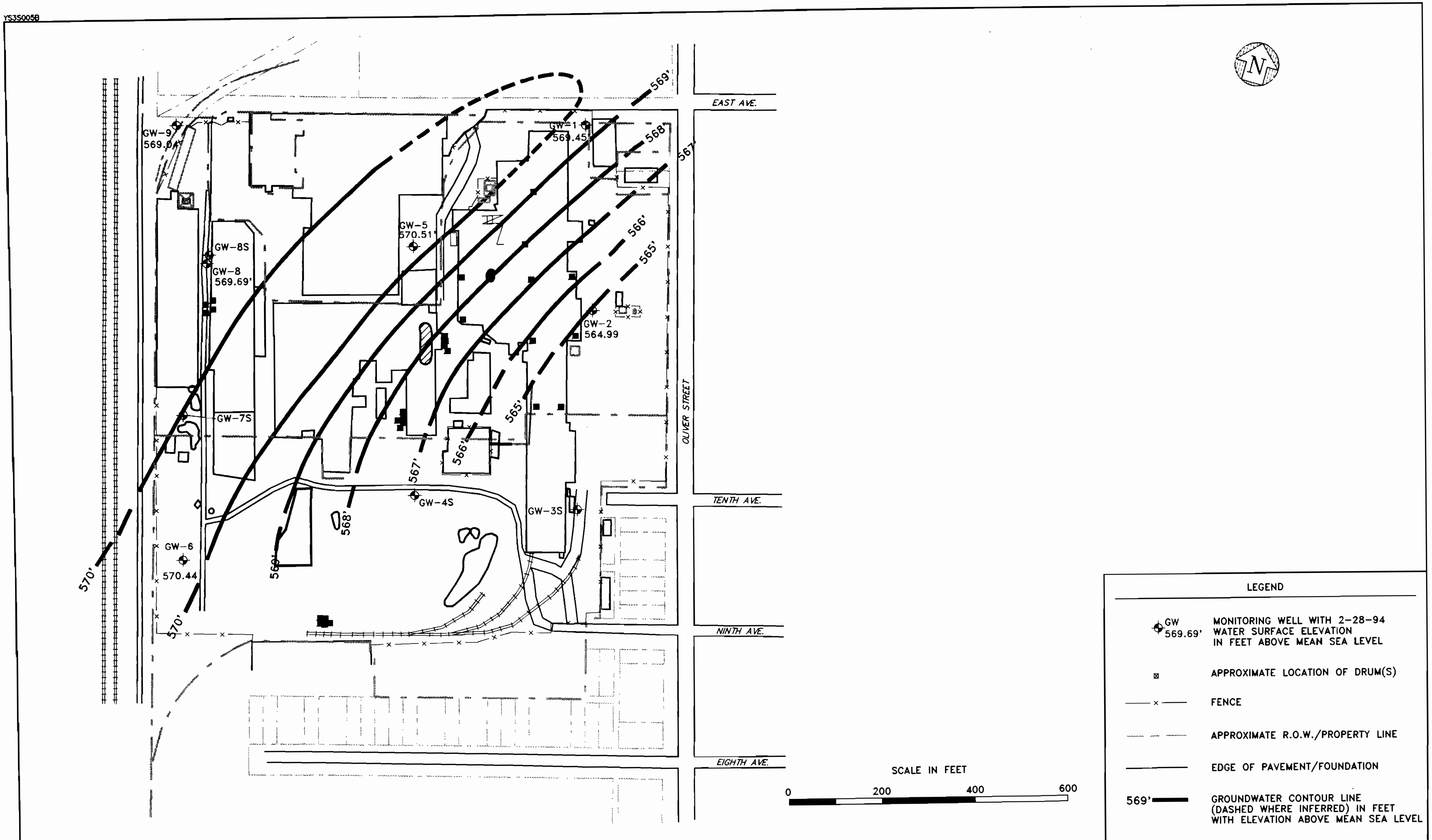

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Figure 3-5 POTENTIOMETRIC SURFACE CONTOUR MAP
DEEP OVERBURDEN WELLS
FEBRUARY 28, 1994
ROBLIN STEEL

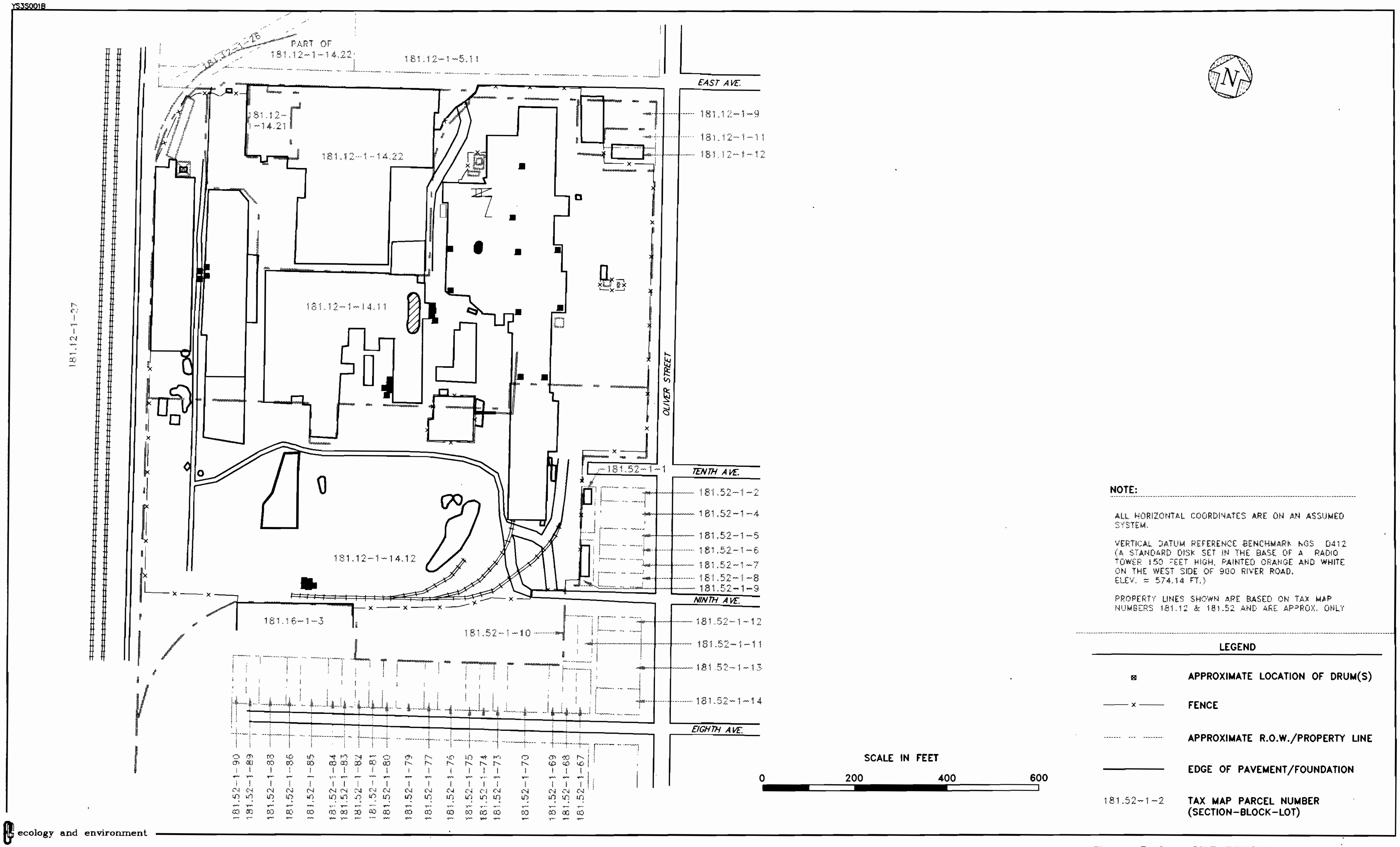

Figure 3-6 SITE PROPERTY BOUNDARY MAP
ROBLIN STEEL