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

## PRELIMINARY SITE ASSESSMENT
## VOLUME 1

Erwin Town Landfill
Site Number 851003
Town of Erwin, Steuben County

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May 1995

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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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) in conjunction with Joseph C. Lu, P.E., P.C. (JCL) conducted a Preliminary Site Assessment (PSA) at the Erwin Town Landfill (site number 851003).

The landfill was active from 1966 until 1983. During this period it was operated by Steuben County and the Town of Erwin. Waste deposited at the site included sanitary, construction/demolition, and industrial wastes. Included in the industrial waste was hazardous waste from Corning Glass Works identified as containing heavy metals.

Previous studies at the site were conducted in 1979, 1987, 1989, and 1990. These studies discussed site history, developed a preliminary Hazard Ranking System score of 50.47 for the site, and included limited sampling during the 1990 study. This sampling indicated elevated levels of some metals in water samples. Soil samples contained volatile and semi-volatile organic compounds, polychlorinated biphenyls (PCBs) and heavy metals. These reports recommended additional investigation of the site.

The initial phase (Task 1) of the Erwin Town Landfill PSA was conducted by E & E in 1992. The PSA was continued in 1993 and 1994 with fieldwork including sampling of surface water, sediment, surface soil, subsurface soil, groundwater, waste materials, and drum contents at the site. Surface water and sediment sampling did not reveal significant levels of contaminants in areas where runoff would drain from the site. Surface soil sampling indicated that there are exposed materials at the site containing elevated levels of polynuclear aromatic hydrocarbons (PAHs), PCBs, dichlorodiphenyltrichloroethane (DDT)/dichloro-diphenylethylene (DDE), and metals (lead in particular). Semivolatile organics and metals were detected in subsurface soil samples. Five metals, including lead, were detected at levels above expected background concentrations for eastern United States soils.

Groundwater was found to flow in a generally radial pattern from the site and contained the following contaminants at concentrations above the NYSDEC Class GA groundwater standards; chloroethane, chlorobenzene, total xylenes, Aroclor-1242 (PCB), antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, sodium, and zinc. Analysis of waste material at the site identified 15 organic contaminants, but none were at concentrations exceeding the regulatory levels for the Toxicity Characteristic Leaching Procedure. Chloroethane, toluene, total xylenes, and 4-methylphenol were identified in the waste and were also found in groundwater samples at the site. A sample from the supply well at the wastewater treatment plant adjacent to the site was found to contain barium, iron, magnesium, manganese, and sodium above Class GA groundwater standards.

Field hazard categorization and subsequent laboratory analysis of contents from containers located on the west side of the landfill indicated that 10 of the 18 containers were empty or contained only trash or rainwater. Four containers, including the tank and three drums, contained residual combustible petroleum products mixed with water. One drum contained a solid material with properties consistent with a polyurethane foam insulation. One drum contained a liquid with properties consistent with soap. Two drums contained a white liquid emulsion suspected of containing herbicide mixed with a flammable petroleum product. These two drums contained high levels of volatile organic compounds, including tetrachloroethene, trichloroethene, toluene, ethylbenzene, and total xylenes.

Due to several factors, including documented hazardous waste disposal at the site, the location of the site in relation to drinking water supplies and surface waters, the detection of hazardous constituents in environmental media associated with documented disposal, and the detection of other contaminants in groundwater, it is recommended that the Erwin Town Landfill site be reclassified as a Class 2 site. Further study is recommended to fully delineate the nature and extent of the contamination.

# 1. SITE ASSESSMENT SUMMARY

## 1.1 INTRODUCTION

Under the New York State Department of Environmental Conversation (NYSDEC) Superfund Standby Contract, Ecology and Environment Engineering, P.C. (E & E) has conducted a Preliminary Site Assessment (PSA), with the firm of Joseph C. Lu, P.E., P.C. (JCL) as a subcontractor, at the Erwin Town Landfill. This site is located within both the Village of Painted Post and Town of Erwin, Steuben County, New York. This report summarizes PSA site activities, investigative conclusions, and recommendations for further action.

## 1.2 PURPOSE

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

- **Class 1:** Causing or presenting an imminent danger of 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.

The Erwin Town Landfill is currently classified as a Class 3 site (NYSDEC 1992). If none of the above categories 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 Erwin Town Landfill (NYSDEC site number 851003) is located immediately west of the confluence of the Cohocton and Tioga rivers in the Village of Painted Post and Town of Erwin, Steuben County, New York (see Figure 1-1). Details of the site are included on the site map (see Figure 1-2). An area of approximately 15 acres, encompassing the landfill and the Erwin wastewater treatment plant to the east, is owned by the Town of Erwin. Property adjacent to the landfill is isolated from the site by the rivers and U.S. routes 15 and 17. A Conrail railroad line runs along the southeast side of the landfill. The urbanized area of Painted Post is located approximately 1/4 mile northeast of the site, north of the Cohocton River. The nearest occupied facilities, other than the wastewater treatment plant on site, are a motel and residences located approximately 1/4 mile northwest of the site. The commercial area of Gang Mills is located approximately 1/2 mile southwest of the site.

The natural topography of the immediate vicinity is flat river valley with an elevation of approximately 935 feet above sea level. Hills surrounding the valley range up to approximately 1,800 feet above sea level (USGS 1976). The most significant topographical features in the immediate site vicinity are man-made. These include flood levees to the north, east, and south; U.S. Route 15, which is elevated and located just west of the site; the wastewater treatment facility to the east; a built-up railroad grade parallel to the southeastern flood levee; and the landfill mound itself which has a flat top and is approximately 35 feet high.

Most of the landfill appears to be adequately covered and revegetated. However, in some areas, items such as steel reinforcing bars, broken glassware, and glass beads are present on the surface. A gravel road, which contains a high proportion of colored glass fragments, runs up the west side of the landfill to the top. Some areas that were observed to have stressed vegetation or no vegetation during 1993 field activities may have been dry leachate collection areas. Previous reports indicated areas of leachate outbreaks on the south, northwest, and northeast sides of the landfill (E & E 1992; NUS 1990). Areas of subsidence exist on the top of the landfill, creating a hummocky surface, particularly at the north end. A number of animal burrows were also present in various areas of the landfill cover. The 1990 NUS report indicated that the area northwest of the landfill and east of Route 15 was used for sewage sludge disposal, storage of cinder and salt stock piles, and vehicle storage (garage). A gravel pad and windsock, comprising an emergency heliport, were recently installed on top of the landfill.

Three NYSDEC classified water bodies are adjacent to the site: the Cohocton River to the north; the Tioga River to the southeast; and Weaver Hollow Brook to the southwest (6 NYCRR 811). The Cohocton and Tioga rivers merge approximately 1,000 feet northeast of the site to form the Chemung River. Weaver Hollow Brook is a Class D tributary of the Tioga River. It flows within 100 feet of the southern border of the landfill, but is effectively isolated from landfill surface runoff by a flood levee. The Tioga River, a Class C waterbody, is located approximately 500 feet southeast of the landfill and is also isolated from the landfill by a flood levee. The Cohocton River, also a Class C waterbody, is located approximately 350 feet northeast of the site. Although a flood levee also separates the Cohocton River from the landfill, a drainage swale, located north of the wastewater treatment plant, drains into a storm sewer that penetrates the levee and empties into the Cohocton River.

The site is situated above a primary aquifer, consisting of highly permeable sand and gravel deposits, that provides potable water for a population of approximately 29,000 people in the Town of Erwin, City of Corning, and Village of Painted Post (Waller and Finch 1982). This aquifer is currently the sole source of potable water for the area (NYSDEC 1989).

The nearest wells used for drinking water are the wastewater treatment plant well located approximately 400 feet northeast of the landfill, and a Painted Post municipal water supply well located approximately 0.7 mile north of the site (NUS 1990; Hunt 1994). The depth and construction of the wastewater treatment plant well are unknown. All municipal wells, with the exception of the wastewater treatment plant well, are located on opposite sides of the rivers from the site. Other drinking water wells, located within approximately 1 mile of the site, include two City of Corning wells and two Town of Erwin wells (Majesky 1994; Curreri 1994). The two Corning wells are located approximately 1 mile east of the landfill site and are currently inactive, but are scheduled to be reactivated in 1995. The two Erwin wells are active and are located west (upgradient) of the landfill site. The City of Corning has nine additional municipal supply wells, located to the east along a 2.5-mile stretch of the

Chemung River, that are further than 1 mile from the site. Analytical data for the municipal wells are available from the respective municipalities. However, based on existing data for the area, it is reasonable to assume that the Cohocton and Tioga rivers are groundwater discharge areas that would hydraulically separate the site from the municipal wells across the rivers.

## 1.4 HAZARDOUS WASTE SITE DISCUSSION

The Erwin Town Landfill is currently listed as a Class 3 site on the NYSDEC Inactive Hazardous Waste Disposal Site registry. The site has been used for disposal of sanitary, construction/demolition, and industrial waste. Documented non-sanitary waste contributors to the site include the Steuben County Highway Department, Corning Glass Works, and Ingersoll-Rand Company (NYSDEC 1989). Wastes deposited by the Steuben County Highway Department included brush, stumps, and minor amounts of construction/demolition debris. A NYSDEC hazardous waste questionnaire, completed by Corning Glass Works personnel in 1984 as part of Community Right-to-Know requirements, provides documentation of hazardous waste disposal at the Erwin Landfill. This questionnaire indicates that "tens of tons" of inorganic and heavy metal waste (Resource Conservation and Recovery Act [RCRA] hazardous waste codes D004 through D011) were disposed of at the site between 1978 and 1980 (NYSDEC 1984). Approximately 50% of the Corning waste consisted of "ceramic logs." Other items included cullet, wood, sawdust, pallets, construction debris, cardboard, paper, grinding wastes, and sand (Standard Engineering Corporation [SEC] 1979). Ingersoll-Rand deposited 4-foot layer of foundry sand at the site as a base for the sanitary landfill in 1966 (SEC 1979). The areal extent of the foundry sand layer is unknown. Other wastes deposited at the site by Ingersoll-Rand included scrap iron and steel, shot blast dust, silica sand, organic sand binders, and other materials. Some of this waste is suspected to contain phenols; however, it has not been determined if any of the Ingersoll-Rand waste can be classified as RCRA hazardous waste (SEC 1979).

## 1.5 SUMMARY OF PSA WORK

Task 1 of the Erwin Town Landfill PSA was completed in 1992 by E & E. The Task 1 report included documentation of hazardous waste disposal at the landfill by Corning Glass Works and a discussion of previous sampling results that identified PCBs and volatile and semivolatile organic compounds at this site. The report concluded that further investigation was required to determine if the site posed a significant threat to human health or the environment.

The 1993 PSA fieldwork included the collection and analysis of five co-located surface water and sediment samples, seven surface soil samples, seven subsurface soil samples, one waste sample, and installation and sampling of six groundwater monitoring wells. The on-site wastewater treatment plant supply well provided a seventh groundwater sample.

Surface water and sediment sampling did not reveal significant levels of contaminants in areas where runoff migrates from the site. A surface water and sediment sample, collected from standing water south of the fill area, contained volatile organic and inorganic contaminants at low levels. However, runoff in this area is contained by a flood levee.

Surface soil sampling indicated that there is exposed soil and waste at the site containing contaminants including semivolatiles, PCBs, DDT/DDE, and metals. These contaminants were detected at levels above those detected in the background sample which was collected east of the landfill. Lead was detected in three surface soil samples at significantly elevated concentrations as compared to background concentrations for eastern United States soils (Shacklette and Boerngen 1984).

Elevated levels of semivolatile organics were detected in the subsurface soil samples as compared to expected background levels. Six metals, including relatively high concentrations of lead and antimony, were detected in subsurface soil samples at elevated levels as compared to background concentrations for soils of the eastern United States. Low levels of PCBs and DDT/DDE were also detected in several subsurface soil samples.

Groundwater was found to flow in a radial pattern from the landfill. Analytes detected above the NYSDEC Class GA groundwater standards include chloroethane, chlorobenzene, total xylenes, Aroclor-1242, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, sodium, and zinc.

Eighteen containers, including fifteen 55-gallon drums, two 5-gallon containers, and one 1,000-gallon tank, were inventoried and sampled. These containers were located on the west side of the landfill. Field hazard categorization and subsequent laboratory analysis indicated that 10 of the containers were empty or contained only trash or rainwater. Four containers, including the tank, showed evidence of residual combustible petroleum products.

One drum contained material with properties consistent with polyurethane foam insulation and one drum contained a soap-like liquid. The two remaining drums contained a white liquid emulsion suspected of containing residual herbicide. A thin layer of flammable petroleum product was also present in these two drums. In addition, these drums contained high concentrations of chlorinated and petroleum hydrocarbons.

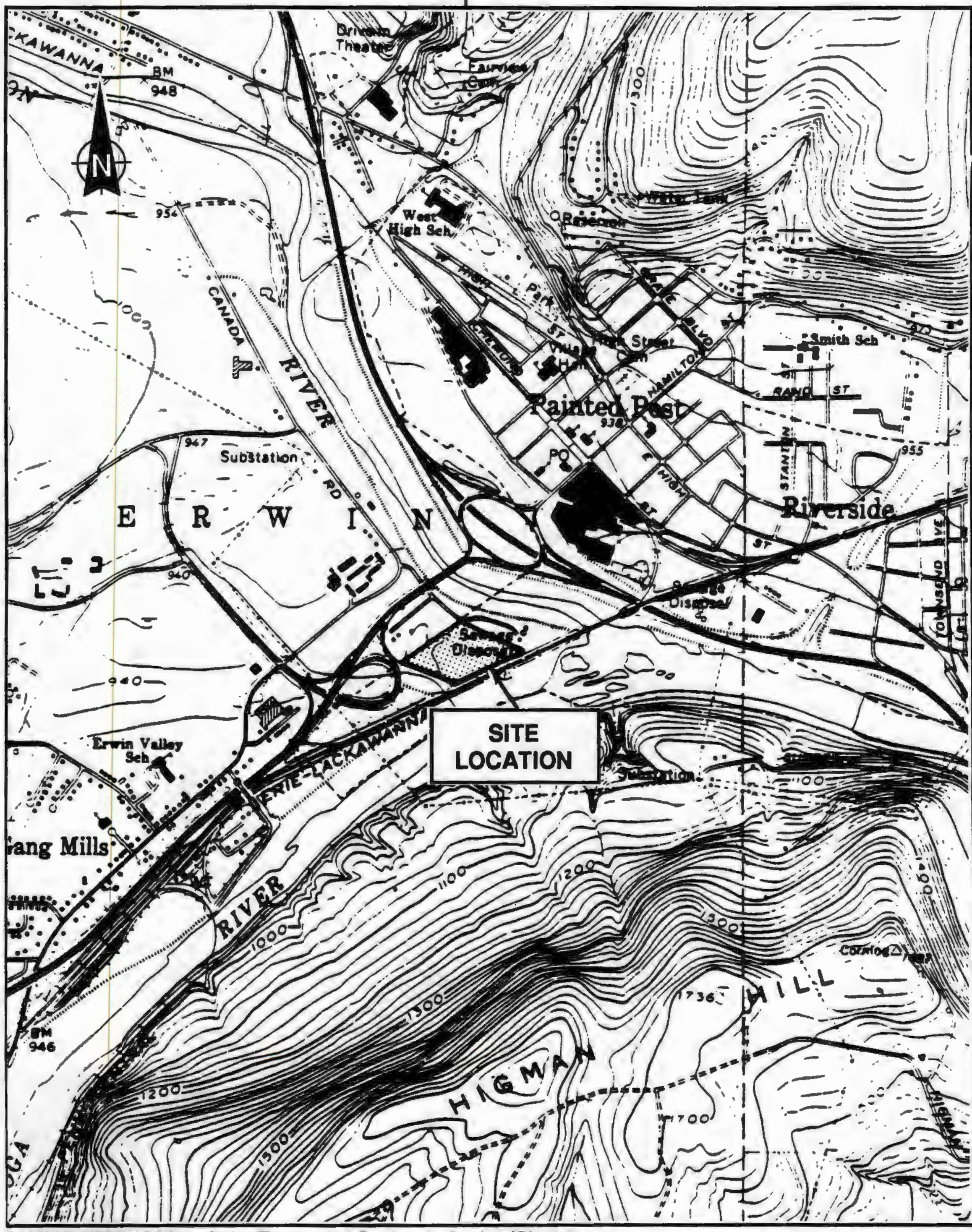
Analysis of a waste sample collected from a partially exposed drum identified 15 organic contaminants. However, when subjected to TCLP organic analysis, the material did not exceed the regulatory levels defining a RCRA hazardous waste. Four of the contaminants identified in the waste (total xylenes, chloroethane, toluene, and 4-methylphenol) were also identified in groundwater samples collected at the site.

Based on the documented hazardous waste disposal at the site, the detection of hazardous constituents associated with this disposal in environmental media, the location of the site relative to drinking water supplies and surface waters, and the detection of other contaminants in groundwater at the site, it is recommended that the Erwin Town Landfill site be reclassified as a Class 2 site.

### 1.6 NYSDEC CLASSIFICATION FORMS

The NYSDEC Registry Site Classification Decision Form, Classification Worksheet, and Site Priority Ranking Worksheet are presented on pages 1-11 through 1-13. These forms provide information pertinent to the classification of the site in accordance with 6 NYCRR Part 375.

77°05'50"W




SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle: Corning, NY. 1969

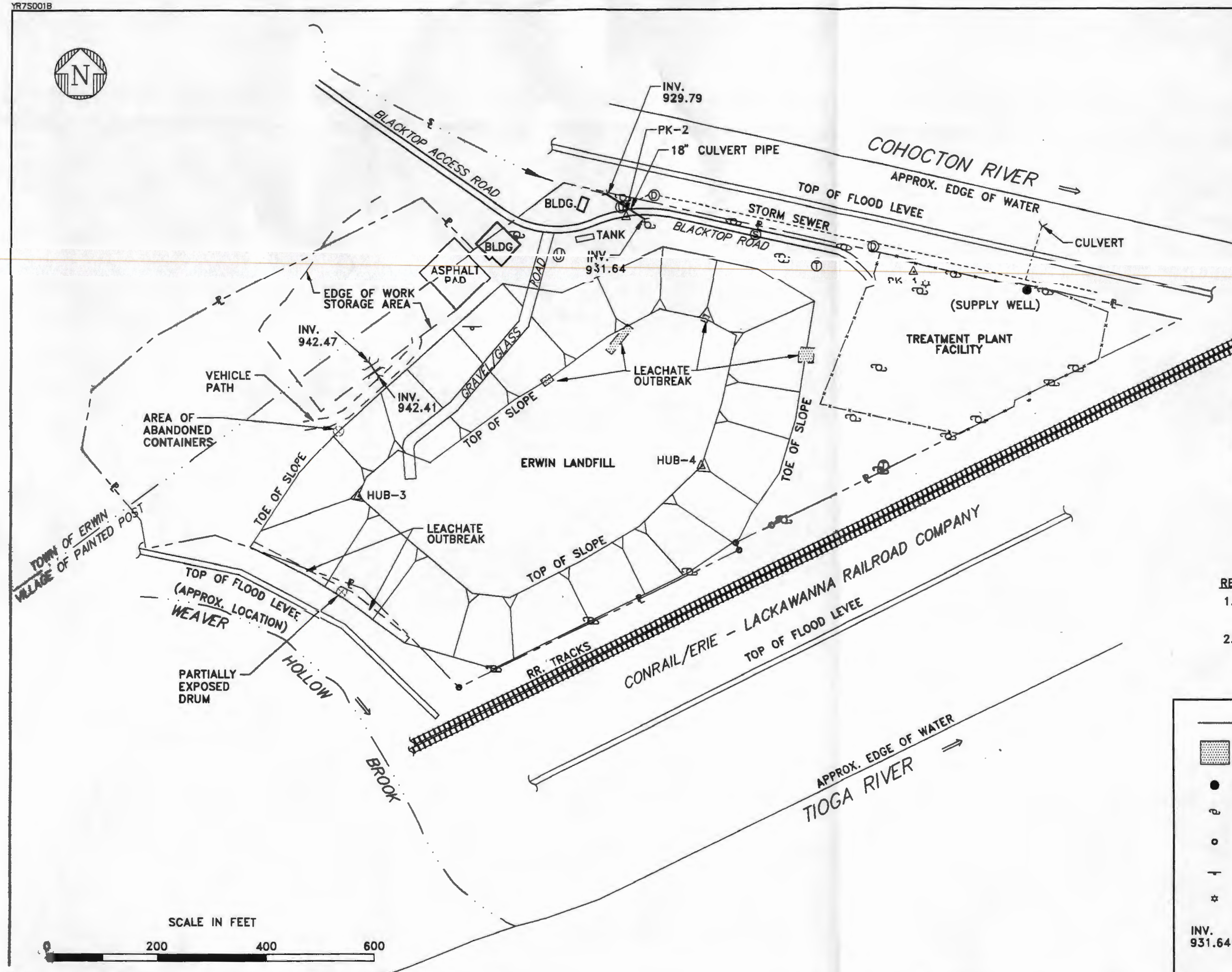
SCALE 1:24,000

0 ½ 1 Mile

0 .5 1 Kilometer

**Figure 1-1**
**LOCATION MAP, ERWIN TOWN LANDFILL SITE**

YR7S001B




CONTROL INFORMATION

| SITE CONTROL | ELEVATION | NORTH | EAST |
|---|---|---|---|
| PK-1 | 945.78 | 5030.0057 | 4973.6038 |
| PK-2 | 934.88 | 5128.3623 | 4443.4504 |
| HUB-3 | 970.90 | 4615.7446 | 3951.3950 |
| HUB-4 | 970.37 | 4670.0789 | 4581.1253 |

ALL COORDINATES ARE ON AN ASSUMED SYSTEM. BEARINGS AND BOUNDARIES SHOWN ARE FROM REFERENCE 1.
PROPERTY LINES WERE NOT SURVEYED, BUT ARE BASED ON REFERENCE 1.

REFERENCES

1. MAP ENTITLED "MAP OF LANDS OF THE TOWN OF ERWIN" DATED APRIL 1, 1992. MAP BY DENNIS J. WIELAND, L.S.
2. ELEVATIONS ARE REFERENCED TO THE 1929 MEAN SEA LEVEL. BENCHMARK IS FINISHED FLOOR OF CONTROL BUILDING AT TREATMENT PLANT FACILITY (ELEVATION = 946.50 FEET).

LEGEND

LEACHATE OUTBREAK AREA
EXISTING WELL
UTILITY POLE
PROPERTY IRON PIN
SIGN
LIGHT POLE
INV. 931.64 — INVERT ELEVATION IN FEET ABOVE MSL
APPROX. PROPERTY LINE
CENTERLINE OF SWALE
JCL SURVEY CONTROL POINT
TELEPHONE MANHOLE
SANITARY MANHOLE
DRAINAGE MANHOLE
UNKNOWN MANHOLE
TOWN BORDER LINE
FENCE

ecology and environment

Figure 1-2 SITE MAP
ERWIN TOWN LANDFILL

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

## REGISTRY SITE CLASSIFICATION DECISION

| | | | |
|---|---|---|---|
| 1. Site Name<br>Erwin Town Landfill | 2. Site No.<br>851003 | 3. Town/City/Village<br>Erwin | 4. County<br>Steuben |
| 5. Region<br>8 | 6. Classification<br>Current: 3 Proposed: 2 Modify: | | |

7. Location of Site (see Figure 1-1 for site location)
a. Quadrangle: Corning; b. Site Latitude: 42 09' 05" N; Longitude: 77 05'50"W; c. Tax Map Number: 299.17

8. Briefly Describe the Site (see Figure 3-1 for site plan)
The site is a relatively small landfill rising approximately 35 feet above the surrounding terrain and is located near the confluence of the Cohocton, Tioga, and Chemung rivers, in the Town of Erwin, Stueben County, New York. The landfill is currently covered with grass. Minor leachate outbreaks and areas of exposed glass fragments are present.

a. Area 13 acres b. EPA ID Number NYD000511881
c. Completed ☒ Phase I ☐ Phase II ☒ PSA ☐ RI/FS ☒ PA/SI ☐ Other

9. Hazardous Wastes Disposed
Between 1978 and 1980, Corning Glass Works reportedly deposited "tens of tons" of hazardous wastes containing arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver at the site. The Ingersoll-Rand Company deposited foundry wastes at the landfill in the 1960's. The Ingersoll-Rand waste is suspected to contain phenols. However, no determination has been made regarding the presence of hazardous waste from Ingersoll-Rand.

10. Analytical Data Available
a. ☐ Air ☒ Groundwater ☒ Surface Water ☒ Soil ☒ Waste ☒ EPTox ☒ TCLP
b. Contravention of Standards or Guidance Values

Chloroethane, chlorobenzene, total xylenes, aroclor-1242, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, sodium, and zinc in groundwater; and iron and nickel in surface water exceeded standards or guidance values. Sediment and surface soils contained various organic and metal contaminants at concentrations substantially higher than those of background soil.

11. JUSTIFICATION FOR CLASSIFICATION DECISION

The proposed classification is based on the detection of contamination of groundwater and other media as indicated above (10b), the proximity of drinking water supply wells, the presence of leachate and other indicators of poor containment of wastes (i.e., poor landfill cover), and the poorly restricted site access. Consideration of these factors indicates it is reasonably foreseeable that hazardous wastes from the site could result in significant environmental damage.

12. Site Impact Data
a. Nearest surface water: Distance 100 ft. Direction south Classification D
b. Nearest groundwater: Depth 10 ft. Flow Direction east ☐ Sole Source ☒ Primary ☐ Principal
c. Nearest water supply: Distance 400 ft. Direction east Active? ☒ Yes ☐ No
d. Nearest building: Distance 150 ft. Direction northwest Use Storage
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. HRS Score: 50.47 (Recra 1989)
l. For Class 2: Priority Category 1

| | | |
|---|---|---|
| 13. Site Owner's Name<br>Town of Erwin | 14. Address<br>Erwin Town Hall, Painted Post, New York 14870 | 15. Telephone Number<br>(607)936-3652 |

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

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

**SITE I.D.** 851003 **SITE NAME** Erwin Town Landfill

**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? . . . ☐ ☒(1)

c) Has bioaccumulation of site contaminants in flora or fauna resulted in a health advisory? . . . ☐ (If 1 or more boxes are checked, check this box)

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

**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)? . . . ☐ ☐(2)

c) Are contaminants at levels chronically toxic to fish/wildlife? . . . ☐ (If 1 or more boxes are checked, check this box)

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

**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 . . . 1 (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 . . . 1 (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 . . . 1 (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: Proper disposal of drums on the west side of the landfill and remediation of spilled, partially exposed drum on southwest side of the landfill is recommended.

Preparer: ______ Date: December 1994

## CLASSIFICATION WORKSHEET

Site: Erwin Town Landfill  County: Steuben  Region: 8

| | | | |
|---|---|---|---|
| 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
- ☐ b. streams, wetlands, or coastal zones
- ☐ c. bioaccumulation
- ☐ d. fish, shellfish, crustacea, or wildlife
- ☐ e. fire, spill, explosion, or toxic reaction
- ☐ 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) Documented disposal of hazardous waste consisting of heavy metals and disposal of other wastes of unknown content; detection of metals as well as organic contaminants in environmental media such as soil and groundwater; and the foreseeable threat posed to the nearby water supply well.

5. Factor(s) considered in making this determination: factors b, c, d, e, g, i, k, and l from 6 NYCRR 375-1.4(b). Based on these factors it is reasonably foreseeable that hazardous waste from the site may result in significant environmental damage. Specific examples include the presence of a drinking water well 400 feet from the landfill; other water supply wells within one mile of the site; the detection of hazardous constituents (metals) associated with documented disposal in environmental media; the detection of three volatile organics, 13 metals, and a PCB in groundwater at levels above the Class GA standard; the bioaccumulation potential of PCBs and metals; and the detection of organic compounds identified in a waste sample from the site in groundwater at the site.

### SUMMARY

Consequential Hazardous Waste: ☒ Yes ☐ No ☐ Unknown

Significant Threat: ☒ Yes ☐ No ☐ Unknown

Proposed Classification: 2  Site Number: 851003

May 1994
Date

Signature and Title

# 2. SITE HISTORY

## 2.1 FACILITY HISTORY

Aerial photographs from the Town of Erwin Assessor's Office indicate that the Erwin Town Landfill site consisted of agricultural fields prior to 1966 (E & E 1992). However, according to the Site Inspection Report prepared for U.S. Environmental Protection Agency (EPA), the site was a borrow pit prior to landfilling (NUS 1990). Prior to the initiation of landfilling activities in 1966, a 4-foot layer of foundry sand from the Ingersoll-Rand Company was placed to serve as the base of the landfill (SEC 1979). The areal extent of the foundry sand layer is unknown. From 1966 until 1978, the site was owned and operated by the Town of Erwin as a sanitary landfill and was permitted to accept household and industrial solid waste (NYSDEC 1989; NUS 1990). In 1978, the site was leased to Steuben County which continued operating the landfill until 1983 (NYSDEC 1989). The landfill was closed in 1983. At this time, the final cover, consisting of a 2-foot layer of topsoil, was applied (Morse 1989). After closure, responsibility for the site reverted to the owner, the Town of Erwin.

According to Standard Engineering Corporation's 1979 Demolition Debris Disposal Site Report, the proposed users of the landfill during the period of operation by Steuben County included the Steuben County Highway Department, Ingersoll-Rand Company, and Corning Glass Works. Steuben County's wastes were to include brush and stumps. Ingersoll-Rand's waste was to be foundry sand which includes scrap iron, scrap steel, shot blast dust, silica sand, organic sand binders, ferrous and non-ferrous alloys, firebrick, claybinder sand, refractory washes, and occasional loads of broken concrete. The maximum amount of foundry wastes was to be 75 tons per day. Corning Glass Works wastes were to include ceramic logs; cullet; wood pallets; sawdust; construction debris including bricks and concrete blocks; cardboard; paper; grinding wastes composed of pumice and cerium oxide;

and sand. The maximum quantity of daily wastes from Corning was approximately 325 cubic yards. Fifty percent of this waste was ceramic logs (SEC 1979).

The above-mentioned wastes were also described as being disposed of at the site in NYSDEC's Phase I Investigation Report (1989) and USEPA's Site Investigation Report (1990). The Phase I Investigation Report also indicates that Corning's waste was suspected of containing lead and other heavy metals. Additionally, the Site Investigation Report indicates that Ingersoll-Rand's foundry waste is suspected to contain phenols, that Corning's ceramic logs are suspected to contain hazardous organic compounds, and that Corning may have disposed drums of glue at the site.

A NYSDEC Hazardous Waste Disposal Questionnaire, completed by Corning Glass Works personnel in 1984, indicates that "tens of tons" of hazardous waste containing inorganics and heavy metals (RCRA hazardous waste codes D004 through D0011) were disposed of at the site between 1978 and 1980.

On July 30, 1980, several drums with unknown contents were mistakenly delivered to the site by Corning. These drums were reportedly removed within several days (E & E 1992).

On September 7, 1980, a fire of unknown origin occurred in Corning's waste disposal area. Eight fire fighters were treated at Corning Hospital, for what was initially suspected to be inhalation of "toxic fumes" liberated by the ceramic logs. However, after examination of the fire fighters, it could not be determined if they had been exposed to "toxic fumes" or had suffered from smoke inhalation (Schmied and Shattuck 1981; Barto 1980).

In June 1987, the Erwin Town Board informally endorsed the concept of using the Erwin Town Landfill for a heliport pad (Morse 1987). Since 1987, the Town of Erwin has made a formal application to the Federal Aviation Administration, contracted an engineering firm to develop sketch plans for the heliport, and contacted agencies having regulations and/or requirements affecting the plans (Morse 1990). On December 26, 1990, NYSDEC Region 8 gave written permission to the Town of Erwin engineering contractor (Sniedze Associates) to proceed with the heliport project. NYSDEC project approval was contingent on the understanding that future site investigations might impact the heliport (Butkas 1990). A gravel pad and windsock were observed on top of the landfill during an E & E site visit in 1994.

## 2.2 INVESTIGATION HISTORY

A preliminary assessment of the site was conducted by NUS Corporation for the EPA in 1987 (NUS 1987). This report assigned the site a medium priority. Sampling of surface water and groundwater were recommended due to the observed potential for contamination of these media.

In 1989, a Phase I Investigation was conducted for NYSDEC by Recra Environmental, Inc. and Lawler, Matusky, & Skelly Engineers, and the site was scored using the Hazard Ranking System (NYSDEC 1989). The site was assigned a score of 50.47 for the potential for harm due to possible migration of contaminants from the site. However, the report indicated that the data available was inadequate for a proper site assessment and recommended further investigation.

In June 1990, NUS Corporation conducted sampling at the site and later completed a Site Investigation Report for EPA (NUS 1990). Sampling included the following: two water samples from a manhole; one groundwater sample from the wastewater treatment plant well; one surface water sample; two sediment samples; and eight soil samples. The analysis indicated elevated levels of metals including arsenic, manganese, lead, silver, zinc, barium, iron, and sodium in water samples. Soil samples contained various levels of polynuclear aromatic hydrocarbons (PAHs), PCBs (280 to 300 $\mu$g/kg), and elevated concentrations of arsenic, cadmium, silver, and manganese. One surface soil sample collected adjacent to a partially exposed drum contained chloroethane, acetone, 1,1-dichloroethane, 1,2-dichloroethane, 2-butanone, 1,1,1-trichloroethane, carbon tetrachloride, 1,1,2-trichloroethane, 4-methyl-2-pentanone, tetrachloroethene, toluene, xylenes, and 4-methylphenol. The groundwater sample collected from a tap connected to the wastewater treatment plant supply well contained barium, iron, and manganese at concentrations exceeding EPA maximum contaminant levels and NYSDEC Class GA groundwater standards. The report recommended the installation of monitoring wells and additional soil sampling to determine the extent of contamination at the site.

The potable water supply well at the wastewater treatment plant (approximately 400 feet northeast of the landfill) was sampled by the Town of Erwin in 1990 and analyzed for various organic and inorganic substances (Halstead 1990; Buck 1990). The analytes detected were copper, zinc, nitrate nitrogen, bis(2-ethylhexyl)phthalate, and diethylphthalate. Each of these analytes was detected at a concentration below NYSDEC Class GA groundwater

**standards, except diethylphthalate. However, since phthalates are common field/laboratory contaminants resulting from the use of rubber gloves, they were not believed to be related to the site.**

# 3. PSA TASK DISCUSSION

Task 1 of the PSA was performed in 1992 by E & E under contract to NYSDEC. The PSA was continued by JCL, a subcontractor to E & E, with fieldwork performed from August to November 1993. The scope-of-work for the PSA was prepared by NYSDEC. With minor exceptions, all field tasks were performed in accordance with NYSDEC's abbreviated work plan. Some variations from the NYSDEC work plan occurred as a result of site conditions and judgments made in the field. All variations from the work plan were made with the concurrence of NYSDEC representatives. These variations are discussed below in the appropriate sections.

## 3.1 PSA TASK 1 REPORT

Task 1 of the Erwin Town Landfill PSA included a file review, site inspection, and preparation of a report (E & E 1992). The file review included state, county, municipal, and site-specific resources. Existing reports and new sources were utilized to obtain information to assist in the characterization of the site. A site inspection was conducted by E & E in May 199[illegible] to assess the surficial characteristics of the site, identify evidence of hazardous waste or substances, photograph the site, conduct preliminary air and radiation monitoring, and confirm information obtained in the initial data review.

At the time of the inspection, some subsidence of the northern end of the top of the landfill was noted. Leachate seeps were observed around the base of the landfill including three ponds of leachate along the southern toe of the landfill. The majority of the landfill cover was heavily vegetated with grasses. Preliminary air monitoring, conducted with a photoionization detector (PID) and radiation meter, did not reveal any readings above background levels. The PSA Task 1 Report included documentation of disposal of hazardous waste (heavy metals) by Corning Glass Works. The report also summarized past sampling activities at the site which indicated that site soils contain elevated levels of metals, PCBs, and volatile and semivolatile organic compounds. The report concluded that the level of threat to human health and the environment posed by the Erwin Town Landfill could not be determined based on available data. In order to further characterize the site, additional sampling was recommended.

## 3.2 PRE-FIELD INVESTIGATION

Continuation of the PSA for the Erwin Landfill site involved several field tasks as 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 as well as technical specifications for the management and performance of the field tasks, laboratory analyses, and report preparation.

In June 1993, E & E also submitted the General Health and Safety Plan (HASP) and 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. This document and information gathered during Task 1 of the PSA were used to generate a site-specific health and 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 designed in accordance with NYSDEC and EPA guidance documents to ensure that all technical data generated by E & E's Analytical Services Center (ASC) meet specific 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 JCL and E & E personnel on August 6, 1993 (see Appendix A). At this time, the site was observed to be in the same general condition as during the Task 1 site inspection. However, 15 drums, two 5-gallon containers, and one 1,000-gallon tank with unknown contents were found on the west side of the landfill. The markings, condition, and contents of any drum that was open were noted so that a sampling plan for these containers could be developed.

## 3.3 GEOPHYSICAL INVESTIGATION

Initial geophysical surveys at the site were performed by JCL on August 19, 20, and 24, 1993. Additional surveys were performed by E & E on October 6, 1993 due to the relocation of wells MW-1 and MW-6 during drilling and well installation. The purpose of these surveys was to aid in the safe location of the proposed wells. One survey grid was established at each of the six proposed well locations. Additionally, E & E surveyed one grid for the relocation of MW-6 and performed a general magnetic survey for the relocation of MW-1. The methodologies and results of the geophysical investigation are presented in Appendix B of this report.

The initial geophysical surveys were conducted with both 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 and four readings were recorded with the conductivity meter (one in each instrument orientation) at each data station. The additional surveys conducted on October 6, 1993 were performed with the magnetometer only.

Contour maps for the magnetic data (one map per grid) and conductivity data (four maps per grid) were generated to illustrate the geophysical results. Minor magnetic and conductivity anomalies were found throughout all of the grids at this site. The majority of these anomalies were attributable to natural soil conditions, interference from nearby surface features, and small, buried, metallic objects. The only grid which showed significant anomalous readings was located at MW-2. One large magnetic anomaly was present within the central portion of this grid. The source of this anomaly is not known.

## 3.4 GROUNDWATER MONITORING WELLS

### 3.4.1 Monitoring Well Installation

A total of six groundwater monitoring wells (MW-1 through MW-6) were installed at the site between October 4 and 8, 1993. Drilling and well construction activities were performed by American Auger and Ditching Company, Inc. under the supervision of a JCL geologist and health and safety coordinator. The wells were drilled to characterize the subsurface soils, assess the hydrogeology of the site, and provide locations for the collection of groundwater samples.

Monitoring well locations were based on NYSDEC's abbreviated work plan for the site. However, as previously discussed, two wells were relocated. The initial location of MW-1 was abandoned during drilling due to the presence of fill. The abandoned boring was identified as AMW-1. Well MW-6 was moved because the initial location was determined to be on a Conrail right-of-way. The locations of the six wells and AMW-1 are shown on Figure 3-1. Subsurface boring and well construction logs for each well and AMW-1 are provided in Appendix C.

Each of the borings for the six monitoring wells were advanced to approximately 8 feet below the water table using 4 1/4-inch inside diameter (ID) hollow-stem augers. The wells were drilled to total depths ranging from 18.0 to 22.0 feet below ground surface (BGS) and were completed in the overburden.

Split-spoon samples were obtained from each well boring according to the standard penetration test methods described in American Society for Testing and Materials (ASTM) (designation D-1586-84). In each of the well borings, split-spoon samples were collected at 5-foot intervals above the water table and collected continuously below the water table.

All split-spoon samples were logged in the field by a JCL geologist. The logs include descriptions of soil types, depth to groundwater, and other notable observations. Soil samples were visually classified based on the Unified Soil Classification System (USCS). Each split-spoon sample was monitored for volatile organic compounds (VOCs) with a PID and flame-ionization detector (FID). Continuous monitoring of the drilling area and borehole was performed with an oxygen/combustible gas meter and an aerosol monitor. Soil samples from each boring were retained for chemical analysis as discussed in Section 3.5.4. One additional sample from each well boring was retained for grain-size distribution analysis (ASTM D-422). The grain-size analysis was performed by Atlantic Testing Laboratories, Ltd. of Canton, New York. The geotechnical results, including a sample summary table and gradation curves, are presented in Appendix D.

Each of the six wells was constructed with a 10-foot section of threaded, flush-joint, 2-inch ID, polyvinyl chloride (PVC) screen with 0.010-inch slots. Schedule 40 PVC riser pipe was used to complete the well casing to approximately 2.5 feet above the ground surface. A quartz sand pack was then used to backfill the annular space to a level approximately 2 feet above the screen. A 2-foot bentonite seal was installed above the sand pack. The remaining annulus above the bentonite seal was filled with cement/bentonite grout and completed with a

4-inch ID, locking, protective steel casing. Specific well construction information is included in Table 3-1 and on the boring logs in Appendix C.

A paste-like waste material was encountered at approximately 8 feet BGS during drilling at AMW-1. PID readings of 50 ppm were noted within the augers. At NYSDEC's request, the boring was terminated and backfilled with borehole cuttings. A sample of the waste material was retained for metals analysis according to the extraction procedure (EP) toxicity method.

All well drilling equipment was decontaminated before and after use by high-pressure steam cleaning. A sample of the water used for well construction and decontamination was collected on October 6, 1993 and submitted to the E & E ASC for full target compound list (TCL) analysis, excluding cyanide. This sample was collected from the drill rig water storage tank through the main water valve on the rig. The source of this water was a fire hydrant located at the Town of Erwin Highway Department on South Hamilton Street. Water from the fire hydrant was temporarily stored in a polyethylene tank, and then transferred to the drill rig water storage tank. The drilling water sample (DW-1) contained the trihalomethanes chloroform, bromodichloromethane, and dibromochloromethane at a total estimated concentration of 10 $\mu$g/L. These compounds are commonly found in chlorinated water supplies. In addition, toluene (29 $\mu$g/L), ethylbenzene (12 $\mu$g/L), total xylenes (58 $\mu$g/L), and naphthalene (approximately 2 $\mu$g/L) were detected in DW-1. Nine metals were also detected in the drilling water sample, but all were below the New York State Department of Health (NYSDOH) maximum contaminant levels for public water supplies (10 NYCRR 5-1).

The source(s) of the toluene, ethylbenzene, total xylenes, and naphthalene are unknown at this time. Since the sample was collected from the drill rig water storage tank, which contained water obtained from a polyethylene storage tank that originally came from the fire hydrant, the source(s) of these contaminants are unknown. It is suspected that they were introduced prior to the water being placed into the drill rig water storage tank, since no contaminants were discovered at other sites where the drill rig had previously been utilized. The impact of these contaminants on the groundwater samples is discussed in Section 3.5.5 of this report.

Following completion, all wells were developed to restore the natural properties of the aquifer immediately adjacent to the boreholes and to enhance flow into the wells. Development occurred on October 7 to 12, 1993 and was accomplished utilizing water evacuation. A low-flow rate, submersible pump was utilized in all wells, except MW-2, in which the rig-mounted displacement pump was used. Development continued until turbidity readings stabilized below 50 Nephelometric turbidity units (NTU) or for a period of two hours. All wells stabilized below 50 NTU, except MW-2, which reached 59 NTU. Well development water volumes ranged between 55 and 150 gallons (37 to 73 bore volumes). Final pH values in the wells ranged from 6.31 in MW-6 to 7.86 in MW-1. Final conductivity values ranged from 1,016 microSiemens per centimeter ($\mu$S/cm) in MW-1 to 3,260 $\mu$S/cm in MW-2.

### 3.4.2 Site Geology

According to the Geologic Map of New York, bedrock in the vicinity of the site consists of the Upper Devonian West Falls Group. This group is comprised of interbedded shales and siltstones which locally include the Corning Shale, Roricks Glen Shale, and Beers Hill Shale members (Rickard and Fisher 1970).

Overburden deposits in the vicinity of the site generally consist of glacial drift overlain by more recent (postglacial) alluvium along the Cohocton, Tioga, and Chemung rivers (Cadwell *et al.* 1986). The drift consists of outwash sand and gravel, lacustrine sand, lacustrine silt, lacustrine clay, and morainal till. The relative positions and thicknesses of these layers change along the valleys. Overburden thicknesses in the Corning area range from 60 to 130 feet, but are typically 90 feet (Waller and Finch 1982).

Near-surface soils in the area of the site consist of the Unadilla silt loam, a moderately permeable soil, to a depth of approximately 5 feet BGS (USDA 1978). Little of this native topsoil was encountered during drilling at the site, probably due to regrading associated with the site's past use. As a result, disturbed and reworked soils of varying grain size are present to variable depths up to 12 feet near the toe of the landfill. Soils encountered in well borings located further from the landfill (MW-1 and MW-6) more closely resemble native soils expected in the area, and consist predominantly of silt to depths of approximately 5 and 9 feet BGS, respectively. Native sand and gravel deposits were found to predominate below these upper fine-grained sediments.

Grain-size distribution analysis was performed on one sample from each well boring. These samples were obtained from within the saturated zone at each well location. The depth of each sample is shown in the summary table included in Appendix D. Analysis indicates that the water-bearing zones of the overburden consist primarily of coarse-, medium-, and fine-grained gravel, and sand. Silt and clay are present in smaller proportions, averaging approximately 17% by weight of each sample.

Figure 3-2 is a geologic cross section representing the inferred overburden stratigraphy along a N 19° W-trending line across the eastern edge of the landfill. This cross section illustrates the presence of fill materials found in the borings for MW-3 and MW-5. Fill materials were also encountered in MW-2 and AMW-1. The fill was found to be of variable composition with a matrix of silt, sand, and gravel, and included wire at MW-2 and MW-3; household waste and construction debris at MW-5; and glass, wire, and a grey paste-like material at AMW-1. The primary water-bearing zone appears to consist of gravel and sand found approximately 10 feet below grade at each well location.

### 3.4.3 Site Hydrogeology

On November 4, 1994, prior to groundwater sampling, the water level in each monitoring well was measured and recorded. Water levels varied from 7.65 feet BGS in MW-6 to 15.37 feet BGS in MW-1. On March 28, 1994, a second complete set of water level measurements was recorded. These water levels varied from 3.19 feet BGS in MW-5 to 9.09 feet BGS in MW-1. The March 28, 1994 water levels were found to roughly correspond to the November readings, but were approximately 5 to 7 feet higher. Groundwater levels and well head elevation survey data were used to calculate the groundwater elevation at each well. The depth to groundwater and groundwater elevation data are presented in Table 3-2.

The two sets of groundwater elevation data were used to generate potentiometric surface contour maps (see Figures 3-3 and 3-4). Many of the groundwater contours are inferred due to the large distance between many of the wells. The inferred groundwater contours were drawn with reference to the site topography and surface water features, particularly on the southwest side of the site where the flood levee and Weaver Hollow Brook would be likely to influence overburden groundwater flow. The potentiometric maps derived from both sets of water level data show that groundwater flows radially away from the landfill. This groundwater mounding effect indicates that the cover material is not significantly restricting recharge into the fill. The maximum horizontal hydraulic gradient of this radial flow was approximately 0.9% based on both sets of groundwater data.

The Corning, New York area, including the Erwin Town Landfill, is underlain by a 28 square mile aquifer which consists of outwash sand and gravel within the valleys of the Canisteo, Tioga, Cohocton, and Chemung rivers. This aquifer provides 16.6 million gallons per day of groundwater to approximately 29,000 people as well as industry. Well yields in the Cohocton and Chemung river valleys can be as high as 500 to 1,000 gallons per minute. Groundwater in this aquifer flows downvalley and discharges into streams. Some groundwater also leaves the valleys as underflow toward the Elmira, New York area. This Corning-area aquifer is continuous with the Elmira-Horsehead-Big Flats-area aquifer located to the east (Waller and Finch 1982).

Observations of the Tioga and Cohocton rivers during the drilling task showed water levels approximately 20 feet below the average ground surface of the site in November 1993. Therefore, it appears that these rivers (and probably Weaver Hollow Brook) act as groundwater receptors in the area. Relative river elevations were not documented in March 1994. However, the March 1994 groundwater contours are not significantly different than the November 1993 contours, except that the average groundwater elevation was higher in March.

Since shallow groundwater flow in the immediate area of the landfill is radial, no well is considered to be representative of background conditions because all wells are downgradient of a portion of the landfill. Flow is towards the Cohocton River on the northeast side of the landfill, towards Weaver Hollow Brook on the southwest side of the landfill, and towards the Tioga River on the southeast side of the landfill.

### 3.5 SAMPLING

Sampling for this phase of the investigation was conducted during four separate events. Surficial sampling, including surface soil, surface water, sediment, and one waste material sample, was conducted on August 6, 1993. Subsurface soil sampling took place on October 4 through 12, 1993 as part of the well drilling task. Groundwater sampling was conducted on November 4 and 5, 1993. Container sampling was conducted on May 4, 1994.

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 (see Figure 3-1). The five leachate samples proposed in the work plan were replaced by two surface soil samples and one waste sample, with the concurrence of

NYSDEC, because no leachate was present at the time of sampling. 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 the 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 site, with the exception of the analytical data from the container sampling event (May 1994), were third-party qualified by ChemWorld Environmental, Inc. Table 3-3 summarizes the samples collected and analyses performed.

Data summary forms and a data usability review are provided in Appendix E. Table 3-4 through Table 3-24 present the analytical results for each media sampled. Table 3-25 provides a list of PAHs that were analyzed for. Tentatively identified compounds (TICs) are presented with the data summary forms in Appendix E.

### 3.5.1 Surface Water and Sediment

Five surface water (SW-1 to SW-5) and five sediment (SD-1 to SD-5) samples were collected from a drainage ditch, storm sewer system, and an area of ponded water on site as indicated on Figure 3-1. A matrix spike/matrix spike duplicate (MS/MSD) sample set was collected at SW-2 for QA/QC purposes. Each surface water and sediment sample was analyzed for Target Compound List organic and inorganic analytes (full TCL). Although these bodies of water are not shown on reference maps, they are assigned to Class D since they are not continuous flowing natural streams (6 NYCRR 811). Therefore, NYSDEC Class D surface water standards were used for screening purposes.

Surface water/sediment samples SW/SD-1 through SW/SD-4 were collected from the drainage system running along the northern edge of the site that discharges to the Cohocton River. Samples SW/SD-1 were collected from an open swale northeast of the landfill to represent upgradient conditions. Samples SW/SD-2 were collected at a culvert where this open swale enters an underground sewer system. Samples SW/SD-3 were collected from a manhole along the storm sewer. Samples SW/SD-4 were collected from a culvert north of the northern flood levee where the storm sewer system discharges into an open swale leading to the Cohocton River. Surface water/sediment samples SW/SD-5 were collected from a swale on the south side of the landfill. Areas of stressed vegetation and accumulated leachate were observed in this area during previous investigations (E & E 1992; NUS 1990).

No organic compounds other than common laboratory contaminants were detected in surface water samples SW-1 through SW-5. Eleven metals were detected in one of more of samples SW-1 through SW-4 (see Table 3-4). None of the metals detected in these four samples exceeded NYSDEC Class D surface water standards. Sample SW-5 contained 17 metals, with most at significantly higher concentrations than detected in samples SW-1 through SW-4. However, only iron (6,210 $\mu$g/L) and nickel (35.4 $\mu$g/L) exceeded the NYSDEC Class D standards. Cyanide was not detected in any of the surface water samples.

Table 3-5 summarizes the organic compounds detected in the sediment samples. Low levels of PAHs were detected in SD-1, SD-4, and SD-5. Total PAH concentrations in these samples ranged from an estimated 260 $\mu$g/kg in SD-5 to approximately 2,200 $\mu$g/kg in SD-1. Several volatile organic compounds (VOCs) were also detected in sample SD-5 at low concentrations including acetone, carbon disulfide, chloroform, 2-butanone, chlorobenzene, toluene, ethylbenzene, styrene, and total xylenes.

Table 3-6 summarizes the inorganic analytes detected in the sediment samples. Nineteen metals were detected in one or more of the sediment samples. The results were compared to the observed range of background concentrations in eastern United States soils and other surficial materials (Shacklette and Boerngen 1984), as well as to the upper limit of the 90th percentile for these ranges. No metals exceeded the upper limit of the 90th percentile in samples SD-2 and SD-3. In SD-1, calcium, lead, and zinc exceeded the upper limit of the 90th percentile. In SD-4, zinc exceeded the upper limit of the 90th percentile. In SD-5, arsenic, calcium, lead, and zinc exceeded the upper limit of the 90th percentile. No metals exceeded the observed range in any of the samples. The following metals were found to be at least five times greater than background sample SD-1: arsenic in SD-5; sodium in SD-2, SD-4, and SD-5; and zinc in SD-2, SD-3, SD-4, and SD-5. Cyanide was not detected in the sediment samples.

### 3.5.2 Surface Soil

Surface soil samples were collected on August 6, 1993 from the top 6 inches of soil at the seven locations indicated on Figure 3-1. An MS/MSD sample set was collected at SS-2 for QA/QC purposes. The sample analysis included full TCL parameters. SS-1 was a composite sample collected from soil at both ends of an oil storage tank. The soil at the west end of the tank appeared to be stained. Sample SS-2 was collected from an area of sparse vegetation, thought to be the site of a leachate pool observed during the May 3, 1991 site reconnaissance. Sample SS-3 was collected from the northern end of the drainage swale along the southeast side of the site. Sample SS-4 was collected on top of the landfill in the bottom of a depression. An area of orange staining, presumably the result of a leachate outbreak, in the drainage swale south of the landfill was the location of sample SS-5. SS-6 was collected from the access road leading to the top of the landfill. No visible soil discoloration was present at this location, but numerous glass fragments were present. Sample SS-7 was taken east of the flood levee on the southeast side of the site to represent a background level.

The organic compounds detected in the surface soil samples are shown in Table 3-7. Organic compounds detected include 1,1,1-trichloroethane (1,1,1-TCA), PAHs, phthalates, the pesticides 4,4'-DDT, and 4,4'-DDE, and the PCB Aroclor-1260. The only VOC detected was 1,1,1-TCA in the reanalysis of background sample SS-7. This compound was also detected in four other surface soil samples, but at comparable levels to that in the associated method blank. Therefore, it is only considered detected in sample SS-7RE.

PAHs were detected in each of the surface soil samples except SS-4. Total PAH concentrations are shown in Table 3-7. Sample SS-1 contained the highest total PAH concentration, as well as the greatest number of individual PAH compounds. The individual PAHs detected in each of the samples are included in Appendix E. The PAH concentrations detected in samples SS-2 and SS-3 were not significantly different from the background sample, SS-7. However, the total concentrations detected in SS-1 and SS-6 were approximately 13 and five times greater than in SS-7, respectively.

Phthalates were detected in all surface soil samples except SS-6. While not detected in the associated method blanks, the presence of very low concentrations of diethylphthalate in SS-4, di-n-butylphthalate in SS-2, SS-3, and SS-4, and bis(2-ethylhexyl)phthalate in SS-1, SS-5, and SS-7 are likely the result of field and/or laboratory contamination since phthalate esters are constituents of the gloves used during sampling and analysis. Bis(2-ethylhexyl)phthalate detected at 940 $\mu$g/kg in SS-2 is considered site related.

The pesticide 4,4'-DDT and its degradation product 4,4'-DDE were identified at concentrations of 260 $\mu$g/kg (estimated) and 160 $\mu$g/kg, respectively, in sample SS-6. The PCB Aroclor-1260 was present in SS-1 at an estimated 2,500 $\mu$g/kg. No pesticides or PCBs were identified in the other surface soil samples including the site background sample, SS-7.

Table 3-8 summarizes the inorganic analytes detected in the surface soil samples. The results were compared to the observed ranges for eastern U.S. soils and other surficial materials (Shacklette and Boerngen 1984) as well as to the upper limit of the 90th percentile. Twenty metals were detected in one or more of the surface soil samples. Of these, the following metals exceeded the upper limit of the 90th percentile: arsenic in SS-2; copper in SS-1 and SS-2; lead in SS-1, SS-2, and SS-6; nickel in SS-1; and zinc in SS-1, SS-2, and SS-6. Additionally, the concentrations of lead detected in samples SS-1 and SS-2 exceeded the observed range of background concentrations.

Cyanide was detected in one surface soil sample (SS-1) at a concentration of 1.1 mg/kg.

### 3.5.3 Waste Material

One waste material sample (W-1) was collected on August 6, 1993 adjacent to a partially exposed and leaking drum in a swale on the southwest side of the landfill (see Figure 3-1). The sample was analyzed for full TCL parameters, organics according to the toxicity characteristic leaching procedure (TCLP), and ignitability. Due to analytical difficulties encountered during the original analysis, an additional volume was collected on November 5, 1993 for TCLP herbicide reanalysis. The material sampled was an oily, adhesive-like substance that appeared to originate from the partially exposed drum. This substance was black on the surface with a gray substrate, possibly an oil-water emulsion, underneath. The sample was difficult to collect due to the sticky nature of the material. A dead songbird covered with the oily material was present nearby.

Organic analysis of waste sample W-1 identified 13 VOCs and two semivolatile organic compounds as shown in Table 3-9. The waste sample contained three types of VOCs. Three ketones (acetone, 2-butanone, and 4-methyl-2-pentanone) were detected at an estimated total concentration of 8,900 $\mu$g/kg. Three aromatic hydrocarbons (toluene, ethylbenzene, and xylenes) were detected at an estimated total concentration of 1,200 $\mu$g/kg. The remaining seven VOCs were chlorinated hydrocarbons totalling an estimated 96,000 $\mu$g/kg.

The only semivolatile compounds detected in sample W-1 were phenol and 4-methylphenol (see Table 3-9). No PCBs or pesticides were detected. As shown in Table 3-10, the only compound identified in the TCLP analysis was 4-methylphenol at 0.31 mg/L (this compound coelutes with 2- and 3-methylphenol and the two are therefore indistinguishable). The flashpoint of the waste was found to be above 140° F.

Inorganic analysis results for the waste sample are included in Table 3-11. Twelve metals were detected in W-1. In general, this sample contained inorganics at levels below those detected in background soil sample SS-7. Though the sample was primarily composed of waste, it did contain some soil which may have contributed to some of the inorganic content observed. While not directly applicable, the results were compared to background concentrations in eastern U.S. soils and other surficial materials (Shacklette and Boerngen 1984) in order to provide a cursory comparison. Only lead was observed at a concentration (40.4 mg/kg) above the upper limit of the 90th percentile.

### 3.5.4 Subsurface Soil

One subsurface soil sample was collected from each monitoring well boring (MW-1 through MW-6) for full TCL analysis. Additionally, the waste material encountered in boring AMW-1 was collected and analyzed for EP toxicity metals. A summary of the subsurface soil sample parameters and depths is presented in Table 3-12. One MS/MSD sample set was also collected (from MW-5) for QA/QC purposes.

The waste material sampled from boring AMW-1 consisted of a gray, paste-like substance. The EP toxicity metals results for this sample are shown in Table 3-13. Barium, chromium, and lead were detected in the extract prepared from the waste material, but all at concentrations below the regulatory levels.

The organic compounds detected in the subsurface soil samples are shown in Table 3-14. The only VOC detected other than common laboratory contaminants was total xylenes at an estimated concentration of 1 $\mu$g/kg in MW-1. Semivolatile organic compounds detected in the subsurface soil samples include PAHs, dibenzofuran, phthalates, pesticides, and PCBs. PAHs were detected in samples MW-2 and MW-3 at estimated total concentrations of 4,100 and 1,200 $\mu$g/kg, respectively. Dibenzofuran, which like PAHs, results from incomplete combustion of organic material, was detected only in MW-2 at an estimated 53 $\mu$g/kg. Phthalates were detected in samples MW-2, MW-3, and MW-4A. While not present in the associated method blanks, the presence of di-n-butylphthalate in MW-2 and MW-4A as well as butylbenzylphthalate in MW-2 are suspected to be the result of field/laboratory contamination by rubber gloves. Since four phthalates were detected in MW-3 at a total concentration of approximately 4,600 μg/kg, their presence is attributed to site-related contamination. The presence of these compounds is consistent with the fact that fill material was encountered in the boring of MW-3.

Pesticide analysis of the subsurface soil samples detected 4,4'-DDD in sample MW-3 (46 μg/kg), and 4,4'-DDT in MW-1 (140 μ/kg), MW-3 (53 μg/kg), and MW-6 (190 μg/kg). PCBs were detected in two subsurface soil samples. Aroclor-1248 was present in MW-2 (24 μg/kg), and Aroclor-1260 was present in MW-5 (60 μg/kg). PCBs were not detected elsewhere in the subsurface soils on the site.

As shown in Table 3-15, 19 of the 24 inorganics analyzed for were detected in one or more of the subsurface soil samples. When compared to background concentrations for eastern U.S. soils, elevated levels of inorganic analytes were found in subsurface soil samples MW-1, MW-2, MW-3, MW-4, and MW-5. Metals detected above the upper limit of the 90th percentile in one or more of the subsurface soil samples included antimony, calcium, copper, lead, magnesium, and zinc. The only metal detected above the observed range for eastern U.S. soils was antimony, which was detected only in MW-3 at an estimated 308 mg/kg. The remaining metals exceeded the upper limit of the 90th percentile as follows: calcium in MW-1, MW-2, and MW-4; copper in MW-2; lead in MW-3 and MW-5; magnesium in MW-4; and zinc in MW-2. Cyanide was not detected in any of the subsurface soil samples.

### 3.5.5 Groundwater

Groundwater samples from the six monitoring wells (MW-1 to MW-6) and the water supply well (MW-7) at the wastewater treatment plant were collected on November 4 and 5, 1993. All samples were analyzed for full TCL parameters. An MS/MSD sample set was collected at MW-2 for QA/QC purposes. Prior to sample collection, water level and total depth measurements were recorded for wells MW-1 through MW-6, and each well was purged of three standing volumes. Due to high turbidities (i.e. >200 NTUs) encountered upon completion of well purging, the suspended solids in the wells were allowed to settle for a period of no longer than 24 hours prior to collecting the inorganic groundwater sample portions. However, due to the presence of silt and clay in the aquifer, sample turbidities remained above 200 NTU throughout this time period. Following collection of the inorganic sample portion, the wells were again purged of three volumes and the organic sample portion was collected immediately thereafter.

The water supply well at the wastewater treatment plant is used as a potable water source at the plant. This well contains a submersible pump and was not readily accessible. Therefore, sample MW-7 was collected from the cold water tap nearest the well. Water was allowed to run from this tap for approximately five minutes prior to sample collection. Since the turbidity of this sample was low, both the organic and inorganic sample portions were collected at the same time. Turbidity, pH, conductivity, and temperature measurements for all samples were recorded at the time of sampling and are presented in Table 3-16.

The organic compounds detected in the groundwater samples are presented in Table 3-17. The results were compared to NYSDEC Class GA groundwater standards. Low levels of several VOCs were found in MW-1 through MW-4. No VOCs were detected in samples MW-5, MW-6, or MW-7. VOCs identified included chloroethane at 87 $\mu$g/L in MW-4; carbon disulfide at an estimated concentration of 2 $\mu$g/L in MW-2; toluene at estimated levels of 1 $\mu$g/L and 2 $\mu$g/L in MW-1 and MW-2, respectively; chlorobenzene at an estimated concentration of 6 $\mu$g/L in MW-4; and total xylenes at 17 $\mu$g/L in MW-2 and an estimated concentration of 9 $\mu$g/L in MW-3. The chloroethane and chlorobenzene concentrations detected in MW-4 and the total xylenes detected in MW-3 were the only VOCs present in the groundwater samples at concentrations above the NYSDEC Class GA standards. Although toluene, ethylbenzene, and total xylenes were detected in the drill water sample (see Section 3.4.1), it is unlikely that these contaminants significantly impacted the quality of the groundwater samples because the drill water was not directly introduced to any of the monitoring well borings or screened portions of the wells during construction. The drill water was only used for hydrating the bentonite seal, mixing grout, and decontamination. The bentonite would have acted as a barrier preventing migration to the screened portion of the wells, and the mixing of grout and the conversion of the water to steam during decontamination would have likely volatilized the contaminants.

Low levels of semivolatile organic compounds were identified in samples MW-3 and MW-7. The low concentrations of phthalates detected in both of these samples are likely due to field/laboratory contamination resulting from the use of latex rubber gloves. The only other semivolatile detected in the groundwater samples was 4-methylphenol at an estimated concentration of 1 $\mu$g/L in MW-3. One PCB, Aroclor-1242, was detected in MW-2 at an estimated 0.62 $\mu$g/L. This level exceeds the NYSDEC Class GA groundwater standard of 0.1 $\mu$g/L.

A variety of metals concentrations were detected in groundwater samples including many concentrations in excess of the NYSDEC Class GA groundwater standards and guidance values (see Table 3-18). The highest levels of significant inorganic contamination were found at MW-1 where arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, sodium, and zinc exceeded the Class GA standard or guidance value.

Sodium, manganese, magnesium, and iron exceeded the NYSDEC Class GA standards or guidance values in every well (except magnesium in MW-6). Other metals which exceeded NYSDEC Class GA standards and guidance values in the six monitoring well samples include: antimony in MW-3; arsenic in MW-1, MW-3, and MW-4; barium, beryllium, cadmium, and copper in MW-1; chromium in MW-1 and MW-3; lead in MW-1, MW-3, MW-4, and MW-5; and zinc in MW-1 MW-4, and MW-5. In sample MW-7 collected from the supply well, barium, iron, magnesium, manganese, and sodium were detected at concentrations exceeding NYSDEC Class GA standards and guidance values.

### 3.5.6 Container Sampling

On May 4, 1994, a team from E & E performed an inspection and inventory of 18 containers present near a vehicle path on the west side of the landfill in an area formerly used for storage by Steuben County. These containers were first observed by E & E and NYSDEC during the August 6, 1993 site visit. The containers are believed to have been abandoned at the site after the landfill was closed in 1983 (McCarthy 1993). However, Town of Erwin officials were unaware of their source or contents (Houghtaling 1993). A sketch map of the relative positions of the containers is provided in Figure 3-5. Two groups of containers were present: the north group consisted of eight 55-gallon drums and the south group consisted of seven 55-gallon drums, two 5-gallon containers, and one approximately 1,000-gallon tank. An inventory of these containers including their contents, condition, and markings is presented in Table 3-19. Table 3-19 also includes drum S-10 which contains investigation-derived waste generated during field hazardous categorization testing and sampling. Photographs of the drums are provided in Appendix G, and logs from drum sampling are presented in Appendix H.

Small aliquots of the material inside the containers were obtained from all but four of the drums for field hazard categorization. The five drums that were not sampled (N-1, S-4, S-6, S-7, and S-10) were empty, contained only solid domestic trash, or contained investigation-derived waste. Samples of liquid were obtained with dedicated glass thieving rods. For hazard categorization purposes, liquid in contact with the solid material in drum S-1 was sampled, rather than the solid itself. Liquid samples were necessary for the field chemistry performed. Multiple layers of liquid were found in drums N-3, N-6, N-7, and S-2. A single sample that included each layer was collected from each of these drums. Hazard categorization was subsequently performed on each layer if enough material was present.

Hazard categorization involves the use of field chemistry techniques to qualitatively determine the physical and chemical properties of an unknown material. The samples collected from the containers were tested for: solubility in hexane and/or water; pH; the presence of cyanide, sulfide, and chlorinated hydrocarbons; and whether the material was an oxidizer or flammable. Results of the hazard categorization are presented in Table 3-20.

Field chemistry results indicate that of those samples tested, all but two were at least partially soluble in water. The two which were not (upper layers of N-6 and S-2) were petroleum-based products and were soluble in hexane. Of those measured, all samples had pHs between 5 and 7 standard units except S-5 which had a pH of 11. None of the samples were found to contain cyanide, sulfide, or chlorinated hydrocarbons, and none exhibited the characteristics of an oxidizer. One sample from the upper layer of N-3 was found to be flammable; while three samples from the upper layers of N-6 and S-2 and the sample from S-5, as well as the traces of oil in the sample from the tank, were found to be combustible.

Based on the hazard categorization results, it was preliminarily determined that drums N-2, N-4, N-5, N-8, S-3, and S-8 contained rainwater. Container S-9 also contained rainwater but with a petroleum-based sheen resulting from its former contents. A flame ionization detector (FID) reading of 10 ppm above background was obtained from this container. The contents of drum S-5 had properties consistent with a soap product. The liquid sampled from drum S-1 was also determined to be rainwater that did not appear to have been affected by the solid contents of this drum. The physical characteristics of the solid material in this drum were consistent with polyurethane foam insulation. A solvent odor was noted in this drum during the August 1993 site visit. However, during hazard categorization, no FID readings above background were observed. Containers N-6 and S-2 each contained a combustible, petroleum-based, product layer floating on water. Drum N-3 is labeled as a herbicide, and contained a flammable, petroleum-based, product layer floating on a milky-looking aqueous solution that presumably was an emulsion of drum residues from the previous contents. Drum N-7 was not labeled, but appeared to contain the same material as N-3. The tank contents appeared to consist of water with traces of residual petroleum product.

Based on the above determinations, samples of the drum contents were collected for laboratory analysis. Table 3-21 lists the samples collected and analyses performed. Each of the containers were sampled for further laboratory analysis except for containers N-1, S-4, S-6, S-7, S-9, S-10, and the tank. Container S-9 did not contain sufficient volume for analysis, and it was agreed upon with the NYSDEC representative that the tank contents were sufficiently characterized in the field and did not require additional analysis. The water from drums N-2, N-4, N-5, N-8, S-3, and S-8 was composited into one sample (DM-W). Individual samples were obtained from containers S-1, S-2, S-5, N-3, N-6, and N-7.

In addition to the drum content samples, one composite soil sample (DS-1) was collected. This sample consisted of soil collected from 10 discrete locations adjacent to the drums and a nearby electrical utility box in order to determine if leaks or spills had occurred. No evidence of soil staining was observed; therefore, the discrete soil samples were collected from low spots around the drums in areas where liquids would have pooled in the event of a spill. The electric utility box was located between the two drum groups. Soil beneath the box was sampled in the event that it contained oil-bearing transformers or capacitors. For QA/QC purposes, an MS/MSD sample set was collected with soil sample DS-1. A trip blank was also shipped with the samples for QA/QC purposes. The trip blank analysis showed only the presence of methylene chloride at a concentration below the quantitation limit. While not detected in the laboratory method blank, the presence of methylene chloride in the trip blank is considered suspect due to laboratory contamination.

The organic compounds detected in the soil and container content samples are shown in Table 3-22. The metals detected in soil samples DS-1 and the lead contents of samples DM-N-6 and DM-S-2 are included in Table 3-23. Table 3-24 summarizes the hazardous waste characteristics analyses results.

The soil sample collected around the bases of the drums (DS-1) contained no VOCs, pesticides, or PCBs. Semivolatiles were detected, including total PAHs at approximately 3,000 $\mu$g/kg and two phthalate esters. The concentrations of the phthalates detected suggest that they may have resulted from the use of rubber gloves in the field and/or laboratory. This soil sample was also found to contain 18 metals. Of these, lead at 102 mg/kg, selenium at 1.4 mg/kg, and zinc at 264 mg/kg were detected at concentrations exceeding the upper limit of the 90th percentile of background concentrations in eastern U.S. soils (Shacklette and Boerngen 1984). However, no metals were detected at levels exceeding the observed range of background concentrations in eastern U.S. soils. Additionally, this soil did not exhibit the characteristics of a reactive, corrosive, or ignitable waste.

Four drum content samples were subjected to TCL VOC and pesticide/PCB analyses (see Table 3-22). This includes two oil samples (DM-S-2 and DM-N-6) and two unknown white liquid samples suspected of containing herbicides (DM-N-3 and DM-N-7). Three of the four samples (excluding DM-N-3) contained methylene chloride below the quantification limits. While not detected in the laboratory method blank, the presence of methylene chloride in these samples is considered suspect due to laboratory contamination. Oil sample DM-N-6 was found to contain toluene at 12,000 $\mu$g/kg, ethylbenzene at approximately 690 $\mu$g/kg, and total xylenes at 7,500 $\mu$g/kg, but pesticides and PCBs were not detected. Lead was detected at 122 mg/kg in sample DM-N-6. The only VOC detected in soil sample DM-S-2 was total xylenes at approximately 650 $\mu$g/kg. However, the pesticide endosulfan sulfate was detected in this sample at 1,000 $\mu$g/kg and lead was detected at 14.1 mg/kg. Oil sample DM-S-2 was also subjected to hazardous waste characteristics analysis but did not exhibit the properties of a reactive, corrosive, or ignitable waste.

Acetone was detected in sample DM-N-7 at 1,500 $\mu$g/kg and TCE was detected in DM-N-3 at 1,400 $\mu$g/kg. Both samples also contained PCE: DM-N-3 at 940,000 $\mu$g/kg and DM-N-7 at 150,000 $\mu$g/kg. These two samples also both contained toluene, ethylbenzene, and total xylenes at total concentrations of an estimated 350,000 $\mu$g/kg in DM-N-3 and 96,000 $\mu$g/kg in DM-N-7. Both samples contained less than 1 $\mu$g/L of endosulfan sulfate. DM-N-3 contained approximately 1.3 $\mu$g/L of heptachlor epoxide (see Table 3-22).

Sample DM-S-1 consisted of material which appeared to be polyurethane foam insulation. This material was tested for hazardous waste characteristics and TCLP VOCs. No VOCs were detected in the extract prepared from the sample. Additionally, it did not exhibit the characteristics of a reactive, corrosive, or ignitable waste.

The soap-like material (DM-S-5) and composite drum water sample (DM-W) were each tested for hazardous waste characteristics. As shown in Table 3-24, neither exhibited the properties of a reactive, corrosive, or ignitable waste.

### 3.6 SURVEYING

Following completion of the sampling activities, the significant features of the site were surveyed to a vertical accuracy of 0.05 feet, with well casings to within 0.01 feet, and a horizontal precision of 1/10,000. The vertical datum used was a benchmark provided by the Town of Erwin, which was the finished floor of the wastewater treatment plant control building, at an elevation of 946.50 feet. The physical features of this site and all PSA sampling locations were surveyed and are shown on Figures 1-2 and 3-1. Property lines were not surveyed. Town of Erwin tax maps and a survey map provided by the Town (Wieland 1992) were used to approximate the property boundaries (see Figure 3-6).

| Table 3-1<br><br>MONITORING WELL CONSTRUCTION DATA<br>ERWIN TOWN LANDFILL SITE | | | | |
|---|---|---|---|---|
| Well No. | Total Depth (feet BGS) | Screen Interval (feet BGS) | Ground Elevation (feet AMSL) | Inner Casing Elevation (feet AMSL) |
| MW-1 | 22.0 | 11.0-21.0 | 939.05 | 941.11 |
| MW-2 | 18.0 | 7.0-17.0 | 935.77 | 938.02 |
| MW-3 | 21.0 | 10.0-20.0 | 937.05 | 939.07 |
| MW-4 | 22.0 | 11.0-21.0 | 934.75 | 937.23 |
| MW-5 | 19.0 | 8.0-18.0 | 933.00 | 934.88 |
| MW-6 | 19.0 | 8.0-18.0 | 931.72 | 933.92 |

Key:

AMSL = Above mean sea level. Benchmark is finished floor of control building at treatment facility (946.50 feet AMSL).

BGS = Below ground surface.

## Table 3-2

## GROUNDWATER ELEVATION DATA
## ERWIN TOWN LANDFILL SITE

| Well No. | November 14, 1993 | | March 28, 1994 | |
|---|---|---|---|---|
| | Depth to Water (feet BGS) | Groundwater Elevation (feet AMSL) | Depth to Water (feet BGS) | Groundwater Elevation (feet AMSL) |
| MW-1 | 15.37 | 925.74 | 9.09 | 932.02 |
| MW-2 | 11.41 | 926.61 | 7.11 | 930.91 |
| MW-3 | 14.38 | 924.69 | 9.08 | 929.99 |
| MW-4 | 12.81 | 924.42 | 7.38 | 929.85 |
| MW-5 | 10.29 | 924.59 | 3.19 | 931.69 |
| MW-6 | 7.65 | 926.27 | 3.24 | 930.68 |

Key:

AMSL = Above mean sea level. Benchmark is finished floor of control building at treatment facility (946.50 feet AMSL).

BGS = Below ground surface.

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**Table 3-3**

**SAMPLING AND ANALYSIS SUMMARY**
**ERWIN TOWN LANDFILL SITE**

| Sample Identification | Target Compound List: Volatiles | Target Compound List: Semivolatiles | Target Compound List: Pesticides/ PCBs | Target Compound List: Metals | Target Compound List: Total Cyanide | EP Toxicity Metals | TCLP Organics | Ignitability |
|---|---|---|---|---|---|---|---|---|
| **Groundwater** | | | | | | | | |
| Monitoring Wells MW-1 to MW-6 | X | X | X | X | X | — | — | — |
| Treatment Plant Well MW-7 | X | X | X | X | X | — | — | — |
| **Waste** | | | | | | | | |
| W-1 | X | X | X | X | X | — | X | X |
| **Drill Water** | | | | | | | | |
| DW-1 | X | X | X | X | — | — | — | — |
| **Surface Water** | | | | | | | | |
| SW-1 to SW-5 | X | X | X | X | X | — | — | — |
| **Sediment** | | | | | | | | |
| SD-1 to SD-5 | X | X | X | X | X | — | — | — |
| **Surface Soil** | | | | | | | | |
| SS-1 to SS-7 | X | X | X | X | X | — | — | — |
| **Subsurface Soil** | | | | | | | | |
| MW-1 | X | X | X | X | X | — | — | — |
| AMW-1 | — | — | — | — | — | X | — | — |
| MW-2 | X | X | X | X | X | — | — | — |
| MW-3 | X | X | X | X | X | — | — | — |
| MW-4A | X | X | X | X | X | — | — | — |
| MW-5A | X | X | X | X | X | — | — | — |
| MW-6 | X | X | X | X | X | — | — | — |

Note: See Table 3-21 for drum sample analyses.

Key:

X = Analysis performed.
— = Analysis not performed.
EP Toxicity = Extraction procedure toxicity.
PCBs = Polychlorinated biphenyls.
TCLP = Toxicity Characteristic Leaching Procedure.

**Table 3-4**

**INORGANIC ANALYTES DETECTED IN SURFACE WATER SAMPLES**
**ERWIN TOWN LANDFILL SITE**
**(all values reported in $\mu$g/L, except as noted)**

| Analyte | Background SW-1 | SW-2 | SW-3 | SW-4 | SW-5 | NYSDEC Class D Surface Water Standards and Guidance Values[a] |
|---|---|---|---|---|---|---|
| Antimony | ND | ND | ND | 43.8 | 199 J | NA |
| Arsenic | ND | ND | ND | ND | 323 J | 360 |
| Barium | 119 J | 124 | 124 | 123 | 489 J | NA |
| Calcium | 74,900 | 77,200 | 76,300 | 76,200 | 75,800 J | NA |
| Cobalt | ND | ND | ND | ND | 7.9 J | 110 G |
| Copper | 5.4 J | 7.2 | 5.3 | 5.7 | 15.0 J | 59[b] |
| Iron | 41.3 J | 61.5 | 38.9 | 18.3 | 6,210 J | 300 |
| Lead | ND | ND | ND | ND | 23.8 J | 369[b] |
| Magnesium | 18,500 | 19,200 | 18,900 | 18,800 | 89,800 J | NA |
| Manganese | ND | 2.2 | 1.8 | 2.6 | 376 J | NA |
| Nickel | ND | ND | ND | ND | 35.4 J | 1.5[b] |
| Potassium | 2,150 J | 2,300 | 2,060 | 2,150 | 413,000 J | NA |
| Sodium | 27,100 J | 27,700 | 27,400 | 27,300 | 195,000 J | NA |
| Thallium | ND | ND | ND | ND | 10.5 J | 20 |
| Vanadium | ND | ND | ND | ND | 5.3 J | 190 |

Key at end of table.

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## Table 3-4

## INORGANIC ANALYTES DETECTED IN SURFACE WATER SAMPLES
## ERWIN TOWN LANDFILL SITE
## (all values reported in µg/L, except as noted)

| Analyte | Background SW-1 | SW-2 | SW-3 | SW-4 | SW-5 | NYSDEC Class D Surface Water Standards and Guidance Values[a] |
|---|---|---|---|---|---|---|
| Zinc | ND | 4.3 | ND | 3.6 | 34.2 J | 857[b] |
| Total Hardness (mg/L as $CaCO_3$) | 263 | 271 | 268 | 267 | 557 | NA |

Note: Samples collected August 6, 1993.
Shaded values exceed the NYSDEC Class D surface water standards.

[a] NYSDEC 1993.
[b] Standard is a function of hardness (value calculated based on average hardness of 326 mg/L).

Key:

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



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## Table 3-5

**ORGANIC COMPOUNDS DETECTED IN SEDIMENT**
**ERWIN TOWN LANDFILL SITE**
**(all values reported in μg/kg)**

| Compound | Background SD-1 | SD-2 | SD-3 | SD-4 | SD-5 |
|---|---|---|---|---|---|
| **Volatiles** | | | | | |
| Acetone | ND | ND | ND | ND | 190 |
| Carbon Disulfide | ND | ND | ND | ND | 2 J |
| Chloroform | ND | ND | ND | ND | 1 J |
| 2-Butanone | ND | ND | ND | ND | 30 |
| Toluene | ND | ND | ND | ND | 2 J |
| Chlorobenzene | ND | ND | ND | ND | 3 J |
| Ethylbenzene | ND | ND | ND | ND | 2 J |
| Styrene | ND | ND | ND | ND | 1 J |
| Total Xylenes | ND | ND | ND | ND | 5 J |
| **Semivolatiles** | | | | | |
| Total PAHs | 2,200 J | ND | ND | 570 J | 260 J |
| Phenanthrene | 200 J | ND | ND | 74 J | 34 J |
| Fluoranthene | 440 J | ND | ND | ND | ND |
| Pyrene | 370 J | ND | ND | 110 J | 59 J |
| Benzo(a)anthracene | 130 J | ND | ND | 150 J | 60 J |
| Chrysene | 240 J | ND | ND | 86 J | ND |
| Benzo(b)fluoranthene | 230 J | ND | ND | 150 J | 110 J |
| Benzo(k)fluoranthene | 130 J | ND | ND | ND | ND |
| Benzo(a)pyrene | 180 J | ND | ND | ND | ND |
| Indeno(1,2,3-cd)pyrene | 150 J | ND | ND | ND | ND |
| Benzo(g,h,i)perylene | 140 J | ND | ND | ND | ND |

Note: Samples collected August 6, 1993.

Key:

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

**Table 3-6**

**INORGANIC ANALYTES DETECTED IN SEDIMENT SAMPLES
ERWIN TOWN LANDFILL SITE
(mg/kg)**

| Analyte | Background | | | | | Background Concentrations in Eastern U.S. Soils[a] | |
|---|---|---|---|---|---|---|---|
| | SD-1 | SD-2 | SD-3 | SD-4 | SD-5 | Observed Range | Upper Limit of the 90th Percentile |
| Aluminum | 7,260 | 11,500 | 7,950 | 10,300 | 2,930 | 7,000- >100,000 | 128,000 |
| Arsenic | 3.5 | 5.3 | 3.4 | 7.1 | 26.9 | <0.1 - 73 | 16.0 |
| Barium | 115 | 187 | 105 | 179 | 168 | 10 - 1,500 | 867 |
| Beryllium | 0.42 J | 0.67 J | 0.42 | 0.66 | ND | <1 - 7 | 1.81 |
| Cadmium | 1.1 J | 1.3 J | 1.1 | 1.3 | 1.9 | 0.01 - 7.0[b] | NA |
| Calcium | 15,300 | 3,350 | 3,940 | 4,920 | 32,900 | 100 - 280,000 | 14,400 |
| Chromium | 12.0 | 18.0 | 12.8 | 17.2 | 8.0 | 1 - 1,000 | 112 |
| Cobalt | 10.9 J | 14.9 | 11.1 | 13.7 | 7.1 | <0.3 - 70 | 19.8 |
| Copper | 42.2 | 28.0 | 25.4 | 36.3 | 27.1 | <1 - 700 | 48.7 |
| Iron | 17,000 | 24,900 | 18,700 | 24,500 | 16,700 | 100 - >100,000 | 54,100 |
| Lead | 35.0 | 28.2 | 15.5 | 27.8 | 109 | <10 - 300 | 33.0 |
| Magnesium | 3,540 | 3,430 | 2,970 | 4,170 | 2,950 | 50 - 50,000 | 10,700 |
| Manganese | 440 | 764 | 346 | 698 | 1,360 | <2 - 7,000 | 1,450 |
| Nickel | 19.5 | 25.9 | 19.9 | 27.4 | 13.9 | <5 - 700 | 38.2 |
| Potassium | 600 J | 1,000 | 694 | 747 | 1,440 | 50 - 37,000 | 23,500 |
| Silver | ND | ND | ND | 1.2 | ND | 0.01 - 5[c] | NA |
| Sodium | 135 J | 119 | ND | 161 | 3,810 | <500 - 50,000 | 17,400 |
| Vanadium | 12.1 J | 17.9 | 13.2 | 17.0 | 9.5 | <7 - 300 | 140 |
| Zinc | 121 | 81.3 | 70.5 | 111 | 206 | <5 - 2,900 | 104 |

Note: Samples collected August 6, 1993.
Shaded values exceed upper limit of the 90th percentile but not the observed range.

Key at end of table.

**Table 3-6 (Cont.)**

[a] Shacklette and Boerngen 1984, except as noted.
[b] Dragun 1988.
[c] Lindsay 1979.

Key:

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

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Table 3-7

**ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES**
**ERWIN TOWN LANDFILL SITE**
**(μg/kg)**

| Compound | SS-1 | SS-2 | SS-3 | SS-4 | SS-5 | SS-6 | Background SS-7 |
|---|---|---|---|---|---|---|---|
| **Volatiles** | | | | | | | |
| 1,1,1-Trichloroethane | ND | ND | ND | ND | ND | ND | 26 J[a] |
| **Semivolatiles** | | | | | | | |
| Total PAHs | 5,100 J | 640 J | 640 J | ND | ND | 1,800 J | 385 J |
| Diethylphthalate | ND | ND | ND | 150 J | ND | ND | ND |
| Di-n-butylphthalate | ND | 29 J | 25 J | 34 J | ND | ND | ND |
| bis(2-Ethylhexyl)phthalate | 390 J | 940 | ND | ND | 93 J | ND | 38 J |
| **Pesticides and PCBs** | | | | | | | |
| 4,4'-DDE | ND | ND | ND | ND | ND | 160 | ND |
| 4,4'-DDT | ND | ND | ND | ND | ND | 260 J | ND |
| Aroclor-1260 | 2,500 J | ND | ND | ND | ND | ND | ND |

Note: Samples collected August 6, 1993.

[a] Detected in reanalyzed sample SS-7RE only.

Key:

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



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**Table 3-8**

**INORGANIC ANALYTES DETECTED IN SURFACE SOIL SAMPLES**
**ERWIN TOWN LANDFILL SITE**
**(mg/kg)**

| | | | | | | | Background | Background Concentrations In Eastern U.S. Soils[a] | |
|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | **SS-1** | **SS-2** | **SS-3** | **SS-4** | **SS-5** | **SS-6** | **SS-7** | **Observed Range** | **Upper Limit of 90th Percentile** |
| Aluminum | 9,510 | 6,950 | 4,660 | 7,020 | 1,960 | 3,690 | 4,520 | 7,000 - >100,000 | 128,000 |
| Arsenic | 6.4 | 26.0 | 13.0 | 5.9 | 4.5 | 14.3 | 5.4 | <0.1 - 73 | 16.0 |
| Barium | 163 | 204 | 150 | 199 | 67.2 | 172 | 82.1 | 10 - 1,500 | 867 |
| Beryllium | 0.51 J | 0.45 J | 0.55 J | 0.68 J | ND | 0.41 J | 0.43 J | <1 - 7 | 1.81 |
| Cadmium | 2.1 | 4.5 | 1.2 J | 0.87 J | ND | 1.4 | 0.93 J | 0.01 - 7.0[b] | NA |
| Calcium | 7,990 | 3,380 | 3,110 | 1,890 | 2,250 | 3,310 | 2,460 | 100 - 280,000 | 14,400 |
| Chromium | 31.4 | 12.8 | 7.6 | 11.0 | 3.4 | 8.3 | 8.3 | 1 - 1,000 | 112 |
| Cobalt | 17.3 | 10.1 J | 7.9 J | 11.2 J | 3.2 J | 7.0 J | 8.5 J | <0.3 - 70 | 19.8 |
| Copper | 94.2 | 49.9 | 19.7 | 17.3 | 7.2 | 46 | 14.2 | <1 - 700 | 48.7 |
| Iron | 38,000 | 14,700 | 12,500 | 14,600 | 5,220 | 11,200 | 12,100 | 100 - >100,000 | 54,100 |
| Lead | 3,210 | 572 | 30.1 | 27.4 | 26.1 | 201 | 20.0 | <10 - 300 | 33.0 |
| Magnesium | 5,810 | 2,270 | 1,620 | 1,900 | 465 J | 793 J | 1,790 | 50 - 50,000 | 10,700 |
| Manganese | 529 | 589 | 287 | 768 | 215 | 422 | 537 | <2 - 7,000 | 1,450 |
| Mercury | ND | ND | ND | ND | ND | 0.25 | ND | 0.01 - 3.4 | 0.265 |
| Nickel | 41.1 | 28.6 | 12.8 | 16.8 | 3.5 J | 8.4 J | 14.1 | <5 - 700 | 38.2 |

Key at end of table.

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**Table 3-8**

**INORGANIC ANALYTES DETECTED IN SURFACE SOIL SAMPLES
ERWIN TOWN LANDFILL SITE
(mg/kg)**

| Analyte | SS-1 | SS-2 | SS-3 | SS-4 | SS-5 | SS-6 | Background | Background Concentrations In Eastern U.S. Soils[a] | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SS-7 | Observed Range | Upper Limit of 90th Percentile |
| Potassium | 833 J | 1,240 J | 868 J | 1,090 J | 442 J | 567 J | 541 J | 50 - 37,000 | 23,500 |
| Selenium | 0.69 J | 0.49 J | 0.32 J | ND | ND | 0.59 J | ND | <0.1 - 3.9 | 0.941 |
| Sodium | 83.0 J | 384 J | 862 J | ND | 686 J | 151 J | 80.9 J | <500 - 50,000 | 17,400 |
| Vanadium | 16.5 | 10.1 J | 14.0 J | 11.2 J | 4.8 J | 10.0 J | 8.0 J | <7 - 300 | 140 |
| Zinc | 335 | 164 | 48.8 | 46.5 | 23.3 | 144 | 48.7 | <5 - 2,900 | 104 |
| Total Cyanide | 1.1 J | ND | ND | ND | ND | ND | ND | NA | NA |

Note: Samples collected August 6, 1993.
Shaded values exceed the observed range and/or the upper limit of the 90th percentile.

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

Key:

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



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## Table 3-9

## ORGANIC COMPOUNDS DETECTED IN WASTE SAMPLE ERWIN TOWN LANDFILL ($\mu g/kg$)

| Compound | W-1 |
|---|---|
| **Volatiles** | |
| Chloroethane | 21,000 |
| Acetone | 7,900 |
| 1,1-Dichloroethene | 220 J |
| 1,1-Dichloroethane | 44,000 |
| 1,2-Dichloroethane | 29 J |
| 2-Butanone | 580 J |
| 1,1,1-Trichloroethane | 31,000 J |
| 1,1,2-Trichloroethane | 73 J |
| 4-Methyl-2-pentanone | 430 J |
| Tetrachloroethene | 150 J |
| Toluene | 810 J |
| Ethylbenzene | 54 J |
| Total Xylenes | 370 J |
| **Semivolatiles** | |
| Phenol | 490 |
| 4-Methylphenol | 1,400 |

Note: Sample collected August 6, 1993.

Key:

J = Reported value is estimated.

Table 3-10

HAZARDOUS WASTE CHARACTERISTIC ANALYSIS OF WASTE SAMPLE
TCLP ORGANICS AND IGNITABILITY
ERWIN TOWN LANDFILL

| Compounds | W-1 | Regulatory Level |
|---|---|---|
| **TCLP Organics** | | |
| 4-Methylphenol | 0.31 mg/L | 200 mg/L[a] |
| **Ignitability** | No flash at 140°F | No flash below 140°F[b] |

Note: Sample collected August 6, 1993.

a 40 CFR 261.
b 6 NYCRR 371.

Table 3-11

INORGANIC ANALYTES DETECTED IN WASTE MATERIAL
ERWIN TOWN LANDFILL SITE
(mg/kg)

| Analyte | W-1 | Background Concentrations in Eastern U.S. Soils[a] | |
|---|---|---|---|
| | | Observed Range | Upper Limit of the 90th Percentile |
| Aluminum | 251 | 7,000 - >100,000 | 128,000 |
| Arsenic | 4.1 | <0.1 - 73 | 16.0 |
| Barium | 25.9 J | 10 - 1,500 | 867 |
| Calcium | 3,340 | 100 - 280,000 | 14,400 |
| Copper | 3.6 J | <1 - 700 | 48.7 |
| Iron | 1,490 | 100 - >100,000 | 54,100 |
| Lead | 40.4 | <10 - 300 | 33.0 |
| Magnesium | 294 J | 50 - 50,000 | 10,700 |
| Manganese | 174 | <2 - 7,000 | 1,450 |
| Potassium | 224 J | 50 - 37,000 | 23,500 |
| Sodium | 190 J | <500 - 50,000 | 17,400 |
| Zinc | 17.3 | <5 - 2,900 | 104 |

Note: Sample collected August 6, 1993.
Shaded value exceeds upper limit of the 90th percentile but not the observed range.

a While not directly applicable, these values were used for a conservative comparison (Shacklette and Boerngen 1984).

## Table 3-12

## SUBSURFACE SOIL SAMPLING SUMMARY
## ERWIN TOWN LANDFILL SITE

| Boring | Sample I.D. | Sample Depth (feet BGS) | Sample Date | Analysis | PID/FID Reading (ppm) |
|---|---|---|---|---|---|
| AMW-1 | AMW-1 | 6.0 - 8.0 | 10-4-93 | EP toxicity metals | 50/80 |
| MW-1 | MW-1 | 16.0 - 18.0 | 10-7-93 | Full TCL | 0/25 |
| MW-2 | MW-2 | 11.0 - 13.0 | 10-4-93 | TCL VOCs | 0/1,000 |
| | | 15.0 - 17.0 | 10-4-93 | Full TCL excluding VOCs | 0/100 |
| MW-3 | MW-3 | 5.0 - 7.0 | 10-5-93 | TCL VOCs | 0/10,000 |
| | | 14.0 - 17.0 | 10-5-93 | Full TCL excluding VOCs | 2/10,000 |
| MW-4 | MW-4A | 10.0 - 12.0 | 10-5-93 | TCL VOCs | 14/50 |
| | | 16.0 - 18.0 | 10-5-93 | Full TCL excluding VOCs | 0/10 |
| MW-5 | MW-5A | 8.0 - 10.0 | 10-6-93 | TCL VOCs | 0/100 |
| | | 14.0 - 16.0 | 10-6-93 | Full TCL excluding VOCs | 0/3 |
| MW-6 | MW-6 | 11.0 - 13.0 | 10-8-93 | Full TCL | 0/0 |

Key:

BGS = Below ground surface.
EP = Extraction procedure.
FID = Flame-ionization detector.
Full TCL = Target Compound List organics and inorganics.
PID = Photo-ionization detector.
VOCs = Volatile organic compounds.

| Table 3-13 | | |
|---|---|---|
| **EP TOXICITY METALS RESULTS FOR SAMPLE AMW-1 ERWIN TOWN LANDFILL SITE ($\mu$g/L)** | | |
| **Analyte** | **Concentration** | **Regulatory Level[a]** |
| Barium | 1,650 | 100,000 |
| Chromium | 9.3 | 5,000 |
| Lead | 75.4 | 5,000 |

Note: Sample AMW-1 consisted of waste material collected from 6 to 8 feet BGS from boring AMW-1 on 10-4-93.

[a] 6 NYCRR 371.

## Table 3-14

## ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES ERWIN TOWN LANDFILL SITE ($\mu$g/kg)

| Compound | MW-1 | MW-2 | MW-3 | MW-4A | MW-5A | MW-6 |
|---|---|---|---|---|---|---|
| **Volatiles** | | | | | | |
| Total Xylenes | 1 J | ND | ND | ND | ND | ND |
| **Semivolatiles** | | | | | | |
| Total PAHs | ND | 4,100 J | 1,200 J | ND | ND | ND |
| Dibenzofuran | ND | 53 J | ND | ND | ND | ND |
| Di-n-butylphthalate | ND | 53 J | 380 J | 53 J | ND | ND |
| Butylbenzylphthalate | ND | 240 J | 3,800 J | ND | ND | ND |
| bis(2-Ethylhexyl)phthalate | ND | ND | 370 J | ND | ND | ND |
| Di-n-octylphthalate | ND | ND | 35 J | ND | ND | ND |
| **Pesticides and PCBs** | | | | | | |
| 4-4'-DDD | ND | ND | 46 J | ND | ND | ND |
| 4-4'-DDT | 140 | ND | 53 | ND | ND | 190 |
| Aroclor-1248 | ND | 24 J | ND | ND | ND | ND |
| Aroclor-1260 | ND | ND | ND | ND | 60 | ND |

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

Key:

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

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Table 3-15

INORGANIC ANALYTES DETECTED IN SUBSURFACE SOIL SAMPLES
ERWIN TOWN LANDFILL SITE
(mg/kg)

| Analyte | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | Background Concentrations in Eastern U.S. Soils[a] | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Upper Limit of the 90th Percentile | Observed Range |
| Aluminum | 5,170 | 6,120 | 5,490 | 6,330 | 7,630 | 6,940 | 128,000 | 7,000 - >100,000 |
| Antimony | ND | ND | 308 J | ND | ND | ND | 1.58 | <1 - 8.8 |
| Arsenic | 4.2 | 5.0 | 5.6 | 5.0 | 9.3 | 15.4 | 16.0 | <0.1 - 73 |
| Barium | 147 | 72.1 | 67.7 | 80.9 | 107 | 158 | 867 | 10 - 1,500 |
| Beryllium | 0.20 J | 0.23 J | 0.25 J | 0.23 J | 0.30 J | 0.39 J | 1.81 | <1 - 7 |
| Cadmium | 1.5 | 1.8 | 1.7 | 1.6 | 1.4 | 1.5 | NA | 0.01 -7.0[b] |
| Calcium | 36,100 J | 18,400 J | 4,420 J | 48,100 J | 8,260 J | 2,350 J | 14,400 | 100 - 280,000 |
| Chromium | 11.2 | 25.8 | 37.1 | 17.6 | 15.0 | 11.3 | 112 | 1 - 1,000 |
| Cobalt | 8.1 J | 9.3 J | 9.4 J | 8.3 J | 9.7 J | 10.4 J | 19.8 | <0.3 - 70 |
| Copper | 24.9 | 58.6 | 29.4 | 20.7 | 30.4 | 20.5 | 48.7 | <1 - 700 |
| Iron | 13,800 | 18,300 | 15,000 | 15,000 | 16,400 | 17,800 | 54,100 | 100- > 100,000 |
| Lead | 14.2 | 28.3 | 82.3 | 15.2 | 34.1 | 13.9 | 33.0 | <10 - 300 |
| Magnesium | 10,000 | 5,350 | 1,950 | 12,100 | 5,250 | 2,590 | 10,700 | 50 - 50,000 |
| Manganese | 1,280 J | 461 J | 291 J | 971 J | 389 J | 910 J | 1,450 | <2 - 7000 |
| Mercury | ND | 0.16 | ND | ND | ND | ND | 0.265 | 0.01 - 3.4 |
| Nickel | 15.6 | 20.7 | 23.9 | 16.1 | 20.0 | 20.1 | 38.2 | <5 - 700 |

Key at end of table.

**Table 3-15**

**INORGANIC ANALYTES DETECTED IN SUBSURFACE SOIL SAMPLES**
**ERWIN TOWN LANDFILL SITE**
**(mg/kg)**

| Analyte | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | Background Concentrations in Eastern U.S. Soils[a] | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Upper Limit of the 90th Percentile | Observed Range |
| Sodium | ND | 349 J | 213 J | 372 J | 308 J | ND | 17,400 | <500 - 50,000 |
| Vanadium | 8.9 J | 10.9 J | 10.2 J | 11.9 | 16.1 | 13.9 J | 140 | <7 - 300 |
| Zinc | 64.2 | 163 | 70.9 | 72.0 | 78.6 | ND | 104 | <5 - 2,900 |

Note: See Table 3-12 for sample collection dates and depths. Shaded Values exceed the upper limit of the 90th percentile and/or the observed range.

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

Key:

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





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**Table 3-16**

**GROUNDWATER SAMPLE PARAMETERS
ERWIN TOWN LANDFILL SITE**

| Sample | pH | Temperature (°F) | Conductivity (μS/cm) | Turbidity (NTU) |
|---|---|---|---|---|
| MW-1 | 7 | 50.1 | 1,211 | >200 |
| MW-2 | 7.92 | 56.0 | 3,810 | >200 |
| MW-3 | 8.01 | 53.7 | 2,090 | >200 |
| MW-4 | 8.36 | 57.9 | 2,410 | >200 |
| MW-5 | 8.51 | 55.1 | 2,110 | >200 |
| MW-6 | 7.45 | 53.0 | 1,340 | >200 |
| MW-7[a] | 7.14 | 53.3 | 2,070 | 5 |

Note: Samples collected November 4 and 5, 1993.

[a] Water supply well at wastewater treatment plant.

## Table 3-17

## ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES
### (μg/L)

| Compound | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7[c] | NYSDEC Class GA Groundwater Standards and Guidance Values[a] |
|---|---|---|---|---|---|---|---|---|
| **Volatiles** | | | | | | | | |
| Chloroethane | ND | ND | ND | 87 | ND | ND | ND | 5 |
| Carbon disulfide | ND | 2 J | ND | ND | ND | ND | ND | NA |
| Toluene | 1 J | 2 J | ND | ND | ND | ND | ND | 5 |
| Chlorobenzene | ND | ND | ND | 6 J | ND | ND | ND | 5 |
| Total Xylenes | ND | 17 | 9 J | ND | ND | ND | ND | 5 |
| **Semivolatiles** | | | | | | | | |
| 4-Methylphenol | ND | ND | 1 J | ND | ND | ND | ND | 1[b] |
| Butylbenzylphthalate | ND | ND | 1 J | ND | ND | ND | ND | 50 G |
| bis(2-Ethylhexyl)phthalate | ND | ND | 2 J | ND | ND | ND | 2 J | 50 |
| **Pesticides and PCBs** | | | | | | | | |
| Aroclor - 1242 | ND | 0.62 J | ND | ND | ND | ND | ND | 0.1 |

Note: Samples collected November 4 and 5, 1993.
Shaded values exceed regulatory standard or guidance value.

[a] NYSDEC 1993.
[b] Refers to sum of total phenols.
[c] Water supply well at wastewater treatment plant.

Key:

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

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## Table 3-18

**INORGANIC ANALYTES DETECTED IN GROUNDWATER**
**ERWIN TOWN LANDFILL**
**(all values reported in μg/L)**

| Analyte | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7[c] | NYSDEC Class GA Groundwater Standards and Guidance Values[a] |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 114,000 J | 1,850 | 16,600 | 10,500 | 10,500 | 2,510 | 175 J | NA |
| Antimony | ND | ND | 1,010 | ND | ND | ND | ND | 3 G |
| Arsenic | 49.1 J | 22.9 | 39.5 | 26.1 | 16.5 | 3.3 J | 21.6 | 25 |
| Barium | 4,840 J | 648 | 784 | 995 | 665 | 412 | 1,420 | 1,000 |
| Beryllium | 5.3 J | ND | 0.84 J | 0.48 J | 0.42 J | 0.27 J | ND | 3 G |
| Cadmium | 27.1 J | ND | 4.8 J | 3.3 J | 3.0 J | ND | ND | 10 |
| Calcium | 380,000 J | 121,000 | 184,000 | 126,000 | 206,000 | 135,000 | 204,000 | NA |
| Chromium | 202 J | 7.8 J | 66.5 | 23.2 | 28.0 | ND | ND | 50 |
| Cobalt | 155 J | 12.6 J | 24.3 J | 19.2 J | 17.7 J | 10.5 J | ND | NA |
| Copper | 498 J | 15.0 J | 49.8 | 39.0 | 51.5 | 11.8 J | 30.3 | 200 |
| Iron | 221,000 J | 15,800 | 39,400 | 32,900 | 26,300 | 4,660 | 2,440 | 300[b] |
| Lead | 278 J | 18.9 J | 98.3 | 28.1 | 75.3 | 3.3 | 2.2 J | 25 |
| Magnesium | 147,000 J | 63,600 | 54,100 | 44,000 | 50,000 | 25,400 | 50,800 | 35,000 G |
| Manganese | 38,500 J | 618 | 5,090 | 4,210 | 3,650 | 7,240 | 2,670 | 300[b] |
| Nickel | 322 J | 17.9 J | 53.1 | 33.1 J | 40.3 J | 10.8 | 8.4 J | NA |
| Potassium | 16,200 J | 159,000 | 6,790 | 17,000 | 28,800 J | 2,000 | 1,540 J | NA |
| Sodium | 50,800 J | 479,000 | 133,000 | 130,000 | 158,000 | 113,000 | 145,000 | 20,000 |

Table 3-18

INORGANIC ANALYTES DETECTED IN GROUNDWATER
ERWIN TOWN LANDFILL
(all values reported in $\mu g/L$)

| Analyte | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7[c] | NYSDEC Class GA Groundwater Standards and Guidance Values[a] |
|---|---|---|---|---|---|---|---|---|
| Thallium | 1.6 | ND | ND | ND | ND | ND | ND | 4 G |
| Vanadium | 174 J | 8.9 J | 32.4 J | 20.6 J | 19.3 J | 10.5 J | 3.4 J | NA |
| Zinc | 1,240 J | 80.2 | 200 | 708 | 482 | 229 | 34.1 | 300 |

Note: Samples collected November 4 and 5, 1993.
Shaded values exceed regulatory standards or guidance values.

a NYSDEC 1993.
b The concentration of iron plus manganese shall not exceed 500 $\mu g/L$ (NYSDEC 1993).
c Water supply well at wastewater treatment plant.

Key:

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



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**Table 3-19**

**CONTAINER INVENTORY
ERWIN TOWN LANDFILL SITE**

| Drum ID | Contents | Condition | Comments/Markings |
|---|---|---|---|
| N-1 | Empty | Intact with some rust | White, labeled "Jamestown Soap & Solvent" |
| N-2 | 2/3 Full - liquid | Very rusty with holes in top | Probably contains rainwater |
| N-3 | 1/4 Full - liquid | Intact with some rust, closed | White with brown label "Weed Stopper 10 to 1; Vegetation Killer; Active Ingredients: Prometon: 2,4-Bis(isopropylamine)-6 = 3.73% [and] Methoxy-s-Triazine = 96.27%; Inert Ingredients = 100%; Made by Top Quality Products, P.O. Box 342, Jamestown, NY 14702 716-483-0833 |
| N-4 | 1/8 Full - liquid | Upside down with holes in bottom | Blue and yellow, labeled "ZEP," probably contains rainwater |
| N-5 | 1/2 Full - liquid | Holes punched in lid | Blue, labeled "Valvoline," probably contains rainwater |
| N-6 | 1/3 Full - liquid | Intact and closed | Rusty, red color |
| N-7 | 1/3 Full - liquid | Intact and closed | Rusty, green color |
| N-8 | 3/4 Full - liquid | Rusted-out lid | Blue and yellow; labeled "ZEP," probably contains rainwater |
| S-1 | 1/2 Full - solid with small amount of water | No lid | Black with red center stripe; solvent-like odor; solid looks like polyurethane foam |
| S-2 | 3/4 Full - oil | Cap missing | 5-gallon steel, spout-top container; white with orange paint; labeled "Amalie Brand Lubricants, Witco Chemical Co., Bradford, PA" |
| S-3 | 1/4 Full - liquid plus some solids | Rusty but intact with only small holes | Orange with blank, white, square label; probably contains rainwater |
| S-4 | Nearly empty | No lid | Black with red center stripe; contains small amount of crushed glass and rainwater |
| S-5 | 1/5 Full - liquid | Sealed except for open, bent, 12-inch long by 3/4-inch OD vent pipe | Painted black with white letters in following configuration: "B 2<br>W" |
| S-6 | 1/2 Full - solid waste | Very rusty, no top | Green; trash mixed with ash - looks like burnt garbage |
| S-7 | Full - solid waste | No lid, very rusty | Black with bulged bottom. Contains domestic trash in plastic bags |
| S-8 | 7/8 Full - liquid | Rusty, missing bung | Orange with blank, white label, probably contains rainwater |

**Table 3-19**

**CONTAINER INVENTORY**
**ERWIN TOWN LANDFILL SITE**

| Drum ID | Contents | Condition | Comments/Markings |
|---|---|---|---|
| S-9 | < 1/8 Full | Intact and closed | 5-gallon container; blue; labeled "Fisher Scientific Company, Chemical Manufacturing Division, Fair Lawn, NJ 07410;" also hand labeled "KEROSENE" |
| S-10 | Full - solid waste | New and sealed | Investigation derived waste generated during HAZCAT testing and sampling, including Tyvek, respirator cartridges, gloves, HAZCAT wastes, etc. |
| Tank | Small amount of liquid | Intact | Approximately 1,000-gallon steel tank; labeled "Listed Underground Tank for Flammable Liquids, Underwriters Laboratories, G828113." |

Note: Drums inventoried on August 6, 1993 and again on May 4, 1993. All are steel, 55-gallon drums, except where noted.

**Table 3-20**

**HAZARD CATEGORIZATION RESULTS FOR CONTAINER CONTENT SAMPLES ERWIN TOWN LANDFILL SITE**

| Drum | Sample Description | Solubility | | pH | Cyanide | Sulfide | Oxidizer | Flammability | Chlorine |
|---|---|---|---|---|---|---|---|---|---|
| | | In Water | In Hexane | | | | | | |
| N-2 | Clear, low viscosity liquid; small amount of rusty sediment | Completely | NA | 6 | NA | ND | Non | Non | ND |
| N-3 | Three phases: | | | | | | | | |
| | Upper - dark red-brown, high viscosity liquid | Low | NA | NA | ND | ND | Non | Positive | ND |
| | Middle - light pink-orange, milky, low viscosity liquid emulsion | Completely | NA | 6-7 | ND | ND | Non | Non | ND |
| | Lower - dark red brown paste of rust mixed with upper layer | NA | NA | NA | NA | NA | NA | NA | NA |
| N-4 | Rusty orange, low viscosity liquid; small amount of rusty sediment | Completely | NA | 5 | NA | ND | Non | Non | ND |
| N-5 | Rusty orange, low viscosity liquid; small amount of rust and paint flake sediment | Completely | NA | 5-6 | NA | ND | Non | Non | ND |
| N-6 | Two phases (appears to be motor oil/water): | | | | | | | | |
| | Upper - black, opaque, high viscosity liquid | NA | Completely | NA | NA | NA | NA | Combustible | ND |
| | Lower - clear, low viscosity liquid | Completely | NA | 6 | NA | ND | ND | Non | ND |

Key at end of table.

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Table 3-20

HAZARD CATEGORIZATION RESULTS FOR
CONTAINER CONTENT SAMPLES
ERWIN TOWN LANDFILL SITE

| Drum | Sample Description | Solubility | | pH | Cyanide | Sulfide | Oxidizer | Flammability | Chlorine |
|---|---|---|---|---|---|---|---|---|---|
| | | In Water | In Hexane | | | | | | |
| N-7 | Two phases (similar to N-3): | | | | | | | | |
| | Upper - very thin, red-orange, high viscosity liquid | Low | NA | NA | NA | NA | NA | NA | NA |
| | Lower - light pink-orange, milky, low | Completely | NA | 7 | ND | ND | Non | Non | ND |
| N-8 | Rusty orange, low viscosity liquid; small amount of rusty sediment | Completely | NA | 5-6 | NA | ND | Non | Non | ND |
| S-1 | Clear, low viscosity liquid; small amount of rusty sediment | Completely | NA | 6 | ND | ND | Non | Non | ND |
| S-2 | Two phases: | | | | | | | | |
| | Upper - dark brown, opaque, high viscosity liquid | NA | Completely | NA | NA | NA | Non | Combustible | ND |
| | Lower - clear, low viscosity liquid | Completely | NA | 5 | NA | ND | Non | Non | ND |
| S-3 | Clear, orange-yellow, low viscosity liquid; small amount of rusty sediment | Completely | NA | 5 | NA | ND | Non | Non | ND |
| S-5 | Clear, yellow, high viscosity liquid; density >1 | Positive after mixing | NA | 11 | ND | ND | Non | Combustible | ND |
| S-8 | Orange, slightly cloudy, low viscosity liquid; small amount of rusty sediment | Completely | NA | 5 | NA | ND | Non | Non | ND |

Key at end of table.

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## Table 3-20

## HAZARD CATEGORIZATION RESULTS FOR CONTAINER CONTENT SAMPLES ERWIN TOWN LANDFILL SITE

| Drum | Sample Description | Solubility In Water | Solubility In Hexane | pH | Cyanide | Sulfide | Oxidizer | Flammability | Chlorine |
|---|---|---|---|---|---|---|---|---|---|
| S-9 | Rust-brown, opaque, low viscosity liquid; some sheen observed | Completely | NA | 5-6 | NA | ND | Non | Possible | ND |
| Tank | Yellow, low viscosity liquid with traces of black oil or grease | Completely | NA | 5-6 | NA | ND | Non | Non (oil traces combustible) | ND |

Note: Testing performed in field on May 4, 1994. Cyanide, sulfide, and chlorine (as chlorinated hydrocarbons) tests indicate if substance is present. Solubility, oxidizing reaction, and flammability are qualitative results. pH measured in standard units with test strips.

Key:

NA = Not analyzed due to low volume or not applicable due to sample type.
ND = Not detected.
Non = Non-oxidizer or non-flammable.

**Table 3-21**

**CONTAINER CONTENT AND SOIL SAMPLE ANALYSIS SUMMARY**
**ERWIN TOWN LANDFILL SITE**

| Sample I.D. | Source | Analysis |
| --- | --- | --- |
| DS-1 | Composite surface soil collected from 10 discrete locations around drums | Full TCL |
| | | Hazardous Waste Characteristics |
| | Matrix spike/Matrix spike duplicate | Full TCL |
| DM-W | Composite water from open drums N-2, N-4, N-5, N-8, S-3, and S-8 | Hazardous Waste Characteristics |
| DM-S-1 | Polyurethane foam from drum S-1 | TCLP VOCs/Hazardous Waste Characteristics |
| DM-S-2 | Oil from drum S-2 | TCL VOCs |
| | | TCL Pesticides/PCBs |
| | | Hazardous Waste Characteristics |
| | | Lead |
| DM-S-5 | Soap from drum S-5 | Hazardous Waste Characteristics |
| DM-N-3 | White liquid (herbicide) from drum N-3 | TCL VOCs |
| | | TCL Pesticides/PCBs |
| DM-N-6 | Oil and water from drum N-6 | TCL VOCs |
| | | TCL Pesticides/PCBs |
| | | Lead |
| DM-N-7 | White liquid (herbicide) from drum N-7 | TCL VOCs |
| | | TCL Pesticides/PCBs |
| TB-050494 | Trip blank | TCL VOCs |

Note: Samples collected May 4, 1994.

Key:

BNA = Base/neutral and acid extractables.
Hazardous Waste Characteristics = Ignitability, corrosivity, and reactive.
PCBs = Polychlorinated biphenyls.
TCL = Target Compound List.
TCLP = Toxicity characteristic leaching procedure.
VOCs = Volatile organic compounds.

## Table 3-22

## ORGANIC COMPOUNDS DETECTED IN CONTAINER CONTENT AND SURFACE SOIL SAMPLES ERWIN TOWN LANDFILL SITE

| Compound | Sample Number (Matrix) | | | | |
|---|---|---|---|---|---|
| | DS-1 (Soil) (μg/kg) | DM-S-2 (Oil) (μg/kg) | DM-N-3 (Aqueous) (μg/kg) | DM-N-6 (Oil) (μg/kg) | DM-N-7 (Aqueous) (μg/kg) |
| **Volatiles** | | | | | |
| Methylene chloride | ND | 220 J | ND | 400 J | 370 J |
| Acetone | ND | ND | ND | ND | 1,500 |
| Trichloroethene | ND | ND | 1,400 J | ND | ND |
| Tetrachloroethene | ND | ND | 940,000 | ND | 150,000 |
| Toluene | ND | ND | 7,000 J | 12,000 | 330 J |
| Ethyl benzene | ND | ND | 38,000 J | 690 J | 5,100 J |
| Total xylenes | ND | 650 J | 310,000 | 7,500 | 91,000 |
| **Semivolatiles** | | | | | |
| Total PAHs | 3,000 J | NA | NA | NA | NA |
| Dimethylphthalate | 230 J | NA | NA | NA | NA |
| bis(2-Ethylhexyl) phthalate | 64 J | NA | NA | NA | NA |
| **Pesticides and PCBs** | μg/kg | μg/kg | μg/L | μg/kg | μg/L |
| Heptachlor epoxide | ND | ND | 1.3 J | ND | ND |
| Endosulfan sulfate | ND | 1,000 | 0.87 J | ND | 0.57 J |

Note: Samples collected May 4, 1993.

Key:

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

## Table 3-23

**INORGANIC ANALYTES DETECTED IN CONTAINER CONTENT AND SURFACE SOIL SAMPLES ERWIN TOWN LANDFILL SITE (All values reported in mg/kg)**

| Analyte | Sample Number (Matrix) | | |
|---|---|---|---|
| | DS-1 (Soil) | DM-N-6 (Oil) | DM-S-2 (Oil) |
| Aluminum | 5,680 | NA | NA |
| Antimony | 10 J | NA | NA |
| Arsenic | 12.2 J | NA | NA |
| Barium | 76.2 | NA | NA |
| Beryllium | 0.30 | NA | NA |
| Cadmium | 0.81 J | NA | NA |
| Calcium | 1,930 | NA | NA |
| Chromium | 11.6 | NA | NA |
| Cobalt | 8.6 | NA | NA |
| Copper | 26.1 | NA | NA |
| Iron | 16,400 | NA | NA |
| Lead | 102 | 122 | 14.1 |
| Magnesium | 2,590 | NA | NA |
| Manganese | 349 | NA | NA |
| Nickel | 29.6 | NA | NA |
| Potassium | 637 | NA | NA |
| Selenium | 1.4 J | NA | NA |
| Vanadium | 10.8 | NA | NA |
| Zinc | 264 J | NA | NA |

Note: Samples collected May 4, 1994.

Key:

NA = Not analyzed.

**Table 3-24**

**HAZARDOUS WASTE CHARACTERISTICS ANALYSIS RESULTS FOR CONTAINER CONTENT AND SURFACE SOIL SAMPLES ERWIN TOWN LANDFILL SITE**

| Analysis | Sample Number (Matrix) | | | | | Regulatory Level[a] |
|---|---|---|---|---|---|---|
| | DM-S-1 (Solid) | DS-1 (Soil) | DM-S-2 (Oil) | DM-S-5 (Liquid) | DM-W (Liquid) | |
| Total sulfide | 65 | ND | 44 | ND | ND | 500 |
| Total cyanide | ND | NA | ND | ND | 0.019 | 250 |
| pH | 8.1 | 5.7 | 3.7 | 9.4 | 5.1 | 2 < pH < 12.5 |
| Ignitability | No flash at 140°F | No flash at 140°F | No flash at 140°F | No flash at 140°F | No flash at 140°F | No flash below 140°F |

Note: Samples collected May 6, 1994. Unit of measure for sulfide and cyanide analyses is $\mu$g/kg for solid and oil samples and $\mu$g/L for liquid samples.

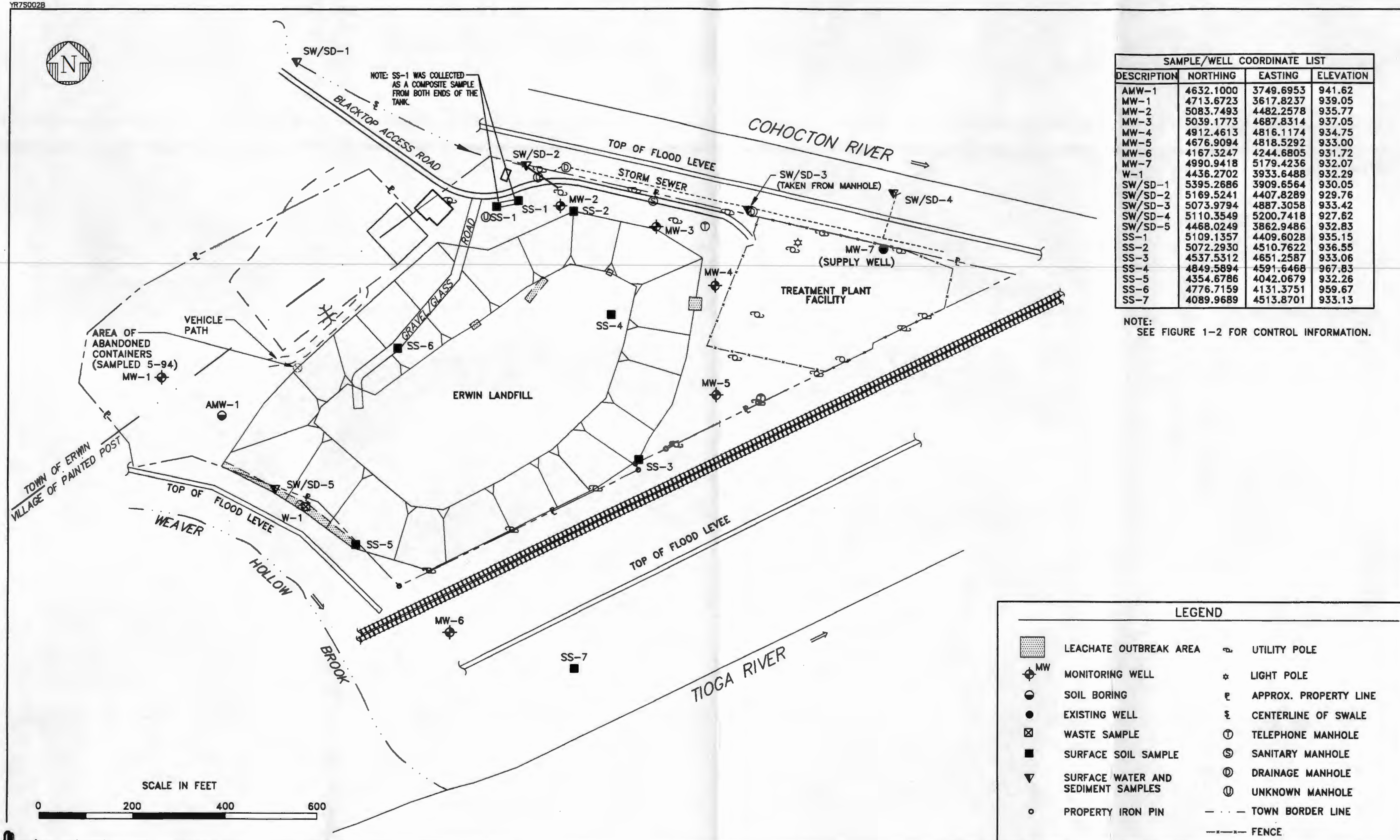
[a] 6 NYCRR 371.

Key:

NA = Not analyzed.
ND = Not detected.

| Table 3-25<br><br>POLYNUCLEAR AROMATIC HYDROCARBON (PAH) ANALYSIS LIST |
| --- |
| Naphthalene |
| 2-Methylnaphthalene |
| 2-Chloronaphthalene |
| Acenaphthylene |
| Acenaphthene |
| Fluorene |
| Phenanthrene |
| Anthracene |
| Fluoranthene |
| Pyrene |
| Benzo(a)anthracene[a] |
| Chrysene[a] |
| Benzo(b)fluoranthene[a] |
| Benzo(k)fluoranthene[a] |
| Benzo(a)pyrene[a] |
| Indeno(1,2,3-cd)pyrene[a] |
| Dibenz(a,h)anthracene[a] |
| Benzo(g,h,i)perylene |

a Considered carcinogenic (Department of Health and Human Services, 1993).




| SAMPLE/WELL COORDINATE LIST | | | |
|---|---|---|---|
| DESCRIPTION | NORTHING | EASTING | ELEVATION |
| AMW-1 | 4632.1000 | 3749.6953 | 941.62 |
| MW-1 | 4713.6723 | 3617.8237 | 939.05 |
| MW-2 | 5083.7493 | 4482.2578 | 935.77 |
| MW-3 | 5039.1773 | 4687.8314 | 937.05 |
| MW-4 | 4912.4613 | 4816.1174 | 934.75 |
| MW-5 | 4676.9094 | 4818.5292 | 933.00 |
| MW-6 | 4167.3247 | 4244.6805 | 931.72 |
| MW-7 | 4990.9418 | 5179.4236 | 932.07 |
| W-1 | 4436.2702 | 3933.6488 | 932.29 |
| SW/SD-1 | 5395.2686 | 3909.6564 | 930.05 |
| SW/SD-2 | 5169.5241 | 4407.8289 | 929.76 |
| SW/SD-3 | 5073.9794 | 4887.3058 | 933.42 |
| SW/SD-4 | 5110.3549 | 5200.7418 | 927.62 |
| SW/SD-5 | 4468.0249 | 3862.9486 | 932.83 |
| SS-1 | 5109.1357 | 4409.6028 | 935.15 |
| SS-2 | 5072.2930 | 4510.7622 | 936.55 |
| SS-3 | 4537.5312 | 4651.2587 | 933.06 |
| SS-4 | 4849.5894 | 4591.6468 | 967.83 |
| SS-5 | 4354.6786 | 4042.0679 | 932.26 |
| SS-6 | 4776.7159 | 4131.3751 | 959.67 |
| SS-7 | 4089.9689 | 4513.8701 | 933.13 |

NOTE:
SEE FIGURE 1-2 FOR CONTROL INFORMATION.

Figure 3-1 SAMPLE LOCATION MAP
ERWIN TOWN LANDFILL

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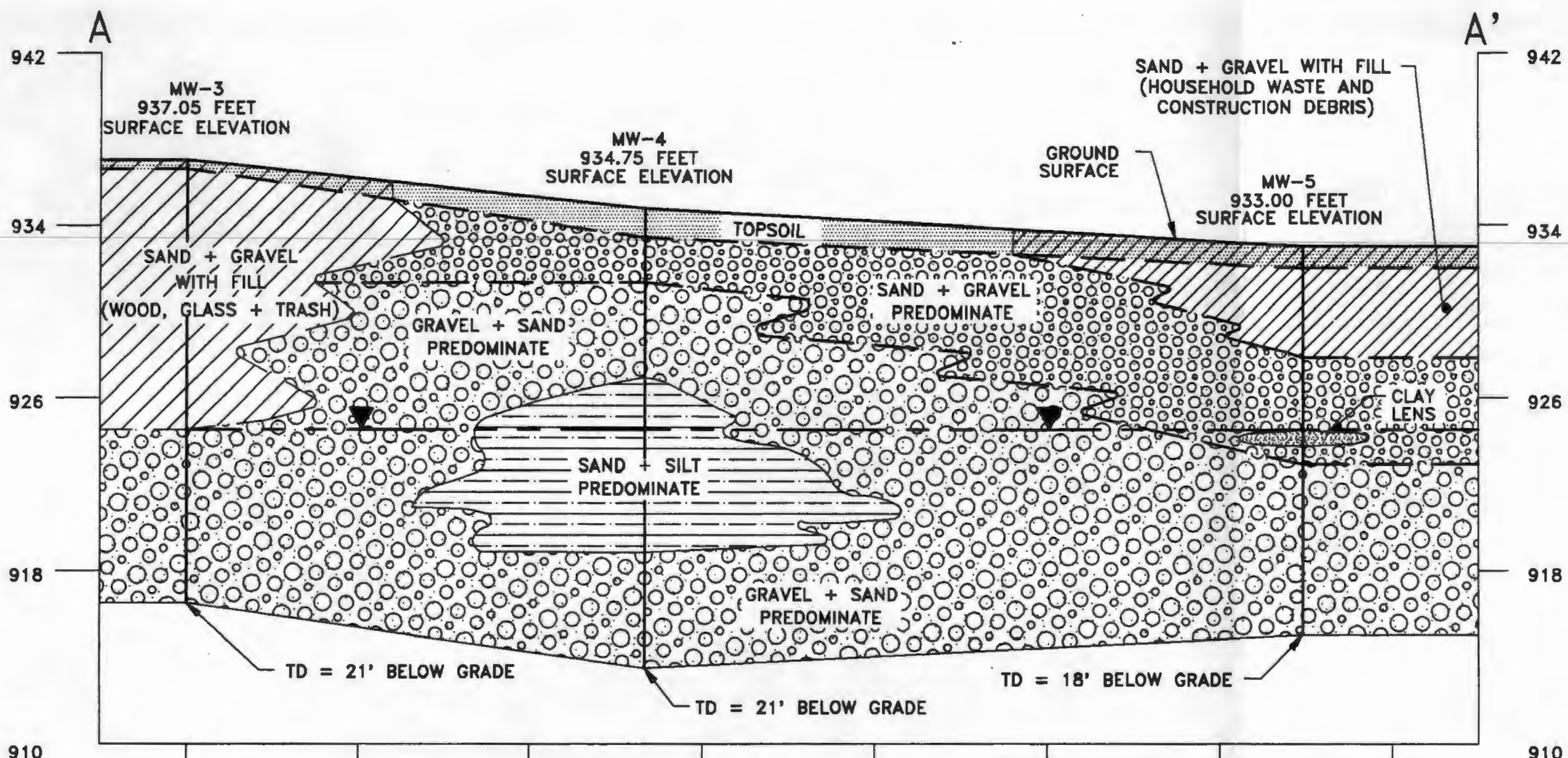
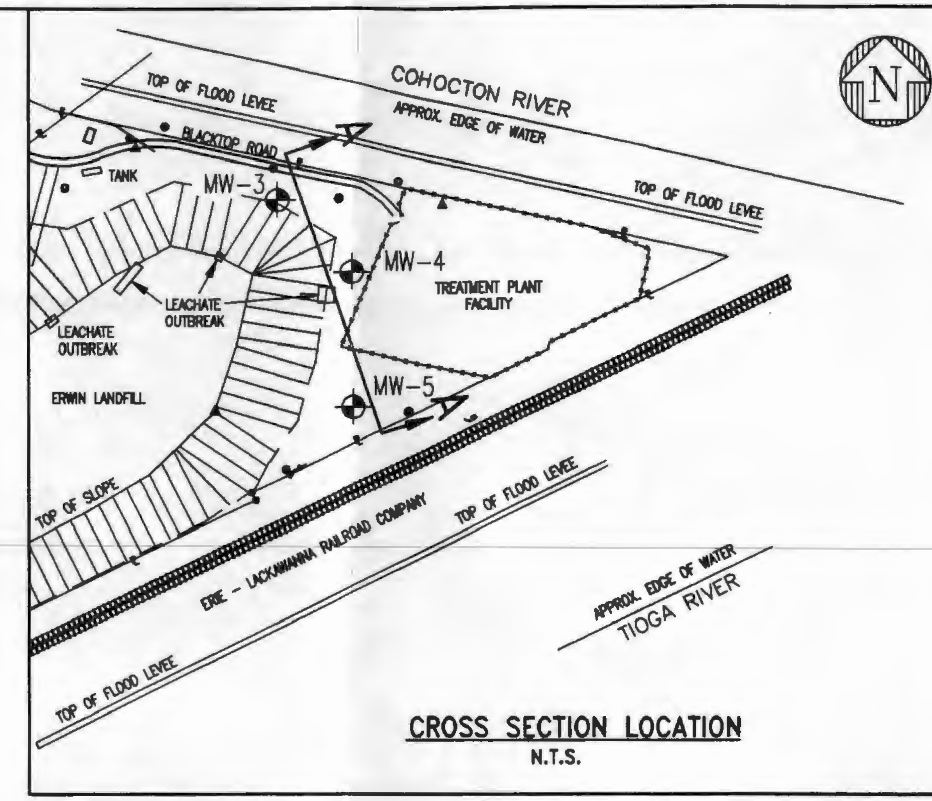



CROSS SECTION A–A'

SCALE: HORIZONTAL: 1"=60'
VERTICAL: 1"=8'

CROSS SECTION A–A' ALIGNMENT = N19°W




CROSS SECTION LOCATION
N.T.S.

NOTE: ELEVATIONS REFERENCED TO 1929 MEAN SEA LEVEL

LEGEND

▼ GROUNDWATER SURFACE ELEVATION MEASURED NOVEMBER 4, 1993

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Figure 3–2 GEOLOGIC CROSS SECTION A–A'
ERWIN TOWN LANDFILL

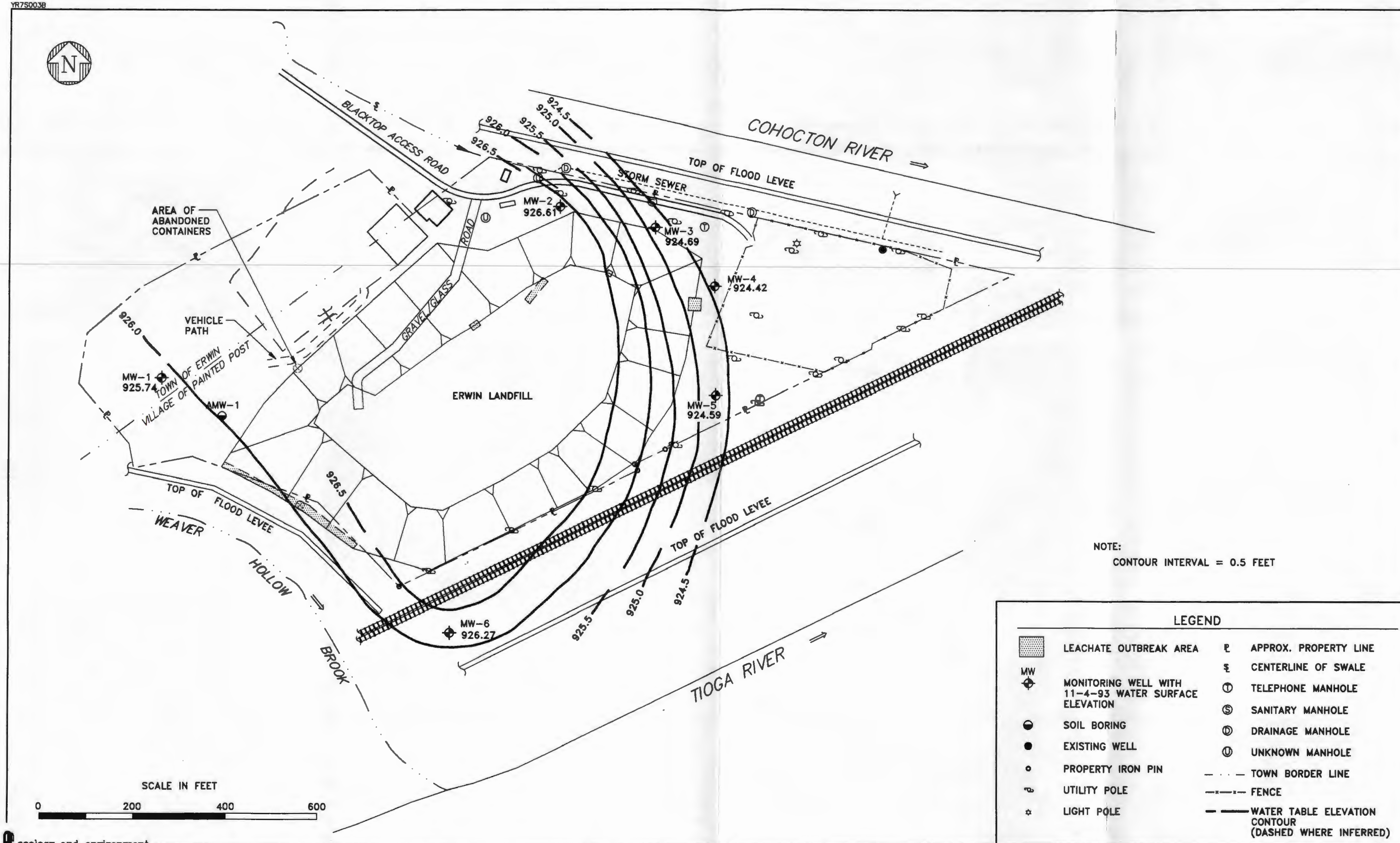


Figure 3-3 OVERBURDEN POTENTIOMETRIC SURFACE CONTOUR MAP NOVEMBER 4, 1993 ERWIN TOWN LANDFILL

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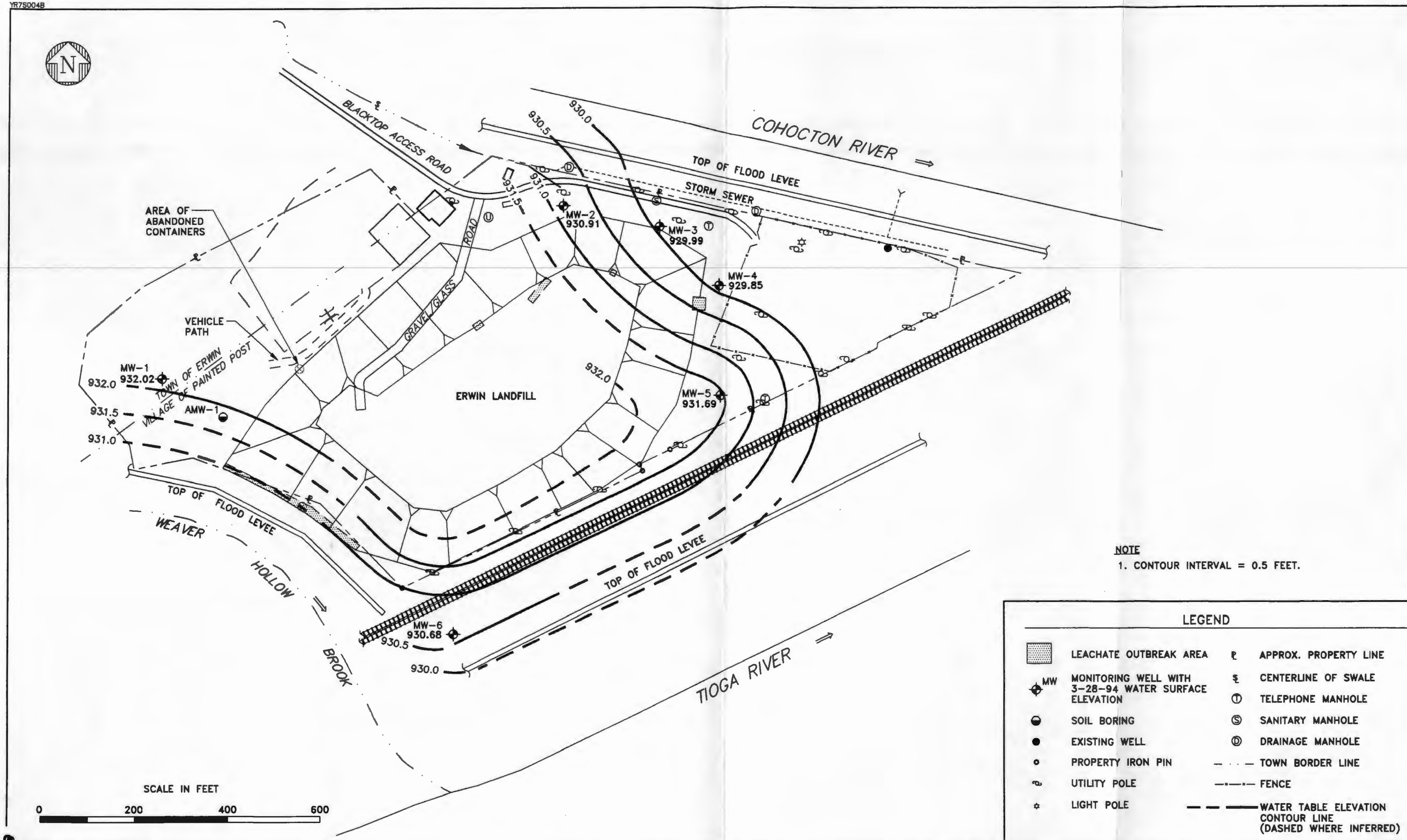


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Figure 3-4 OVERBURDEN POTENTIOMETRIC SURFACE CONTOUR MAP MARCH 28, 1994 ERWIN TOWN LANDFILL

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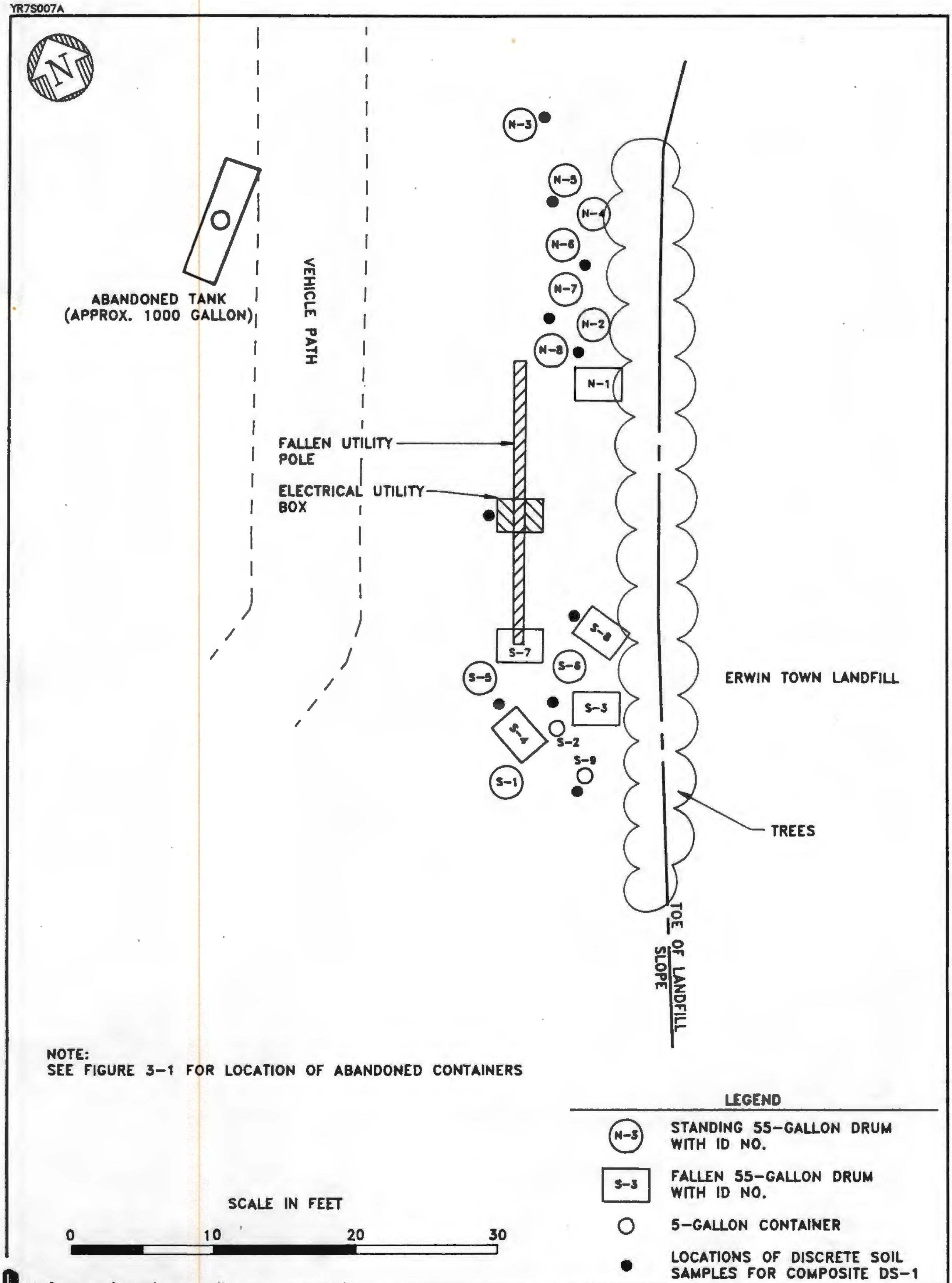


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Figure 3-5 CONTAINER LOCATION SKETCH MAP
ERWIN TOWN LANDFILL SITE

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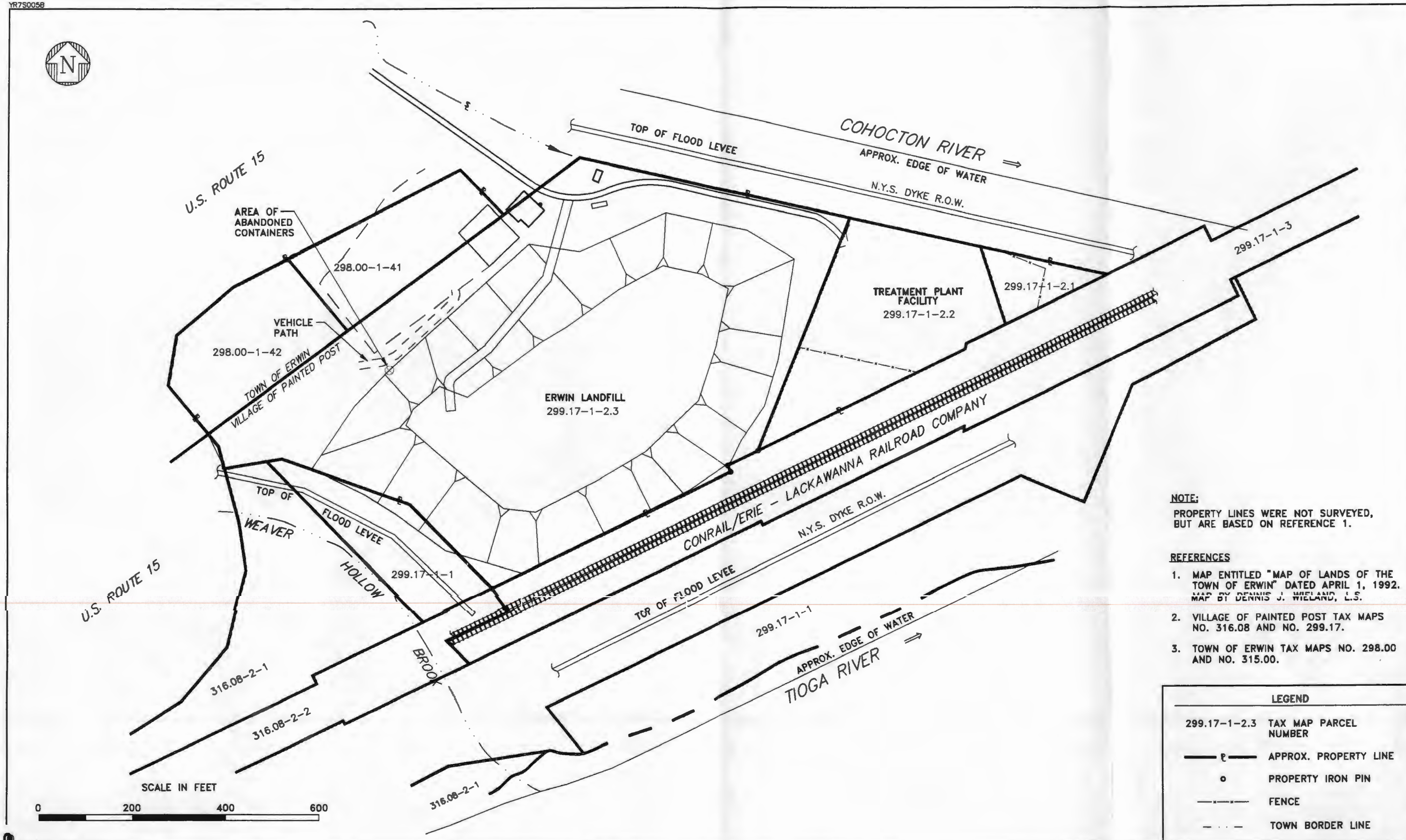


Figure 3-6 SITE PROPERTY BOUNDARY MAP ERWIN TOWN LANDFILL

# 4. CONCLUSIONS AND RECOMMENDATIONS

## 4.1 CONCLUSIONS

The disposal of hazardous waste containing heavy metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) at the site by Corning Glass Works is documented in the Community Right-To-Know and a NYSDEC hazardous waste questionnaire completed by Corning. Elevated levels of five metals (arsenic, barium, cadmium, chromium, and lead) as well as other inorganic analytes were found in surface and subsurface soil samples and groundwater samples. Based on the available data, a release of metals to groundwater is indicated. Groundwater at the site follows a generally radial pattern. Thirteen metals were detected above NYSDEC Class GA groundwater standards and guidance values in one or more of the groundwater samples. Of particular concern is arsenic, copper, lead, zinc, and antimony since these metals were detected at elevated concentrations in groundwater, surface soil, and subsurface soil. The presence of antimony appears to be localized to the area near well MW-3 where it was detected at high concentrations in the groundwater and subsurface soil. A groundwater sample was also collected from the nearby Town of Erwin wastewater treatment plant supply well and contained barium, iron, magnesium, manganese, and sodium above Class GA standards.

Low levels of PCBs were identified at the site in two subsurface soil samples: one surface soil and one groundwater sample. Aroclor-1242 was detected in groundwater from well MW-2 at a concentration which exceeded the NYSDEC Class GA groundwater standard. This well was located near a large, unknown, subsurface, magnetic anomaly. The PCB Aroclor-1248 was detected in the subsurface soil sample from MW-2. Additionally, Aroclor-1260 was detected in subsurface soil sample MW-5A and in surface soil sample SS-1.

In addition to the Aroclor-1242 in MW-2, other releases of organic contaminants into the groundwater were identified. Chloroethane and chlorobenzene in MW-4, and total xylenes in MW-3 were detected at levels above the Class GA groundwater standards. Chloroethane and total xylenes were also detected in a waste sample (W-1) taken from spilled material near a partially exposed drum on the southwest side of the landfill. Toluene and 4-methylphenol, which were also present in the waste sample, were also detected in groundwater samples, but at levels below groundwater standards. Analysis of the waste sample identified 15 organic constituents, but the material did not exhibit the characteristics of a RCRA hazardous waste when analyzed for TCLP organics and ignitability. The detection of components of this waste in groundwater samples suggests that either a significant quantity of this waste is present in the landfill or that other similar sources exist.

The surface water and sediment sampling performed at the site does not suggest that there is any significant release of contaminants from the site through the surface water pathway. This is due to the general lack of direct drainage pathways to surface water bodies, the presence of levees, and the lack of significant contamination in the samples analyzed. The samples which were taken from the northern drainageway that leads off site did not contain significant contamination. In the case of semivolatiles and some of the metals, the upstream samples (SW/SD-1) contained higher levels of contaminants than the downstream samples. Samples SW/SD-5 on the southwest side of the landfill did indicate a probable contribution of volatile and metallic contaminants to pooled surface water on site; however, off-site runoff from this location is blocked by levees.

Surface soil samples SS-1, SS-2, and SS-6 indicate that exposed soil exists at the site with elevated levels of contaminants. The semivolatile and PCB contamination at SS-1 may be associated with spill incidents, landfill activity, or both. The semivolatile, DDT, DDE, and metals levels found in SS-6 as well as the observation of numerous glass fragments suggest that the road may cut through the landfill cover in this area. Low levels of DDT and DDD were also present in subsurface soil samples MW-1, MW-3, and MW-6. Their presence in surface soils and at depth may have resulted from past usage and subsequent regrading. The elevated metals concentrations in SS-2 may indicate an area of poorly covered waste or an area where leachate has caused surface contamination. All three of these surface soil samples also contain significantly elevated levels of lead.

The detection of contaminated surface materials and field observations indicate that the landfill cap is inadequate. In addition to the apparent migration of contaminants from the site in groundwater, surface soil samples indicated elevated levels of metal and semivolatile contaminants. This, in conjunction with visible items such as glass, steel reinforcing bar, a partially exposed drum, etc., indicate that waste material is not fully covered in some areas. Areas of leachate outbreaks were observed on the south, northwest, and northeast sides of the landfill (E & E 1992). The absence of leachate during summer and fall sampling suggests that the leachate outbreaks occur predominantly in the spring. Areas of subsidence were observed and probably reduce the effectiveness of the existing cover material. Based on the geophysical survey results as well as the presence of fill in the borings of AMW-1, MW-2, MW-3, and MW-5, it appears that fill extends beyond the mounded area of the landfill. Thus, the actual extent of the fill is not known.

The soil sample collected around the drums and other containers on the west side of the landfill did not contain significantly elevated levels of contaminants except for PAHs and lead. While the PAH and lead concentrations were greater than that detected in the background soil sample, the concentrations detected are consistent with this area's use for equipment storage. PAHs are commonly generated by combustion engines and lead deposits from leaded gasoline are consistently elevated in areas where vehicles are operated (i.e., along roadways and in storage yards).

Four of the containers (drums N-3, N-6, S-2, and S-5) present in this area, as well as the storage tank, currently contain traces of petroleum products. PAHs are common constituents of these products; however, no evidence of leakage was observed.

With the exception of thin flammable layers in drums N-3 and N-7, none of the container contents were found to exhibit the characteristics of hazardous waste. As discussed in Section 3.5.6, several hazardous substances were detected in the container contents including VOCs and pesticides. However, there was no visual evidence that containers with these substances had leaked. Additionally, the soil sample collected in the vicinity of the drums did not contain VOCs or pesticides. Based on this data, it does not appear that the presence of these containers has had a significant impact on the environment.

The most significant threats to human health and the environment posed by this site include the following:

- Direct contact by wastewater treatment plant workers and landfill trespassers with contaminated soil and/or exposed waste;

- Contamination of groundwater potentially affecting nearby municipal wells. Since the nearby Cohocton and Tioga rivers are expected to receive groundwater discharge, the wastewater treatment plant supply well is the most threatened source. However, based on the limited groundwater investigation performed to date, effects on municipal wells across the rivers can not be determined; and

- Contamination of the Cohocton and Tioga rivers via discharge of contaminated groundwater.

## 4.2 RECOMMENDATIONS

Due to the detection in environmental media of hazardous constituents associated with documented hazardous waste disposal, the location of the site in relation to drinking water supplies, the proximity of NYSDEC-classified surface waters, and the detection of other contaminants in groundwater such as VOCs (which were also identified in a waste sample), it is recommended that the Erwin Town Landfill site be reclassified as a Class 2 site.

As part of the follow-up and future activities for the Erwin Town Landfill, the following are recommended:

- Proper closure of the landfill under applicable (Division of Solid Waste) regulations. This would be anticipated to include filling the subsidence areas to avoid pooling/leaching, improving the landfill cap, the implementation of leachate collection, and establishing a groundwater monitoring program to evaluate the success of improved containment efforts.

- In conjunction with the Hornell District Office of the New York State Department of Health, design a monitoring program for or restrict use of the wastewater treatment plant supply well since this is the nearest potential receptor of site-related contaminants.

- Remediation of the exposed adhesive waste drum and proper disposal of the containers on the west side of the landfill. The containers have not had a significant impact on the environment, but because two contain flammable material, several contain hazardous substances, and site access is not restricted, the containers pose a threat due to direct contact.

- Increased control of access to secure the site by installing fencing and/or signs.

- Investigate the large magnetic anomaly near MW-2 to determine if it represents buried drums, a transformer, or other metallic waste.

- Determine the actual extent of the fill area with a more extensive geophysical survey of the site.

- Consider the installation of an additional well or wells on the northwest side of the site to attempt to obtain an upgradient well location.

- Collect a sample of water directly from the fire hydrant used as a source of drill water to determine the source of the VOCs detected in the drill water sample.

- The drill water is not believed to have impacted groundwater quality; however, to alleviate concerns, those wells found to contain toluene, ethylbenzene, or total xylenes (MW-1, MW-2, and MW-3) should be resampled. In the time that has elapsed since well installation, any contaminants introduced into the groundwater at concentrations as low as those in the drill water sample will no longer be present.

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