NUS CORPORATION
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FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
SUPERFUND DIVISION

02-9007-24-SI
REV. NO. 0

FINAL DRAFT
SITE INSPECTION REPORT
CONSOLIDATED FREIGHTWAYS
TONAWANDA, NEW YORK

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-9007-24
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

DECEMBER 31, 1990

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

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SITE SUMMARY AND RECOMMENDATIONS

Consolidated Freightways is located in a primarily industrial area on River Road in Tonawanda, New York (Ref. No. 26). The site encompasses approximately 25 acres and is relatively flat with a slight slope to the southeast (Ref. Nos. 15, 26). River Road borders the northern boundry of the site and Two Mile Creek Road borders the eastern boundry. The remainder of the site is bordered by wooded areas and open fields. A steep embankment is located along the southern border with an unnamed stream located at the base. This stream is a tributary to Two Mile Creek, which flows north into the Niagara River. The Niagara River lies approximately 400 feet north of the site (Ref. Nos. 1, 15, 26). Figures 1 and 2 provide a Site Location Map and a Site Map, respectively.

During construction of the Consolidated Freightways facility in the late 1960s, foundry sands from Chevrolet and fly ash from the Niagara Mohawk Huntley Station were landfilled in approximately a 3-acre section in the southern portion of the 25-acre site (Ref. Nos. 14, 26). Foundry sands may contain phenols and formaldehyde (Ref. Nos. 26-28). In 1970, the terminal and freight yards were completed, all landfilling activities were stopped, and Consolidated Freightways began operation at the facility (Ref. Nos. 3, 26).

During the period from 1975 to 1976, the existing freight yard was excavated and backfilled, and storm drains were added to facilitate drainage. These storm drains discharge to the adjacent unnamed stream and are sampled monthly by the New York State Department of Environmental Conservation (NYSDEC) as per a State Pollutant Discharge Elimination System (SPDES) permit (NY0109878). In 1982 and 1983, toluene and benzene were detected in samples (Ref. No. 22). Excavation materials including asphalt and concrete were surface-piled on top of the original fill material in the southern portion of the site (Ref. No. 3).

On-site spills and discharges to the unnamed stream are documented (Ref. Nos. 29-31, 33). Drums were also observed in the unnamed stream during a 1986 NYSDEC inspection (Ref. No. 29).

The Consolidated Freightways facility is surrounded by a chain link fence except for the 3-acre landfilled section. However, all wastes deposited and currently present at the site have been buried and are not exposed (Ref. Nos. 15, 26).

Since the landfill is unlined and foundry sands may contain phenols and formaldehyde, there is the potential for contaminants to percolate via leachate into groundwater; however, groundwater within 4 miles of the site is used only for industrial and irrigational purposes (Ref. Nos. 4, 5, 16, 17, 26). The possibility of contaminants entering surface water via on-site storm sewers and impacting nearby wetlands also exists, but the high flow rate (and therefore dilution factor) of the Niagara River would presumably minimize the potential for any effect. Therefore, based on these facts and a review of available background information, **NO FURTHER REMEDIAL ACTION PLANNED** is recommended for the Consolidated Freightways Site.

SITE ASSESSMENT REPORT: SITE INSPECTION

PART I: SITE INFORMATION

1. **Site Name/Alias** Consolid Freightway/ Consolidated Freightways/William Strassman Property

   Street 877 Niagara Street

   City Tonawanda **State** New York **Zip** 14150

2. **County** Erie **County Code** 029 **Cong. Dist.** 32

3 **EPA ID No.** NYD074023979

4. **Block No.** 1 **Lot No.** 1, Section 52.06

5. **Latitude** 43° 00' 26" **Longitude** 78° 54' 36"

   USGS Quad. Tonawanda West, Tonawanda East, Buffalo Northeast, Buffalo Northwest

6. **Owner** Consolidated Freightways of Delaware **Tel. No.** (415) 326-1700

   Street 175 Linfield Drive

   City Menlo Park **State** California **Zip** 94025

7. **Operator** Consolidated Freightways **Tel. No.** (716) 695-3110

   Street 877 Niagara Street

   City Tonawanda **State** New York **Zip** 14150

8. **Type of Ownership**

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other _____

9. **Owner/Operator Notification on File**

   ☐ RCRA 3001 **Date** _____ ☐ CERCLA 103c **Date** _____
   ☐ None ☒ Unknown

10. **Permit Information**

Permit	Permit No.	Date Issued	Expiration Date	Comments
SPDES	NY0109878	April 1, 1982	April 1, 1987	Discharge to surface water/ground-water

11. **Site Status**

    ☒ Active ☐ Inactive ☐ Unknown

12. **Years of Operation** 1970 to Present
    Landfilling Activities 1966 to 1970

13. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

Waste Unit No.	Waste Source Type	Facility Name for Unit
1	Landfill	Landfill
2	Drums	Drums/Barrels

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

There were at least four previously reported spills on site. On April 29, 1983, an oily sheen of unknown origin was observed in the unnamed tributary by an Erie County official. On January 31, 1986, a red material was reported to have spilled on site. The source, quantity, location on site, and composition of this material is unknown. On July 29, 1986, an inspection by the NYSDEC observed a white milky discharge of unknown origin in the unnamed stream located adjacent to the site. The source, quantity, and composition of this material is also unknown. An unknown quantity of diesel oil spilled at some unspecified location on site. Comments on the Draft Phase I Report indicate that "several spills and investigations related to spills are on record". However, no further information related to any other spills is available.

14. Information available from

Contact Amy Brochu Agency U.S. EPA Tel. No. (201) 906-6802

Preparer Dave Benfer Agency NUS Corp. Region 2 FIT Date December 31, 1990

Ref. Nos. 1, 3, 9, 12, 21, 26, 29-33, 34, 36

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 1 - Landfill

Source Type

x	Landfill		Contaminated Soil
	Surface Impoundment		Pile
	Drums		Land Treatment
	Tanks/Containers		Other

Description:

In the late 1960s, foundry sand, fly ash, and other materials were landfilled in a 3-acre section of the 25-acre site for property development prior to the construction of the Consolidated Freightways facility. Presently, excavation materials including asphalt, concrete, and construction debris are visible on this section of the site.

Hazardous Waste Quantity

The landfill area is approximately 3 acres. However, the actual quantity of hazardous substances present is unknown.

Hazardous Substances/Physical State

The fill material landfilled at the site contained fly ash and foundry sands. These materials are solids. Foundry sands may contain phenol and formadehyde, while fly ash may contain heavy metals.

Ref. Nos. 3, 14, 15, 27, 28

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 2 - Drums/Barrels

Source Type

_____	Landfill	_____	Contaminated Soil
_____	Surface Impoundment	_____	Pile
x	Drums	_____	Land Treatment
_____	Tanks/Containers	_____	Other

Description:

On several occasions drums have been observed at the Consolidated Freightways facility and the adjacent property to the west owned by New K Realty. Reports indicate that the majority of drums were located on the New K Realty property; however, one partially buried drum was observed along the bank of the fill area and two drums were observed in the unnamed stream adjacent to the site. During the on-site reconnaissance of the Consolidated Freightways facility, conducted by NUS Corp. Region 2 FIT on September 19, 1990, there were no drums observed.

Hazardous Waste Quantity

The actual hazardous waste quantity is unknown. Background information provides conflicting reports as to the number of drums present. During the on-site reconnaissance conducted by NUS Corp. Region 2 FIT on September 19, 1990, there were no drums observed.

Hazardous Substances/Physical State

Drums observed on or adjacent to the site were reported to be rusted and/or empty but are presumed to have previously contained liquids.

Ref. Nos. 15, 29-32

PART III: SAMPLING RESULTS
EXISTING ANALYTICAL DATA
SITE INSPECTION RESULTS

In 1982, Consolidated Freightways was issued a SPDES permit (NY0109878) for the discharge of site drainage via storm sewers to an unnamed tributary of Two Mile Creek (Ref. No. 12). See Figure 2. Monthly samples were collected and analyzed for flow, oil, and grease as well as pH, iron, zinc, benzene, and toluene. Discharge limitations were exceeded in 1984 for pH (February-3.07, July-3.06, August-4.06, and September-4.30). Benzene was detected at a concentration of 370 ppb in December 1982 and 320 ppb in March 1983. Discharges of both benzene and toluene have been less than 1 ppb during the sampling events since March of 1983 (Ref. No. 22). Due to these comparatively low concentrations of benzene and toluene the NYSDEC has discontinued analysis for these compounds. Presently, effluent samples are analyzed for pH, flow, oil and grease, iron, and zinc (Ref. No. 23).

The USGS drilled four test borings at the site in 1982. Subsurface soil samples were collected from each boring at depths ranging from 2.5 feet to 10 feet. Toluene was detected below the quantifiable detection limit. A number of other organic compounds, including benzene, phenol, and several polynuclear aromatic hydrocarbons (PAHs), were detected but not quantified because sample holding times were exceeded. Inorganic (i.e., metal) analyses were not conducted.

No sampling was conducted by NUS Corporation Region 2 FIT.

3. **Is a designated well head protection area within 4 miles of the site?**

   There are no designated well head protection areas within 4 miles of the site.

   Ref. No. 4

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

   The screened interval noted in the log of a well located 3.25 miles from the site indicates that the water table within the shallow unconsolidated glacial deposit aquifer lies no less than 19 feet below the ground surface. Since wastes were deposited on the ground surface, the depth from the lowest point of waste disposal to the highest seasonal level of the aquifer is assumed to be 19 feet.

   Ref. Nos. 1, 6, 26

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

   The site is underlain by unconsolidated deposits consisting primarily of Pleistocene and Holocene lacustrine clay and till. The permeability of lacustrine clay is less than 10^{-7} cm/sec.

   Ref. Nos. 35, 38, 39

6. **What is the net precipitation for the area?**

   The net precipitation for this area is 7 inches.

   Ref. No. 37

7. **What is the distance to and depth of the nearest well that is currently used for drinking purposes?**

   There are no wells currently used for drinking within 4 miles of the site.

   Ref. Nos. 4, 5, 16, 17

8. **If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be located within the contamination boundary of the release.**

   There is a suspected release of contaminants to groundwater; however, groundwater is not used as a source of drinking water within 4 miles of the site.

   Ref. Nos. 4, 5, 16, 17

9. **Identify the population served by wells located within 4 miles of the site that draw from the aquifer of concern.**

Distance	Population
0 - $\frac{1}{4}$ mi	0
> $\frac{1}{4}$ - $\frac{1}{2}$ mi	0
> $\frac{1}{2}$ - 1 mi	0
> 1 - 2 mi	0
> 2 - 3 mi	0
> 3 - 4 mi	0

   There are no wells used for drinking water within 4 miles of the site.

   Ref. Nos. 4, 5, 16, 17

10. **Identify uses of groundwater within 4 miles of the site (i.e. private drinking source, municipal source, commercial, irrigation, unusable).**

Use of groundwater within 4 miles of the site is limited to irrigation and industrial uses.

Ref. No. 17

SURFACE WATER ROUTE

11. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence.**

A release of contaminants to surface water is suspected. The site is bordered to the south by an unnamed stream, and fill material composed of fly ash (possibly containing heavy metals) and foundry sands (possibly containing phenolic binders) were deposited adjacent to the stream. Contaminants may be transported via leachate or overland runoff. An oily sheen and a white milky discharge (both of unknown origin) were observed in the unnamed stream in April 1983 and July 1986, respectively. At least two other spills occurred on site, including a "red material" in January 1986 and a diesel oil spill in February 1983. Contaminants, if present, could enter the unnamed stream, which empties into Two Mile Creek, via overland runoff. Two Mile Creek could also be affected if contaminants were transported to the on-site storm sewers, which discharge into it under a SPDES permit. Drums were also deposited in the adjacent unnamed stream; one drum was observed protruding from the bank of the fill area. Background information indicates these drums were empty and/or rusted. Contaminants (if any) from these drums would have been released directly to surface water. In addition, it was noted during a NYSDEC inspection that the unnamed tributary "did not appear to harbor a healthy aquatic population", which did not "seem normal". Analysis of subsurface soil samples collected by the USGS indicates the presence of benzene, toluene, phenol, and several PAHs in on-site soil.

Ref. Nos. 3, 12, 14, 15, 26-33

12. **Identify the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

The nearest downslope surface water is an unnamed stream located along the southern border of the site. The unnamed stream flows adjacent to the site, under Two Mile Creek Road, and into Two Mile Creek. Two Mile Creek empties into the Niagara River approximately 1,000 feet northeast of the mouth of the unnamed tributary. The facility property slopes slightly toward the southeast. Erosion along the steep embankment of the unnamed stream indicates the potential overland migration of contaminants (if present) in that direction. On-site storm sewers collect facility runoff and discharge it under a SPDES permit to Two Mile Creek. Figure 3 provides a Surface Water Migration Pathway Map.

Ref. Nos. 1, 12, 15

13. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest downslope surface water is an unnamed stream located adjacent to the southern border of the site. Background information indicates that drums were deposited along this stream. Only one drum was observed during the on-site reconnaissance conducted by the NUS Corp. Region 2 FIT on September 19, 1990. This drum was located on the New K Realty property adjacent to the site. There were no drums observed on site or along the stream.

Ref. Nos. 1, 15, 29, 32

14. **Determine the floodplain that the site is located within.**

The site is not located within a floodplain. The area around the site is designated as zone "C", which is described as an area of "minimal flooding."

Ref. Nos. 11, 34

15. **What is the 2-year 24-hour rainfall?**

The 2-year 24-hour rainfall for the Tonawanda area is approximately 2.5 inches.

Ref. No. 10

16. **Identify drinking water intakes in surface waters within 15 miles downstream of the site. For each intake identify: the distance from the point of surface water entry, population served, and stream flow at the intake location.**

Intake	Distance	Population Served	Flow (cfs)
City of Tonawanda	1.1 Miles	20,000	200,000
City of North Tonawanda	1.4 Miles	20,000-30,000	200,000
City of Lockport	1.8 Miles	25,000	200,000

Ref. Nos. 1, 24, 25

17. **Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery specify the following information:**

Fishery	Water Body Type	Flow (cfs)
Niagara River	Very large River	200,000 cfs

The Niagara River is used extensively for fishing. Available species above Niagara Falls include walleye, muskies, and bass, while below the Falls larger lake fish such as lake trout and salmon are present.

Ref. No. 7

18. **Identify sensitive environments that exist within 15 miles of the point of surface water entry. For each sensitive environment specify the following:**

Environment	Water Body Type	Flow (cfs)
Wetlands	Very large river (Niagara River)	200,000 cfs
Wetlands	Small stream (Two Mile Creek)	10-100 cfs
State Threat. Species Hab.	Very large river (Niagara River)	200,000 cfs
Waterfowl Wintering Area	Very large river (Niagara River)	200,000 cfs

Ref. Nos. 13, 18-20

19. **If a release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 16-18 that are or may be located within the contamination boundary of the release.**

Intake	Fishery	Environment

A release to surface water is not observed or suspected.

SOIL EXPOSURE PATHWAY

20. Determine the number of people that occupy residences or attend school or day care on or within 200 feet of the site property.

There are no people occupying residences or attending school or day care on or within 200 feet of the site property.

Ref. No. 15

21. Determine the number of people that work on or within 200 feet of the site property.

The only people that work on or within 200 feet of the site property are the employees of Consolidated Freightways. Consolidated Freightways employees approximately 60 full-time employees.

Ref. No. 15

22. Identify terrestrial sensitive environments on or within 200 feet of the site property.

There are no terrestrial sensitive environments on or within 200 feet of the site property.

Ref. Nos. 1, 15, 20

AIR ROUTE

23. Describe the likelihood of release of contaminants to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release define the supporting analytical evidence.

Wastes deposited on site were buried and subsequently covered with asphalt, concrete, and other demolition debris. Drums previously observed on site and in the adjacent unnamed stream have been removed. In addition, no volatile substance are known to have been deposited at the site. No readings above background were observed on the OVA and HNu air monitoring instruments during the NUS Corp Region 2 FIT on-site reconnaissance conducted on September 19, 1990. There is therefore a low potential for a release of contaminants to air.

Ref. Nos. 3, 15, 26

24. Determine populations that reside within 4 miles of the site.

Distance	Population
0 - ¼ mi	11
> ¼ - ½ mi	1,230
> ½ - 1 mi	3,560
> 1 - 2 mi	15,680
> 2 - 3 mi	35,500
> 3 - 4 mi	72,210

Ref. No. 2

25. Identify sensitive environments and wetlands acreage within ½ mile of the site.

Sensitive Environment Type	Distance
Wetland (7 acres)	Borders the site
Wetland (Unknown acreage)	20 feet
Wetland (Unknown acreage)	1,000 feet
State Threat. Species Hab.	1,500 feet

Ref. Nos. 13, 19, 20

26. If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of air contamination from the release.

A release to air is not observed or suspected.

27. If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 25, that are or may be located within the area of air contamination from the release.

A release to air is not observed or suspected.

ATTACHMENT 1

EXHIBIT A

PHOTOGRAPH LOG

CONSOLIDATED FREIGHTWAYS
TONAWANDA, NEW YORK

ON-SITE RECONNAISSANCE: SEPTEMBER 19, 1990

CONSOLIDATED FREIGHTWAYS
TONAWANDA, NEW YORK
SEPTEMBER 19, 1990

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY DAVE BENFER

Photo Number	Description	Time
1P-1	Part of a panoramic view looking southwest.	1030
1P-2	Part of a panoramic view looking south.	1030
1P-3	Part of a panoramic view looking southeast.	1030
1P-4	Part of a panoramic view looking east.	1030
1P-5	Low area located southwest of the site.	1050
1P-6	Low area located south of the site.	1050
1P-7	View down embankment along the southern border of the site.	1055
1P-9	View of the drainage stream located at the base of the embankment.	1055
1P-10	Construction debris along the embankment.	1059
1P-11	View of the northeast corner of the site.	1105
1P-12	View of Two Mile Creek from Two Mile Creek Road.	1112
1P-13	View of the culvert located in the southeast corner of the site.	1112
1P-14	View of the site from the northeast corner.	1115

Note: Photo number, 1P-8, out of focus-not used in photo log.

CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

1P-1 September 19, 1990 1030
Part of a panoramic view looking southwest.

1P-2 September 19, 1990 1030
Part of a panoramic view looking south.

CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

1P-3 September 19, 1990 1030
Part of a panoramic view looking southeast.

1P-4 September 19, 1990 1030
Part of a panoramic view looking east.

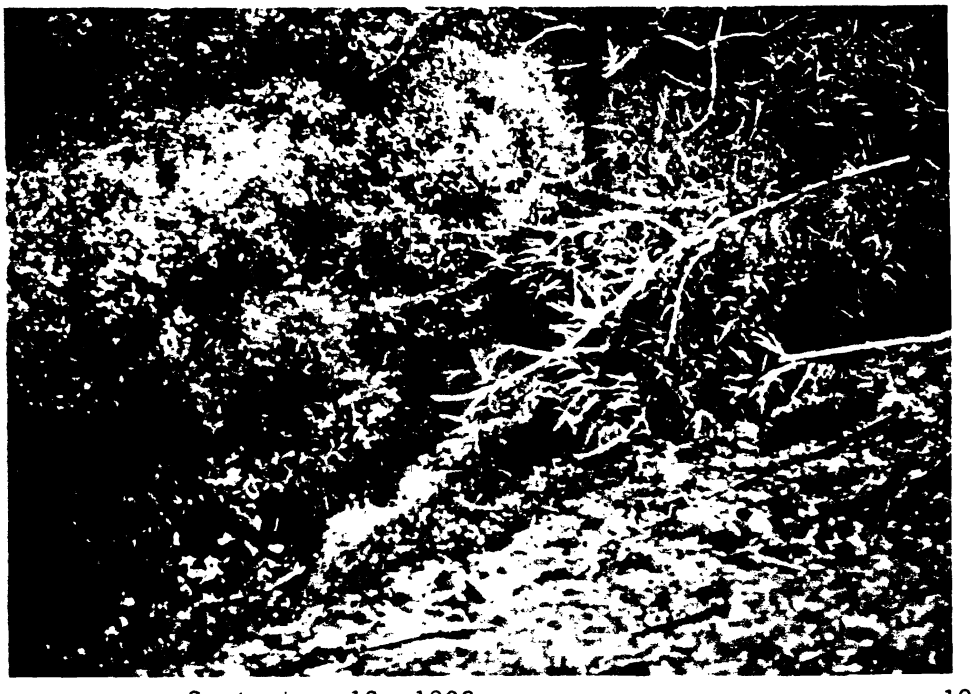
CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

1P-5 September 19, 1990 1050
Low area located southwest of the site.

1P-6 September 19, 1990 1050
Low area located south of the site.

CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

1P-7 September 19, 1990 1055
View down embankment along the southern border of the site.



1P-9 September 19, 1990 1055
View of the drainage stream located at the base of the embankment.

CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

1P-10 September 19, 1990 1059
Construction debris along the embankment.

1P-11 September 19, 1990 1105
View of the northeast corner of the site.

CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

1P-12 September 19, 1990 1112
View of Two Mile Creek from Two Mile Creek Road.

1P-13 September 19, 1990 1112
View of the culvert located in the southeast corner of the site.

CONSOLIDATED FREIGHTWAYS, TONAWANDA, NEW YORK

IP-14 September 19, 1990 1115
View of the site from the northeast corner.

ATTACHMENT 2

REFERENCES

1. Four Mile Vicinity Map based on the U.S. Department of the Interior, USGS Topographic Maps, 7.5 Minute Series, "Tonawanda West Quadrangle, NY," 1980; "Tonawanda East Quadrangle, NY," 1980; "Buffalo Northeast Quadrangle, NY," 1965; "Buffalo Northwest Quadrangle, NY," 1965.

2. General Sciences Corp. Graphical Exposure Modeling Systems (GEMS), Landover, Maryland, 1986.

3. Letter from Thomas P. Connare, Environmental Analyst, Recra Research, Inc., to Frank D. Solberg, Consolidated Freightways. April 30, 1986.

4. Telecon Note: Conversation between Ken Roberts, Water Resources, New York State Department of Environmental Conservation (NYSDEC), and Dave Benfer, NUS Corp., October 9, 1990.

5. Telecon Note: Conversation between Ron Koczoja, Erie County Department of Health, and Dave Benfer, NUS Corp., October 23, 1990.

6. Selected information from wells in groundwater site inventory data base, USGS Water Resources Division, Request 2230, September 8, 1990.

7. Telecon Note: Conversation between Rich Swinivch, Water Department, NYSDEC, and Dave Benfer, NUS Corp., October 23, 1990.

8. La Sala, A.M. Sr. Ground-Water Resources of the Erie-Niagara Basin, New York. United States Department of the Interior Geological Survey, in cooperation with the New York State Conservation Department, Division of Water Resources, 1968.

9. New York State Board of Elections, New York State Legislative Task Force on Demographic Research and Reappointment, New York State Congressional Districts, 1984.

10. Rainfall Frequency Atlas of the United States, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C.

11. National Flood Insurance Program, Flood Insurance Rate Map (FIRM), Town of Tonawanda, New York, Panel 1 of 9, Community-Panel Number 360260 0001 B, Effective Date: August 17, 1981.

12. NYSDEC State Pollutant Discharge Elimination System (SPDES) Permit No. NY0109878, issued to Consolidated Freightways, April 1, 1982.

13. National Wetlands Inventory, US Department of the Interior, Fish and Wildlife Service, "Tonawanda West, NY" Overlay, based on aerial photography dated October 1978.

14. U.S. EPA Potential Hazardous Waste Site Identification, EPA Form 2070-8, Consolidated Freightways, November 12, 1980.

15. Field Notebook No. 0650, Consolidated Freightways, TDD No. 02-9007-24, On-Site Reconnaissance, NUS Corp. Region 2 FIT, Edison, New Jersey, September 19, 1990.

16. Telecon Note: Conversation between Mr. Burdo, City of Tonawanda Pumping Station, and Dave Benfer, NUS Corp., August 30, 1990.

REFERENCES (Cont'd)

17. Telecon Note: Conversation between Ron Koczoja, Erie County Department of Health, and Dave Benfer, NUS Corp., September 12, 1990.

18. National Wetlands Inventory Map, U.S. Department of the Interior, Fish and Wildlife Service, "Niagara Falls, Ont.-NY" Overlay, based on aerial photography dated October 1978.

19. Significant Habitat Overlay, NYSDEC, Division of Fish and Wildlife, Bureau of Wildlife, "Toronto, Quad", August 1980, revised November 1985.

20. Letter from Burrell Buffington, NYSDEC Significant Habitat Unit, to Dave Benfer, NUS Corp., November 19, 1990.

21. U.S. EPA Superfund Program, Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), p. 244, October 4, 1990.

22. NYSDEC Effluent Monitoring Results, July 1982 through December 1986.

23. Letter from Joseph M. Martin, Buffalo Testing Laboratories Inc., to Mike Schleicher, Consolidated Freightways, August 23, 1990.

24. Letter from Dave Benfer, NUS Corp., to Mr. Charles Ciehomski, Town of Tonawanda, Water Department, November 27, 1990.

25. Telecon Note: Conversation between Angelo Sartkees, Water Division, NYSDEC, and Dave Benfer, NUS Corp., December 3, 1990.

26. New York State Superfund Phase I Investigation-Fourth Round. Recra Research, Inc., 1986.

27. Report on water leachables from foundry sands, Dr. R.H. Toeniskoetter, Ashland Chemical Company.

28. Johnson, Dr. Calvin K. Phenols in Foundry Waste Sand. Modern Casting, pp. 48-49, January 1981.

29. NYSDEC memorandum from Mr. Clare to Mr. Tygert (both of NYSDEC), Subject: Consolidated Freight, Site No. 915083. August 4, 1986.

30. Comments on NYSDEC Draft Phase I Report, Region 9, Consolidated Freightways, August 4, 1986.

31. Erie County Department of Environment and Planning (ECDEP), Division of Environmental Control (DEC) memorandum, from Donald Cambell to Robert G. Speed, Subject: Removal of PCB Contaminated Oil from New K Realty Property, March 1, 1984.

32. Letter from Donald Campbell, Sr. Environmental Quality Engineer, ECDEP/DEC, to Mr. Jim Sandonato, New K Realty, May 31, 1983.

33. Letter from Robert N. Leary, Senior Sanitary Engineer, NYSDEC, to Patrick J. Brady, Consolidated Freightways, February 27, 1986.

REFERENCES (Cont'd)

34. ECDEP/DEC Hazardous Waste Site Profile: Consolidated Freightways-Former Wm. Strassman Property, February 1982.

35. U.S. EPA, Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste-Disposal Sites, EPA-905/4-85-001, March 1985.

36. Telecon Note: Conversation between Mike Schleicher, Consolidated Freightways, and Dave Benfer, NUS Corp., December 19, 1990.

37. Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, N.C., 1979.

38. Permeability of Geologic Materials Table compiled from the following sources:

- Davis, S.N. Porosity and Permeability of Natural Materials in Flow-Through Porous Media, ed. R.T.M. DeWest. New York, Academic Press, 1969.

- Freeze, R.A., and T.A. Cherry, Groundwater. New York, Prentice-Hall, Inc., 1979.

39. Erie and Niagara Counties Regional Planning Board (ENCRPB), Surface Materials Map, Areawide Waste Treatment Management Planning Study, November 1976.

40. ENCRPB, Depth to Bedrock Map, 1977.

41. New York State Atlas of Community Water System Sources, New York State Department of Health, 1982.

REFERENCE NO. 1

REFERENCE NO. 2

GRAPHICAL EXPOSURE MODELING SYSTEM

(GEMS)

USER'S GUIDE

VOLUME 2. MODELING

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION
Task No. 3-2
Contract No. 68Ø23970
Project Officer: Russell Kinerson
Task Manager: Loren Hall

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GENERAL SCIENCES CORPORATION
8401 Corporate Drive
Landover, Maryland 20785

Submitted: December 1, 1986

CONSOLIDATED FREIGHTWAYS
LATITUDE 43: 0:26 LONGITUDE 78:54:36 1980 POPULATION

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	1234	3559	15676	35498	72210	128177
RING TOTALS	0	1234	3559	15676	35498	72210	128177

> I

CONSOLIDATED FREIGHTWAYS
LATITUDE 43: 0:26 LONGITUDE 78:54:36 1980 HOUSING

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	380	1230	5587	13053	26879	47129
RING TOTALS	0	380	1230	5587	13053	26879	47129

	Population	Housing
.4	11	3
½	1,234	380
1	4,793	1610
2	20,469	7,197
3	55,967	20,250
4	128,177	47,129

REFERENCE NO. 3

RECRA RESEARCH, INC.

Hazardous Waste And Toxic Substance Control

April 30, 1986

Mr. Frank D. Solberg
Consolidated Freightways
877 Niagara Street
Tonawanda, NY 14150

Dear Mr. Solberg:

As part of the background information search requirements for the NYSDEC Superfund sites, we, the consultants, are required to have all our interviews, personal or telephone, documented.

Below is a synopsis of our telephone conversation which took place on April 29, 1986. I would like to request that you read the account, sign at the bottom of the page, and return it to the undersigned. This request is only to serve as documentation that our conversation took place.

- During construction of the Consolidated Freightways facility in 1969, fill material was disposed of in an approximately three acre section abutting a small tributary to Two Mile Creek.
- The fill material included fly ash from the Niagara Mohawk Huntley Station on River Road in Tonawanda, New York.
- The fly ash was hauled to the site by Carmen M. Pariso, Inc., of 3649 River Road, Tonawanda, New York.
- Consolidated Freightways moved into the site in 1970.
- During the years 1975-1976, the existing freight yard was dug up, repitched, and repaved. Storm drains were installed to facilitate drainage from the site to the tributary of Two Mile Creek. Excavation materials including asphalt and concrete were surface piled on the property abutting the tributary to Two Mile Creek.

4248 Ridge Lea Road, Amherst, New York 14226 Telephone (716) 838-6200

- The Consolidated Freightways property on River Road totals approximately 25 acres.

Should you have any further questions or comments, please feel free to contact me. Thank you for your time and effort.

Sincerely,

RECRA RESEARCH, INC.

Thomas P. Connare

Thomas P. Connare
Environmental Analyst

TPC:pal

Frank D. Solberg

REFERENCE NO. 4

NUS CORPORATION AND SUBSIDIARIES — TELECON NOTE

CONTROL NO.:	DATE:	TIME:
02-9007-24	October 9, 1990	1038

DISTRIBUTION:

Consolidated Freightways, Tonawanda, New York

BETWEEN:	OF:	PHONE:
Ken Roberts	DEC; Water Resources	(518) 457-6781

AND: Dave Benfer (NUS)

DISCUSSION:

Spoke with Ken Roberts. ~~He~~ 10-9-90 DD He said that in the town of Tonawanda, New York there are no wells used for public water supply and there are no designated well head protection areas.

ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 5

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9007-24	10-23-90	1500

DISTRIBUTION: Consolidated Freightways

BETWEEN:	OF:	PHONE:
Ron Koczoja	Erie County Dept. of Health	(716) 858-6966

AND: Dave Benfer (NUS)

DISCUSSION:

Spoke with Ron about uses of groundwater and surface water in the Buffalo-Tonawanda-Niagara Falls area.

Groundwater is not used at all in the area. Dunlop Tire company had a well used for cooling but that well has been abandoned.

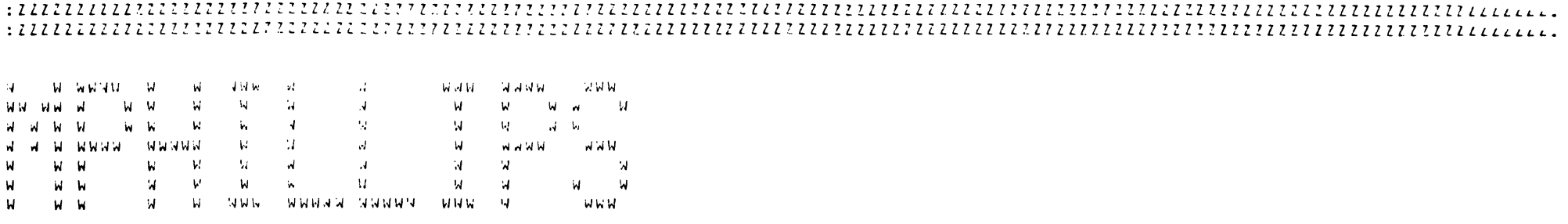
Surface water is used as a primary source of drinking water as well as industrial and commerical uses. The Niagara River is also used for irrigation and multi-purpose recreation.

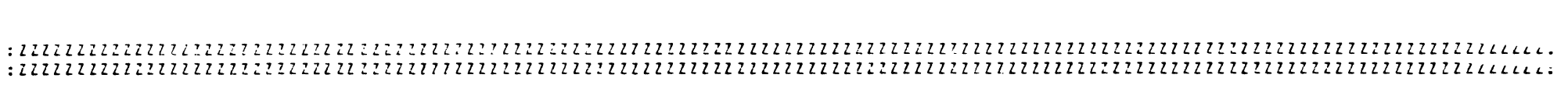
ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 6

Project ID: DEFAULT





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Print Request Attributes: PRO
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File Last Modified: 90-08-23.13:07:32.Tue

Spooled: 90-08-28.13:09:16.Tue
Started: 90-08-28.13:09:16.Tue

LATITUDE (DEGREES)	LONGITUDE (DEGREES)	OWNER	DEPTH DRILLED (FEET)	STATIC WATER LEVEL (FEET)	TOP OF OPEN INTERVAL (FEET)	BTTOM OF OPEN INTERVAL (FEET)	AQUIFER CODE	LITHOLOGY CODE
430250	07 [illegible]	--	--	--	--	--	BEDROCK	--
430250	07[illegible]447	--	--	--	--	--	BEDROCK	--
430251	0735143	CHEM CO HOOKER	--	--	--	--	351CMLS	SHLE
		--		--	--	--	BEDROCK	--
430251	07 [illegible]143	CHEM CO HOOKER	--	--	--	--	351CMLS	SHLE
		--		--	--	--	BEDROCK	--
430253	0735143	CHEM CO HOOKER	--	--	--	--	351CMLS	SHLE
430302	0735349	--	--	--	--	--	BEDROCK	--
430307	0735344	CITY OF NORTH TONAWANDA, CY	20.0	--	17.5	19.0	110QRNR	SDMN
		--		--	--	--	110QRNR	--
430311	0735205	--	91	--	--	--	BEDROCK	--
430311	07[illegible]243	--	--	--	--	--	BEDROCK	--
430314	0735352	GRATWICK RIVERSIDE	--	--	--	--	--	--
430329	0735415	--	--	--	--	--	--	--
430330	0735421	--	--	--	--	--	BEDROCK	--
430354	0735423	NIAGARA COUNTY SEWAGE DISPOSAL	--	--	--	--	--	--

LATITUDE (DEGREES)	LONGITUDE (DEGREES)	DISCHARGE (GPM)	PRIMARY USE OF WATER	OTHER IDENTIFIER
430250	0735138	--	-	--
430250	0735447	--	U	--
430251	0735142	1200	I	--
		--		--
430251	0735149	350	I	--
		--		--
430253	0735142	750	I	--
430302	0735649	--	U	--
430307	0735344	--	U	WELL 12
		--		--
430311	0735205	50	-	--
430311	0735248	--	U	--
430314	0735352	--	-	--
430329	0735416	--	-	GRATWICK PK 07
430330	0735421	--	U	--
430354	0735423	--	-	--

REFERENCE NO. 7

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9007-24	10-23-90	1430

DISTRIBUTION:

Consdidated Freightways

BETWEEN:	OF:	PHONE:
Rich Swinich	D.E.C. Water Department	(716) 847-4590

AND: Dave Benfer (NUS)

DISCUSSION:

The NIAGARA River is used extensively for fishing. The number of spicies has increased tremendously in the past 10 years.

The fishing above the falls is much different than the fishing below the falls. Above the falls species include: Walleye, Muskies, small and large mouth bass. However below the falls fishing involes some of the larger lake fish such as Lake trout and salmon.

ACTION ITEMS:

REFERENCE NO. 8

GROUND-WATER RESOURCES OF THE ERIE-NIAGARA BASIN, NEW YORK

Prepared for the
Erie-Niagara Basin Regional Water Resources
Planning Board

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

in cooperation with

THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3

1968

OCCURRENCE OF GROUND WATER

Ground water is commonly thought of as water that comes from wells and springs. This definition makes the essential point and distinguishes ground water from other subsurface water. Water wells provide the most easily obtainable information on ground-water resources, but the information can be misleading. A casual inspection of a body of random data on wells in the area may lead to the notion that ground water occurs in a haphazard fashion. For example, it is apparent from the data in table 6 that wells vary greatly in depth and yield. Depths range from about 10 to 500 feet, and yields from a few gallons per day to more than 1,000 gpm. What is more, wells of large yield are interspersed with wells of low yield. A more careful study of the data shows that some of the variations in well characteristics reflect differences in well construction rather than in the availability of ground water. A carefully planned and constructed public-supply well gives a more complete picture of water availability than does a driven well constructed for lawn watering. But after accounting for variations in well construction, profound differences in the availability of ground water are still apparent. These differences arise mainly from the geologic and topographic features of the basin.

Ground water occurs in the saturated zone of the earth's crust. The water in the saturated zone (ground water) fills the interconnected openings in the rocks and is under hydrostatic pressure. As shown in figure 4, ground water will flow through the zone of saturation following a course that takes it from a point of higher head to a point of lower head. In this way water entering the ground on a hill may discharge through a spring on the side of the hill, into a nearby stream, or into a river many miles away. When the water standing in a well is pumped out, the head (water level) in the well is lowered. Water from the saturated zone can then move toward the well in the same manner it moves toward points of natural discharge. Where the saturated zone is not overlain by impermeable materials, its upper surface is the water table. The depth to the saturated zone in the area varies from 0 feet in some swamps to possibly more than 75 feet along the edges of some glacial terraces.

The unsaturated materials over the saturated zone make up the zone of aeration, the zone in which the openings are partly filled with air (fig. 4). Water in the zone of aeration is held to the walls of the openings by molecular forces. This prevents the free movement of water in the zone of aeration; water in this zone drains slowly downward but not laterally. Wells and springs, therefore, cannot obtain water from the zone of aeration. The zone is important, however, because water must pass through it to reach the saturated zone.

The unconsolidated deposits and the bedrock differ markedly in the types of water-bearing openings they contain (fig. 4). The unconsolidated deposits are composed of grains packed together with open spaces, or pore spaces, between the grains. Water truly permeates the unconsolidated deposits because it can fill the myriad of tiny pore spaces between the grains.

Still another factor in regard to the water-bearing openings in bedrock must be considered. Some of the rocks are relatively soluble in water; some are essentially insoluble. Ground water circulating through joints removes soluble material by dissolving it, thereby widening the joints and making them still better conduits for ground water. Such solution has enhanced considerably the water-bearing properties of the more soluble rocks.

On the basis of lithology and water-bearing properties, the numerous bedrock units in the Erie-Niagara basin can be divided into two groups: soluble bedrock and shale bedrock. Of the two, the soluble rocks are an important source of water, whereas the shale yields only small supplies.

The Lockport Dolomite, Camillus Shale, Bertie Limestone, Akron Dolomite, and Onondaga Limestone (fig. 2 and pl. 2) are composed of rock materials that are relatively soluble in water. Subsurface water has been relentlessly quarrying the rocks by solution, particularly during the 10,000 years or so since the ice sheet melted from the area. In more extensive and more weathered limestone terranes elsewhere, such as in Kentucky, this process has produced numerous caves and underground streams. In the Erie-Niagara basin, the same process is underway but has advanced only enough to widen considerably many of the water-bearing openings and to enhance the circulation of ground water.

Four of the five formations listed as soluble rocks are either limestone or dolomite. Limestone is composed mainly of the mineral calcite which is a natural form of calcium carbonate. Dolomite is composed of calcium-magnesium carbonate and is less soluble than limestone. Both rocks are attacked by acid. Water that percolates through soil generally dissolves carbon dioxide and, therefore, becomes a weak acid. The initial acidity gives ground water much of its ability to dissolve the carbonate rocks.

The fifth formation, the Camillus Shale, seems out of place listed with dolomite and limestone as a soluble rock. Shale is not by any stretch of the imagination a soluble rock. But the Camillus Shale is unique among the shale formations of the area because it contains a large proportion of gypsum, a calcium-sulfate mineral which is even more soluble than limestone. The gypsum is interbedded with and even diffused through the shale.

Except where removed by erosion, the soluble rocks lie one above another with the Lockport Dolomite on the bottom, the Camillus Shale in the middle, and the Bertie, Akron, and Onondaga on top. For hydrologic purposes the Bertie, Akron, and Onondaga can be considered to form a single aquifer or water-bearing unit, which is called the limestone unit. (These three formations are distinct in a geologic sense but not in a broad hydrologic sense.) All the soluble rocks dip (are inclined) southward at about 40 feet to the mile.

The soluble rocks are bounded top and bottom by shale formations of much lower permeability. The Rochester Shale is at the base of the Lockport Dolomite, and the Marcellus Shale overlies the Onondaga Limestone.

Many domestic-supply wells penetrate from 1 foot to a few feet into the soluble rocks and produce small but adequate yields. On the other hand, industrial wells that were intended to produce large supplies of water give a truer picture of the water-supply potential of the rocks. Data on industrial wells show that the Camillus Shale will yield as much as 1,200 gpm and the limestone unit as much as 300 gpm and probably more. But the data also show that the rocks produce low yields at places. This is shown by such wells as 301-848-1 which was drilled to obtain a large supply for an industry but which yielded only 30 gpm. The water-bearing zones obviously are unevenly distributed through the rocks. Factors that control the occurrence of the water-bearing zones cannot be evaluated at the present time to the extent necessary to predict exactly where the zones occur.

The Lockport Dolomite is the least productive unit of the soluble rocks. Within the Erie-Niagara basin yields of wells in the Lockport range from about 4 to 90 gpm. Depth of the wells range from 20 to 70 feet. Most of the deeper wells were drilled where the depth to bedrock is greatest. Domestic-supply wells generally are finished in the fracture zone at the rock surface or in a bedding joint within the uppermost 30 feet of the rock. It is usually not necessary to drill deeper into the Lockport if only a small supply is needed.

Drilling deeper in an attempt to intersect additional bedding-plane openings at depth would provide higher yields but, generally, at the expense of lower water levels and therefore higher pump lifts. Johnston (1964) collected data on a much larger number of wells along the outcrop belt of the Lockport Dolomite than were inventoried in the Erie-Niagara basin. He found that wells drawing water from the lower 40 feet of the Lockport (the northern part of the outcrop area) yield from 1/2 to 20 gpm and have an average yield of 7 gpm. Wells finished in the upper part of the Lockport (the southern part of the outcrop area) yield from 2 to 110 gpm and have an average yield of 31 gpm. Yields of as much as 50 or 100 gpm are possible from the Lockport in the Erie-Niagara basin but would be exceptional.

CAMILLUS SHALE

Bedding and lithology

The Camillus Shale lies above the Lockport Dolomite and crops out to the south of where the dolomite is exposed. Exposures of the Camillus Shale are rare in the Erie-Niagara basin because of the low relief of the outcrop area and the cover of glacial deposits. Geologists who have studied the Camillus in the study basin agree that it consists mostly of gray shale. (For example, see Buehler and Tesmer, 1963, p. 29-30.) Subsurface data, on the other hand, indicate that a considerable amount of gray limestone and dolomite is interbedded with the shale. Along with these carbonates, gypsum comprises a significant part of the Camillus Shale. Some of the gypsum beds are as much as 5 feet thick. Gypsum also occurs in the Camillus as thin lenses and veins. Table 1,

which is a log compiled during construction of a mine slope, illustrates the occurrence of gypsum and the predominance of carbonate rocks in some parts of the Camillus.

Though the Camillus dips southward at approximately 40 feet to the mile, the dip is not uniform. Gypsum miners say the formation "rolls," to describe the gentle folding of its beds. The formation is marked by broad, low folds with amplitudes of a few feet and spacings of a few hundred feet between crests. The fold axes generally are east-west.

Water-bearing openings

The extensive beds of gypsum make the Camillus Shale unique among the shale formations of the basin. The importance of the gypsum lies in its solubility; gypsum is far more soluble than the enclosing rocks, whether shale, dolomite, or limestone. Where gypsum has been dissolved, openings exist for the passage and storage of water.

The effect of the solution of gypsum on the water-bearing properties of the Camillus Shale (and other rocks) can be readily appreciated. Where the topmost beds of the Camillus crop out at the base of the falls of Murder Creek at Akron, the Camillus seems to be an impermeable shale. If one judged the water-bearing properties of the Camillus on the basis of this outcrop alone, he would be wrong. Yields of water wells and drainage into gypsum mines prove that large volumes of water do move through the Camillus.

Clues to the nature of the water-bearing openings in the Camillus can be obtained by considering some of the circumstances where large volumes of water were obtained. About 1885, the Buffalo Cement Company located a 4-foot thick bed of gypsum only 43 feet below land surface by test drilling in Buffalo on Main Street near Williamsville. A shaft was sunk with the intention of beginning a subsurface mining operation, but when the gypsum was struck the shaft was flooded with ground water. The report is that "..... a pump with a capacity of 2,000 gallons per minute failed to make any impression upon it [the water] and the attempt was abandoned" (Newland and Leighton, 1920, 209-210).

In 1964, a gypsum mine near Clarence Center received an unexpected inflow of ground water. Several hundred gallons of water per minute continuously enters the mine at a place about midway down the entry slope. This water is pumped out by a drainage system diagrammatically shown in figure 6. Ordinarily, only small seeps occur in the remainder of the mine from roof bolts and small cracks in the roof. At a distance of more than a mile from the entry slope, the working face intersected an unplugged drill hole. Water poured into the mine at an alarming rate until the hole was plugged with much effort.

Large-yield wells, such as those at Tonawanda and North Tonawanda, obtain water from thin intervals of gypsum-bearing rock. The gypsum in the Camillus Shale obviously is related to the occurrence of large quantities of water. Gypsum is a highly soluble mineral and is

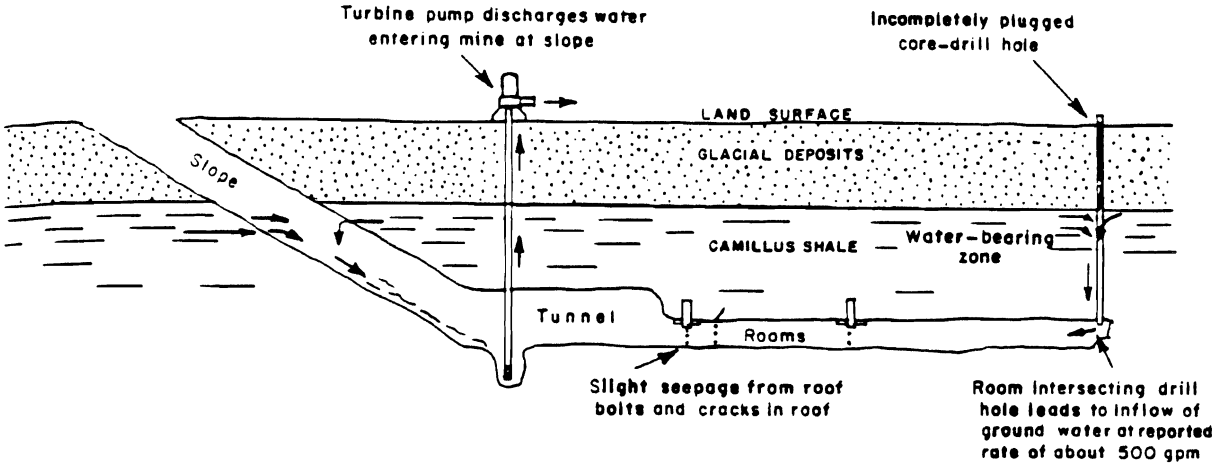


Figure 6.--Occurrence of ground water in the Camillus Shale at a gypsum mine near Clarence Center.

dissolved by circulating ground water faster than are the enclosing rocks. Very likely the openings in the Camillus that yield copious amounts of water were formed by the solution of gypsum by ground water. The water-bearing zones are mainly horizontal because most of the gypsum occurs in horizontal beds and thin zones of gypsiferous shale and dolomite. Only those gypsum zones actually exposed to circulating ground water can be widened by solution. The gypsum must be in contact with an open fracture through which the water can move. If no open fracture exists, the gypsum cannot be dissolved. The occurrence of ground water at the gypsum mine shown in figure 6 is a further illustration. The 4 1/2-foot thick bed that is mined at a depth of 66.9 feet (table 1) is dry because of the lack of vertical fractures to transmit water to it.

The solution-widened water-bearing zones occur at various depths and stratigraphic horizons in the Camillus. The existence of such zones is borne out by well data. For instance, wells 303-850-1 and -2 are 90 feet apart and obtain water from the same 2- to 3-foot thick zone at a depth of 67 to 68 feet. Such zones may be continuous for as much as 1 or 2 miles but information is not available on the extent of individual zones. The gypsum occurs principally in lenticular beds. The thicker beds may be 3 or 4 miles in lateral extent. The thinner beds can be expected to be much smaller in extent.

A zone of fracturing and solution extending several feet below the rock surface yields relatively small but sufficient water supplies for domestic use. This zone appears to be present throughout the area and is unrelated to stratigraphic position.

Yields of wells

The Camillus Shale is by far the most productive bedrock aquifer in the area. Except in the vicinity of Buffalo and Tonawanda, where industrial wells produce from 300 to 1,200 gpm, no attempt has been made to obtain large supplies from the formation. However, the inflow of water to gypsum mines near Clarence Center and Akron indicate that large supplies are not necessarily restricted to the Buffalo and the Tonawanda area. Two examples of large flows of water encountered in gypsum mining have already been mentioned. Pumpage from gypsum mines near Clarence Center (including the mine mentioned previously) is substantial. The water pumped is discharged to Got Creek. On July 2, 1963, the creek had a flow of 2.1 mgd (million gallons per day) about half a mile downstream from the mines, that was due almost entirely to the pumpage. Water for industrial use is pumped from a flooded, abandoned gypsum mine at Akron. This pumpage, at a rate of 500 to 700 gpm, has had no appreciable effect on the water level in the mine.

Probably the larger solution openings are most common in discharge areas near Tonawanda Creek and its tributaries and near the Niagara River; the flow of ground water becomes concentrated as it approaches the streams to which it discharges. Other discharge areas, such as low-lying swampy areas and headwaters of small streams that have perennial flow, are likely places to drill wells.

LIMESTONE UNIT

Bedding and lithology

The term "limestone unit" in this report is applied to a sequence of limestone and dolomite overlying the Camillus Shale. The limestone unit includes the Bertie Limestone at the base, the Akron Dolomite, and the Onondaga Limestone at the top. The lithology and thickness of these units are shown in figure 7. The Bertie Limestone and the Akron Dolomite are Silurian in age and are separated from the overlying Onondaga Limestone of Devonian age by an unconformity or erosional contact.

The Bertie Limestone is mainly dolomite and dolomitic limestone but contains interbedded shale particularly in the thin-bedded lower part of the formation. The middle part is brown, massive dolomite, and the upper part is gray dolomite and shale whose beds are of variable thickness. The total thickness of the formation is about 55 feet (Buehler and Tesmer, 1963, p. 30-31).

The Akron Dolomite is composed of greenish-gray and buff dolomite beds varying from a few inches to about a foot in thickness. The upper contact of the Akron is erosional and is often marked by remnants of shallow stream channels. Thin lenses of sandy sediments lie in the bottoms of some channels. The thickness of the formation is generally between 7 and 9 feet (Buehler and Tesmer, 1963, p. 33-34).

OCCURRENCE OF WATER IN UNCONSOLIDATED DEPOSITS

The unconsolidated deposits overlie the bedrock units previously discussed and consist of a variety of granular material. The bulk of the unconsolidated deposits are glacial in origin and include till, lake deposits, and sand and gravel deposits. The materials laid down since glaciation are thin and consist of alluvium and swamp deposits.

The deposits vary in their hydrologic characteristics because of differences in their lithology and thickness and because of their distribution and spatial relationships to one another. Plate 3 is a geologic map showing the division of the unconsolidated deposits into several groups on the basis of their origin. The distribution of these groups at the surface is readily apparent from the map. An understanding of the geologic processes that formed the deposits allows their subsurface distribution to be inferred. The map, therefore, can be read in three dimensions through proper interpretation.

An explanation of the origin and general features of the several types of deposits is given in figure 8. When the ice sheet advanced over the area, the ice tore and abraded the bedrock surface. The hills were somewhat reduced and rounded and the valleys were deepened. Some of the rock material eroded from the bedrock was redeposited by the ice and forms the poorly sorted mantle material that is called till (fig. 8A). Eventually, the ice began to wane with a change in climate. As the amount of snow nourishing it decreased, the ice sheet thinned. It had difficulty maintaining flow over rough topography along its marginal zone. The margin became scalloped, and some marginal zones grew so thin that they stagnated. These zones separated from the ice sheet and wasted away in place.

The sequence of deposition in an upland valley during retreat generally followed a particular order. A temporary valley was formed between the wasting ice and the rock wall of the valley. Melt water from the ice sheet, which at times of rapid melting was released in enormous quantities, flowed through the valley away from the retreating ice sheet. The melt water carried a heavy load of sediment washed out of the ice. It deposited sediment, mainly sand and gravel, and began to fill up the valley. This type of sand and gravel deposit is an ice-contact deposit (fig. 8B). In southward drained valleys, ice-contact deposits could form at low levels, even in the valley bottoms. In northward drained valleys, because of the divide to the south, the ice-contact deposits could form only high on the sides of the valley above the level of melt-water lakes impounded to the level of the spillway over the divides.

As the ice sheet melted back, a lower outlet for the melt water was uncovered. The melt-water stream was diverted from the ice-contact deposit. As the stagnant ice mass bordering the ice-contact deposits continued to melt away, the sand and gravel held up by the ice mass subsided toward the center of the valley. A lake formed in the open area left by the ice as it melted (fig. 8C). In a southward drained valley, the lake would be caused by a dam of earlier glacial deposits across the valley, perhaps part of the ice-contact deposits. In a northward drained valley, the lake would be formed between the divide to the south and the ice sheet to the north. Fine-grained sediments (clay, silt, and fine sand) settled out

in the lake and gradually filled it (fig. 8D).

Eventually the lake deposits built up to the threshold of the dam, or the dam was cut away by the water spilling over it, or the ice sheet retreated northward opening up the valley. Streams could then flow over the surface of the lake deposits and lay down a second sand and gravel deposit, an outwash deposit (fig. 8D). The sources of the stream waters were the wasting ice sheet (particularly so in southward drained valleys), small masses of wasting ice remaining in tributary valleys, and precipitation. The thickest and most extensive outwash deposits were formed in southward drained valleys and in zones peripheral to the ice sheet. With time, the ice sheet retreated still farther northward, the glacial streams ceased to flow, and glacial deposition came to an end.

As the ice sheet retreated farther north, the climate more nearly approached that of the present. A drainage system developed in response to precipitation. Streams began to incise channels into the deposits. Vegetation took hold as the weather warmed and helped stabilize the slopes. In time, with a change in regimen, the streams began to lay down alluvium (fig. 8E).

The sequence of events discussed above and shown in figure 8 is generalized. Nevertheless, it is useful in understanding the occurrence of the unconsolidated deposits, particularly in valley areas where they constitute an important source of ground water. In the following sections the lithology and water-bearing characteristics of each of the major types of deposits in the Erie-Niagara basin will be discussed.

TILL

As shown in plate 3, till is the most widespread of all the unconsolidated deposits in the Erie-Niagara basin. Till is essentially a nonsorted material whose character depends principally upon the types of rocks over which the ice passed and the vigor with which the ice crushed and abraded the rock. Till overlying the shale is dark gray and clayey or silty. In some areas, mainly on hillsides and terraces south of Cattaraugus Creek, part of the till is stony material. Till on the soluble rocks is light red and silty; in some morainic ridges it is mostly fine sand.

Thickness of the till varies considerably from a thin cover of 2 or 3 feet to more than 200 feet along the divides between Cattaraugus Creek and the northwestward flowing streams, such as Tonawanda, Buffalo, and Eighteenmile Creeks. On flat terraces mapped as till in Buttermilk Creek valley, the stony till is as much as 30 feet thick.

Only small supplies of water are available from till. The permeability of till is so small that wells with large wall areas are required to obtain even small supplies. This requirement for a large wall area is met by digging large-diameter wells.

REFERENCE NO. 9

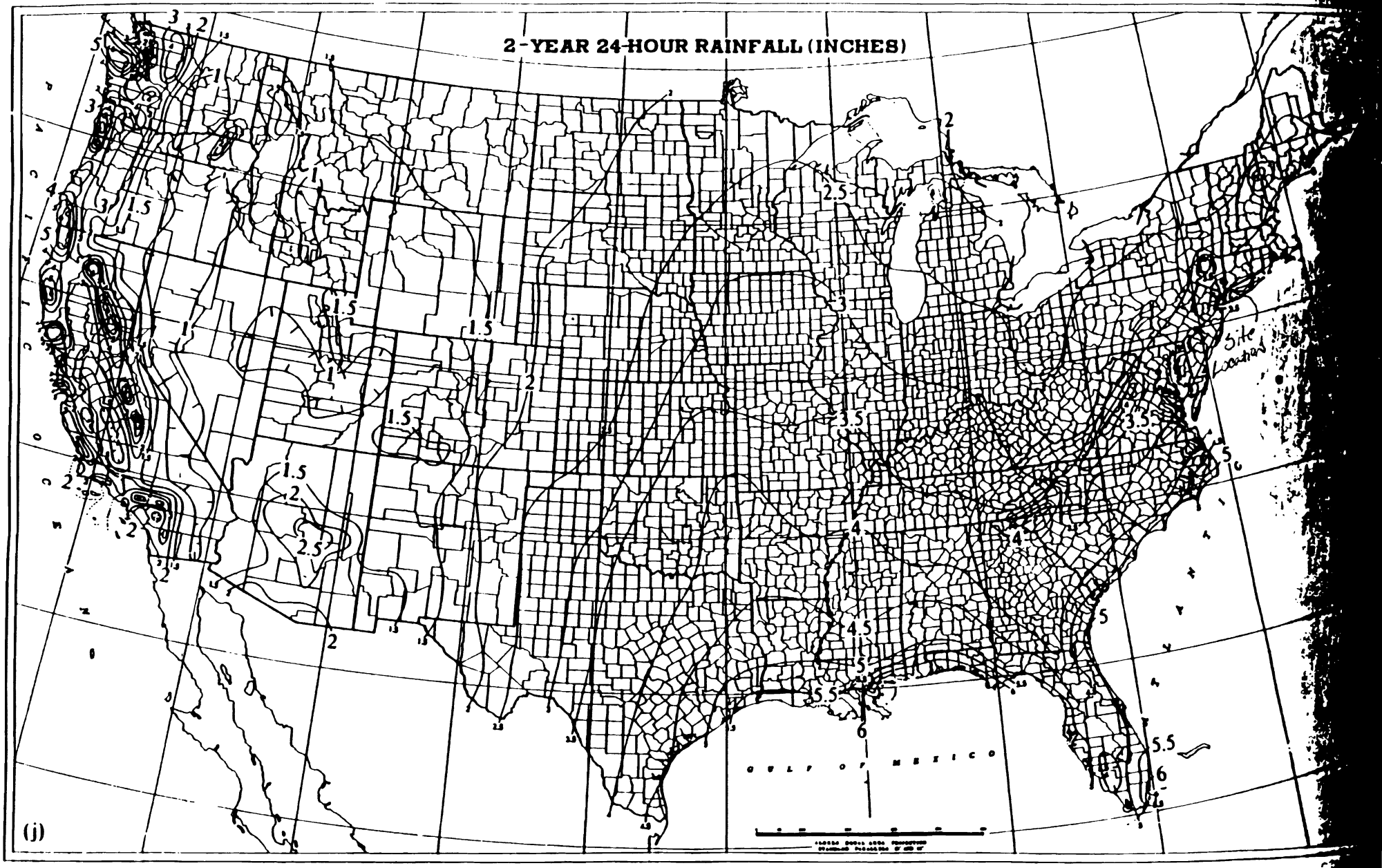
NEW YORK

Congressional District Identification—Continued

Table 1. MUNICIPALITIES—Continued

Municipality	County	Congressional district
RENSSELAER FALLS VILLAGE	ST. LAWRENCE	26
RHINEBECK VILLAGE	DUTCHESS	24
RICHBURG VILLAGE	ALLEGANY	34
RICHFIELD SPRINGS VILLAGE	OTSEGO	25
RICHMONDVILLE VILLAGE	SCHOHARIE	25
RICHVILLE VILLAGE	ST. LAWRENCE	26
RIVERSIDE VILLAGE	STEUBEN	34
ROCHESTER CITY	MONROE	29,30,32
ROCKVILLE CENTRE VILLAGE	NASSAU	5
ROME CITY	ONEIDA	25
ROSLYN VILLAGE	NASSAU	3
ROSLYN ESTATES VILLAGE	NASSAU	3
ROSLYN HARBOR VILLAGE	NASSAU	3
ROUND LAKE VILLAGE	SARATOGA	24
ROUSES POINT VILLAGE	CLINTON	26
RUSHVILLE VILLAGE	ONTARIO	31
	YATES	34
RUSSELL GARDENS VILLAGE	NASSAU	3
RYE CITY	WESTCHESTER	20
SACKETS HARBOR VILLAGE	JEFFERSON	26
SADDLE ROCK VILLAGE	NASSAU	8
SAG HARBOR VILLAGE	SUFFOLK	1
ST. JOHNSVILLE VILLAGE	MONTGOMERY	25
SALAMANCA CITY	CATTARAUGUS	34
SALEM VILLAGE	WASHINGTON	24
SALTAIRE VILLAGE	SUFFOLK	2
SANDS POINT VILLAGE	NASSAU	3
SANDY CREEK VILLAGE	OSWEGO	29
SARANAC LAKE VILLAGE	ESSEX	26
	FRANKLIN	26
SARATOGA SPRINGS CITY	SARATOGA	24
SAUGERTIES VILLAGE	ULSTER	28
SAVONA VILLAGE	STEUBEN	34
SCARSDALE VILLAGE	WESTCHESTER	20
SCHAGHTICOKE VILLAGE	RENSSELAER	24
SCHENECTADY CITY	SCHENECTADY	23
SCHENEVUS VILLAGE	OTSEGO	25
SCHOHARIE VILLAGE	SCHOHARIE	25
SCHUYLERVILLE VILLAGE	SARATOGA	24
SCOTIA VILLAGE	SCHENECTADY	23
SCOTTSVILLE VILLAGE	MONROE	30
SEA CLIFF VILLAGE	NASSAU	3
SENECA FALLS VILLAGE	SENECA	29
SHARON SPRINGS VILLAGE	SCHOHARIE	25
SHERBURNE VILLAGE	CHENANGO	25
SHERMAN VILLAGE	CHAUTAUQUA	34
SHERRILL CITY	ONEIDA	25
SHOREHAM VILLAGE	SUFFOLK	1
SHORTSVILLE VILLAGE	ONTARIO	30
SIDNEY VILLAGE	DELAWARE	25
SILVER CREEK VILLAGE	CHAUTAUQUA	34
SILVER SPRINGS VILLAGE	WYOMING	31
SINCLAIRVILLE VILLAGE	CHAUTAUQUA	34
SKANEATELES VILLAGE	ONONDAGA	27
SLOAN VILLAGE	ERIE	33
SLOATSBURG VILLAGE	ROCKLAND	22
SMYRNA VILLAGE	CHENANGO	25
SODUS VILLAGE	WAYNE	29
SODUS POINT VILLAGE	WAYNE	29
SOLVAY VILLAGE	ONONDAGA	27
SOUTHAMPTON VILLAGE	SUFFOLK	1
SOUTH CORNING VILLAGE	STEUBEN	34
SOUTH DAYTON VILLAGE	CATTARAUGUS	34
SOUTH FLORAL PARK VILLAGE	NASSAU	5
SOUTH GLENS FALLS VILLAGE	SARATOGA	24
SOUTH NYACK VILLAGE	ROCKLAND	22
SPECULATOR VILLAGE	HAMILTON	26
SPENCER VILLAGE	TIOGA	28
SPENCERPORT VILLAGE	MONROE	32
SPRING VALLEY VILLAGE	ROCKLAND	22
SPRINGVILLE VILLAGE	ERIE	31
STAMFORD VILLAGE	DELAWARE	25
STEWART MANOR VILLAGE	NASSAU	5
STILLWATER VILLAGE	SARATOGA	24
SUFFERN VILLAGE	ROCKLAND	22
SYLVAN BEACH VILLAGE	ONEIDA	29
SYRACUSE CITY	ONONDAGA	27
TANNERSVILLE VILLAGE	GREENE	24
TARRYTOWN VILLAGE	WESTCHESTER	22
THERESA VILLAGE	JEFFERSON	26
THOMASTON VILLAGE	NASSAU	3
TICONDEROGA VILLAGE	ESSEX	26
TIVOLI VILLAGE	DUTCHESS	24
TONAWANDA CITY	ERIE	32
TROY CITY	RENSSELAER	23
TRUMANSBURG VILLAGE	TOMPKINS	28
TUCKAHOE VILLAGE	WESTCHESTER	20
TULLY VILLAGE	ONONDAGA	27
TUPPER LAKE VILLAGE	FRANKLIN	26
TURIN VILLAGE	LEWIS	26
TUXEDO PARK VILLAGE	ORANGE	22
UNADILLA VILLAGE	OTSEGO	25
UNION SPRINGS VILLAGE	CAYUGA	29
UNIONVILLE VILLAGE	ORANGE	22
UPPER BROOKVILLE VILLAGE	NASSAU	3
UPPER NYACK VILLAGE	ROCKLAND	22
UTICA CITY	ONEIDA	25
VALATIE VILLAGE	COLUMBIA	24
VALLEY FALLS VILLAGE	RENSSELAER	24
VALLEY STREAM VILLAGE	NASSAU	5
VAN ETTEN VILLAGE	CHEMUNG	34
VERNON VILLAGE	ONEIDA	25
VICTOR VILLAGE	ONTARIO	30
VICTORY VILLAGE	SARATOGA	24
VILLAGE OF THE BRANCH VILLAGE	SUFFOLK	1
VOORHEESVILLE VILLAGE	ALBANY	23
WADDINGTON VILLAGE	ST. LAWRENCE	26
WALDEN VILLAGE	ORANGE	21
WALTON VILLAGE	DELAWARE	25
WAMPSVILLE VILLAGE	MADISON	27
WAPPINGERS FALLS VILLAGE	DUTCHESS	21
WARSAW VILLAGE	WYOMING	31
WARWICK VILLAGE	ORANGE	22
WASHINGTONVILLE VILLAGE	ORANGE	21
WATERFORD VILLAGE	SARATOGA	24
WATERLOO VILLAGE	SENECA	29
WATERTOWN CITY	JEFFERSON	26
WATERVILLE VILLAGE	ONEIDA	25
WATERVLIET CITY	ALBANY	23
WATKINS GLEN VILLAGE	SCHUYLER	30
WAVERLY VILLAGE	TIOGA	28
WAYLAND VILLAGE	STEUBEN	34
WEBSTER VILLAGE	MONROE	29
WEEDSPORT VILLAGE	CAYUGA	29
WELLSBURG VILLAGE	CHEMUNG	34
WELLSVILLE VILLAGE	ALLEGANY	34
WESTBURY VILLAGE	NASSAU	3,4
WEST CARTHAGE VILLAGE	JEFFERSON	26
WESTFIELD VILLAGE	CHAUTAUQUA	34
WESTHAMPTON BEACH VILLAGE	SUFFOLK	1
WEST HAVERSTRAW VILLAGE	ROCKLAND	22
WESTPORT VILLAGE	ESSEX	26
WEST WINFIELD VILLAGE	HERKIMER	26
WHITEHALL VILLAGE	WASHINGTON	24
WHITE PLAINS CITY	WESTCHESTER	20
WHITESBORO VILLAGE	ONEIDA	25
WHITNEY POINT VILLAGE	BROOME	28
WILLIAMSVILLE VILLAGE	ERIE	31,33
WILLISTON PARK VILLAGE	NASSAU	3
WILSON VILLAGE	NIAGARA	32
WINDSOR VILLAGE	BROOME	28
WOLCOTT VILLAGE	WAYNE	29
WOODHULL VILLAGE	STEUBEN	34
WOODRIDGE VILLAGE	SULLIVAN	28
WOODSBURGH VILLAGE	NASSAU	5
WURTSBORO VILLAGE	SULLIVAN	22
WYOMING VILLAGE	WYOMING	31
YONKERS CITY	WESTCHESTER	19,20
YORKVILLE VILLAGE	ONEIDA	25
YOUNGSTOWN VILLAGE	NIAGARA	32

REFERENCE NO. 10


2-YEAR 24-HOUR RAINFALL (INCHES)
Site Location
GULF OF MEXICO
(j)

REFERENCE NO. 11

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF TONAWANDA, NEW YORK
ERIE COUNTY

PANEL 1 OF 9
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
360260 0001 B

EFFECTIVE DATE:
AUGUST 17, 1981

federal emergency management agency
federal insurance administration

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
JUNE 7, 1974
FLOOD HAZARD BOUNDARY MAP REVISIONS:
OCTOBER 24, 1975

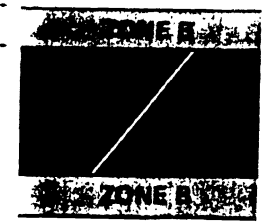
FLOOD INSURANCE RATE MAP EFFECTIVE:
AUGUST 17, 1981
FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620.

KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations*
100-Year Flood Boundary
500-Year Flood Boundary



Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation in Feet Where Uniform Within Zone** — (EL 987)

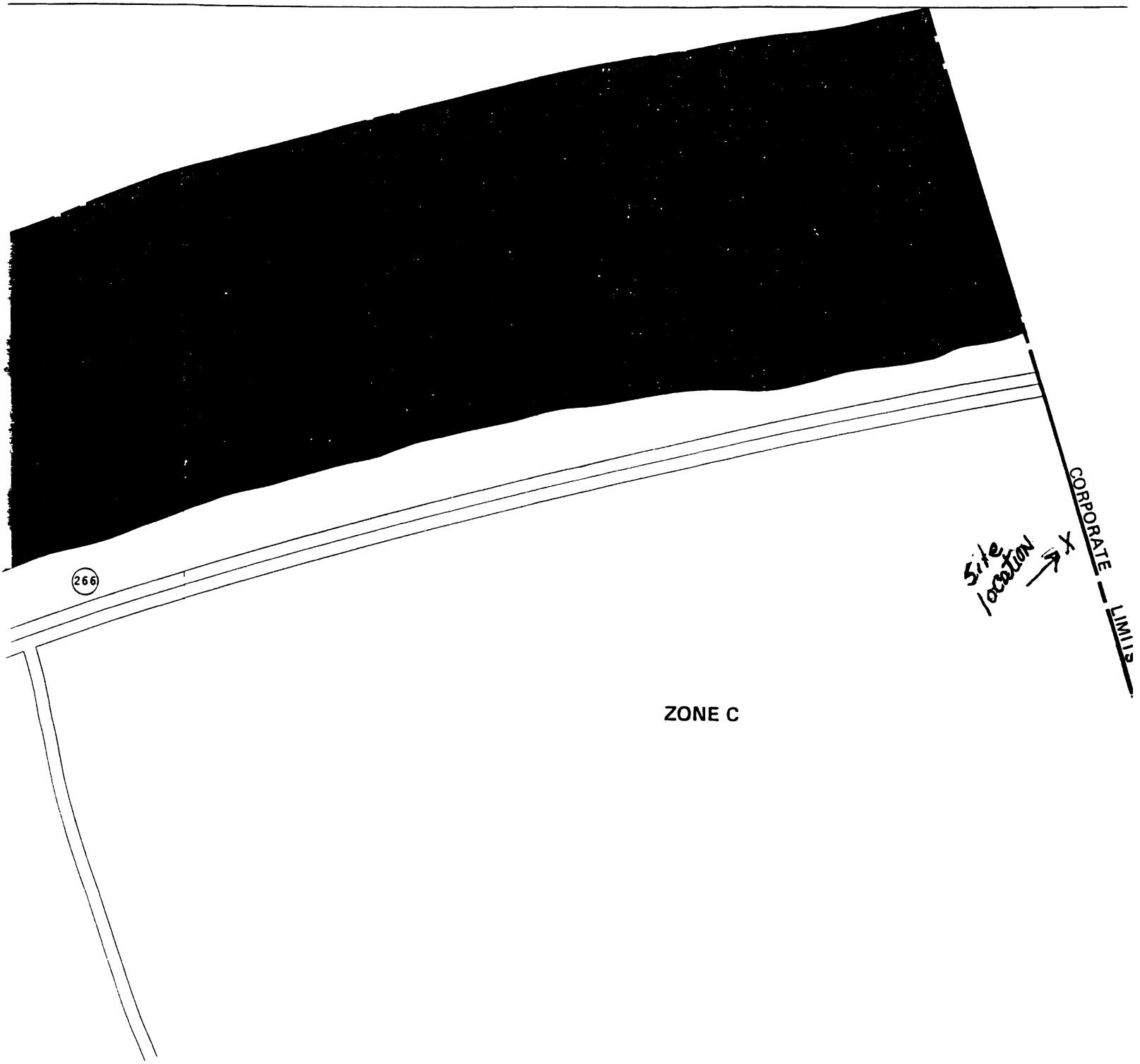
Elevation Reference Mark — RM7×

River Mile — • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

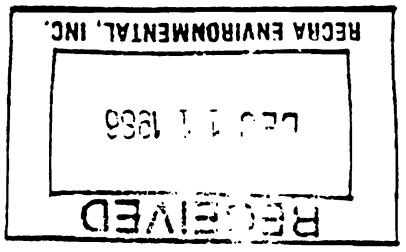
ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.


266
Site location
CORPORATE LIMITS
ZONE C

REFERENCE NO. 12

New York State Department of Environmental Conservation
600 Delaware Avenue Buffalo, NY 14202

Robert F. Flacke
Commissioner



March 30, 1982

Consolidated Freightways
847 Niagara Street
Tonawanda, NY 14150

Re: SPDES Permit #NY 0109878
Consolidated Freightways
Tonawanda (T), Erie Co.

Dear Sir:

Transmitted herewith is the State Pollutant Discharge Elimination System (SPDES) Permit for the discharge of treated wastes from the above facility. This discharge is subject to all conditions and limitations contained herein.

This Permit requires effluent monitoring in accordance with the Schedule on Page 2. The monitoring reports are to be submitted to the Department of Environmental Conservation and the Erie County Dept. of Environment & Planning *at the addresses listed on Page 3. The first monitoring report is due*

October 28, 1982

Should there be any questions concerning this Permit, please contact Mr. Wager *of this office at 716/847-4590.*

Very truly yours,

Robert G. Speed, P.E.
Regional Water Quality Engineer

:dd

cc: PDES Section, Albany
Erie *County* DEP
File

HMENT: GENERAL CONDITIONS(PART II)(8/81).

(W) - 4213

Copies:
SPDES File
Region #9
Erie Co. Dept. of Env. & Plan.
Erie/Niagara Co. Reg. Plan. Board
Mr. Pulaski - BWFD
Mr. Adamczyk - BWFD
Mr. Baker - EPA, Region II
Mr. Hansen - BWFO

Facility ID No. : NY- 010 9878

Effective Date (EDP) : EDP (April 1, 198

Expiration Date (ExDP) : EDP + 5 Years (4/1/8

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES)
DISCHARGE PERMIT

Special Conditions
(Part I)

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et. seq.) (hereinafter referred to as "the Act").

Permittee Name: Consolidated Freightways of Delaware

Permittee Street: 175 Linfield Drive

Permittee City: Menlo Park **State:** California **Zip Code:** 94025

is authorized to discharge from the facility described below:

Facility Name: Consolidated Freightways

Facility Location (C,T,V): Tonawanda (T) **County:** Erie Co.

Facility Mailing Address (Street): 847 Niagara Street

Facility Mailing Address (City): Tonawanda **State:** NY **Zip Code:** 14150

into receiving waters known as: Two Mile Creek

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal as prescribed by Sections 17-0803 and 17-0804 of the Environmental Conservation Law and Parts 621, 752, and 755 of the Departments' rules and regulations.

By Authority of William L. Garvey, P.E., Chief, Permit Administration Section.
Designated Representative of Commissioner of the
Department of Environmental Conservation

Date

Signature

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning EDP (April 1, 1982)
and lasting until EDP + 5 years (April 1, 1987)
the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Daily Max.	Units	Monitoring Reqmts. Measurement Frequency	Sample Type
001 (Oil Water Separator)					
Flow		23	GPH	Monthly*	Instantaneous
Oil & Grease		15	mg/l	"	Grab
pH (Range) (6.0 - 9.0)			SU	"	"
Iron	2.0	4.0	mg/l	Quarterly	Grab
Zinc	0.5	1.0	mg/l	"	"
Benzene**			mg/l	"	"
Toluene**			mg/l	"	"

*During dry weather, i.e. no storm water runoff dilution.
**Monitoring Requirement Only.

Definition of Daily Average and Daily Maximum

The daily average discharge is the total discharge by weight or in other appropriate units as specified herein, during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges in appropriate units as specified herein divided by the number of days during the calendar month when the measurements were made.

The daily maximum discharge means the total discharge by weight or in other appropriate units as specified herein, during any calendar day.

Monitoring Locations

Permittee shall take samples and measurements to meet the monitoring requirements at the location(s) indicated below: (Show locations of outfalls with sketch or flow diagram as appropriate). from the effluent flow prior to discharge to the receiving waters.

NITORING, RECORDING AND REPORTING

a) The permittee shall also refer to the General Conditions (Part II) of this permit for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized and reported by submitting a completed and signed Discharge Monitoring Report form once every 6 months to the Department of Environmental Conservation and other appropriate regulatory agencies at the offices specified below. The first report will be due no later than October 28, 1982. Thereafter, reports shall be submitted no later than the 28th of the following month(s): April & October.

Water Division
New York State Department of Environmental Conservation
50 Wolf Road - Albany, New York 12233

New York State Department of Environmental Conservation
Regional Engineer - Region #9
600 Delaware Avenue - Buffalo, N.Y. 14202

Erie County Dept. of Environment & Planning
95 Franklin St. - Buffalo, N.Y. 14202

☐ (Applicable only if checked):

Dr. Richard Baker, Chief - Permits Administration Branch
Planning & Management Division
USEPA Region II
26 Federal Plaza
New York, New York 10278

c) If so directed by this permit or by previous request, Monthly Wastewater Treatment Plant Operater's Reports shall be submitted to the DEC Regional Office and county health department or county environmental control agency specified above.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

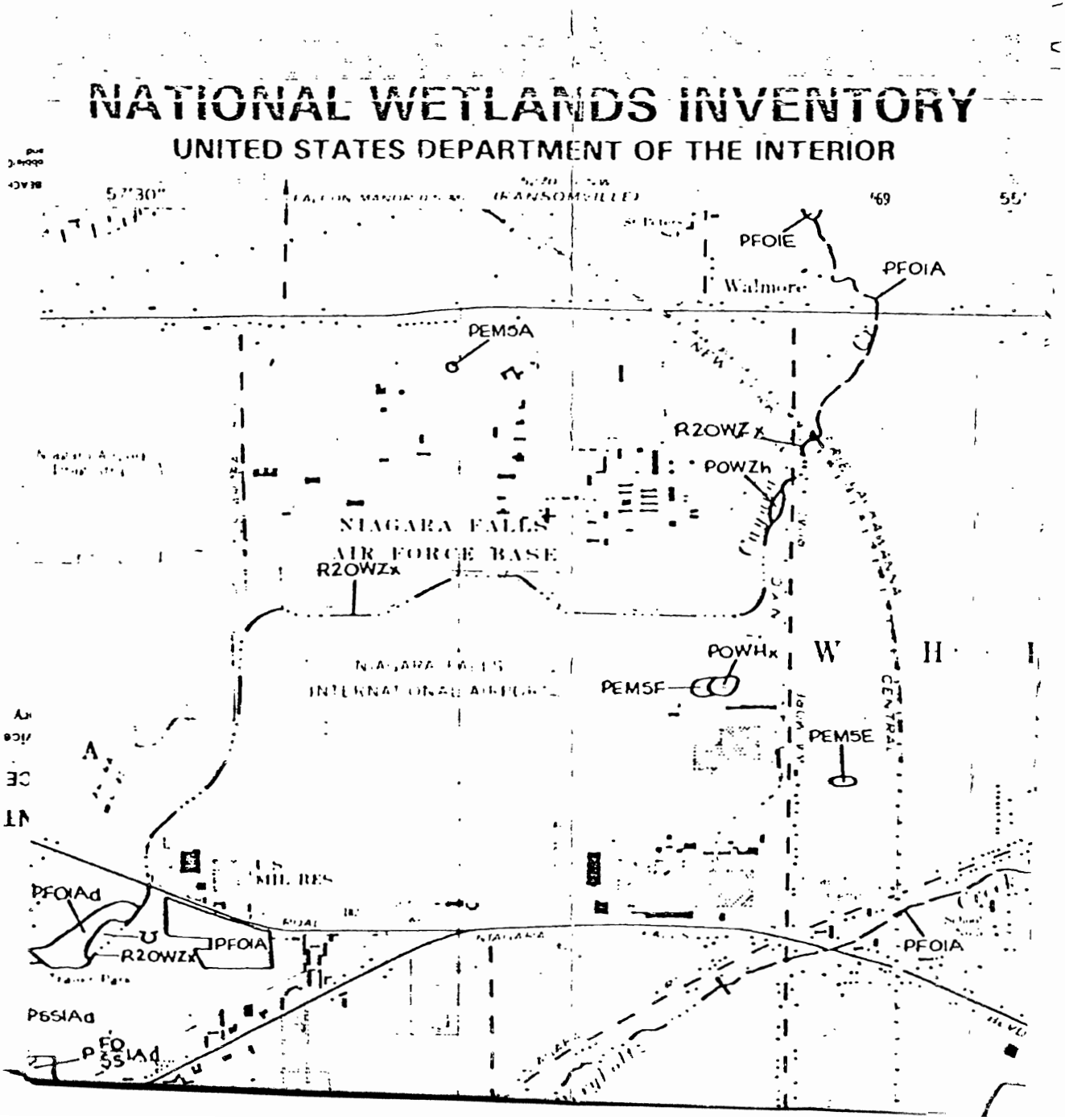
e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Reports.

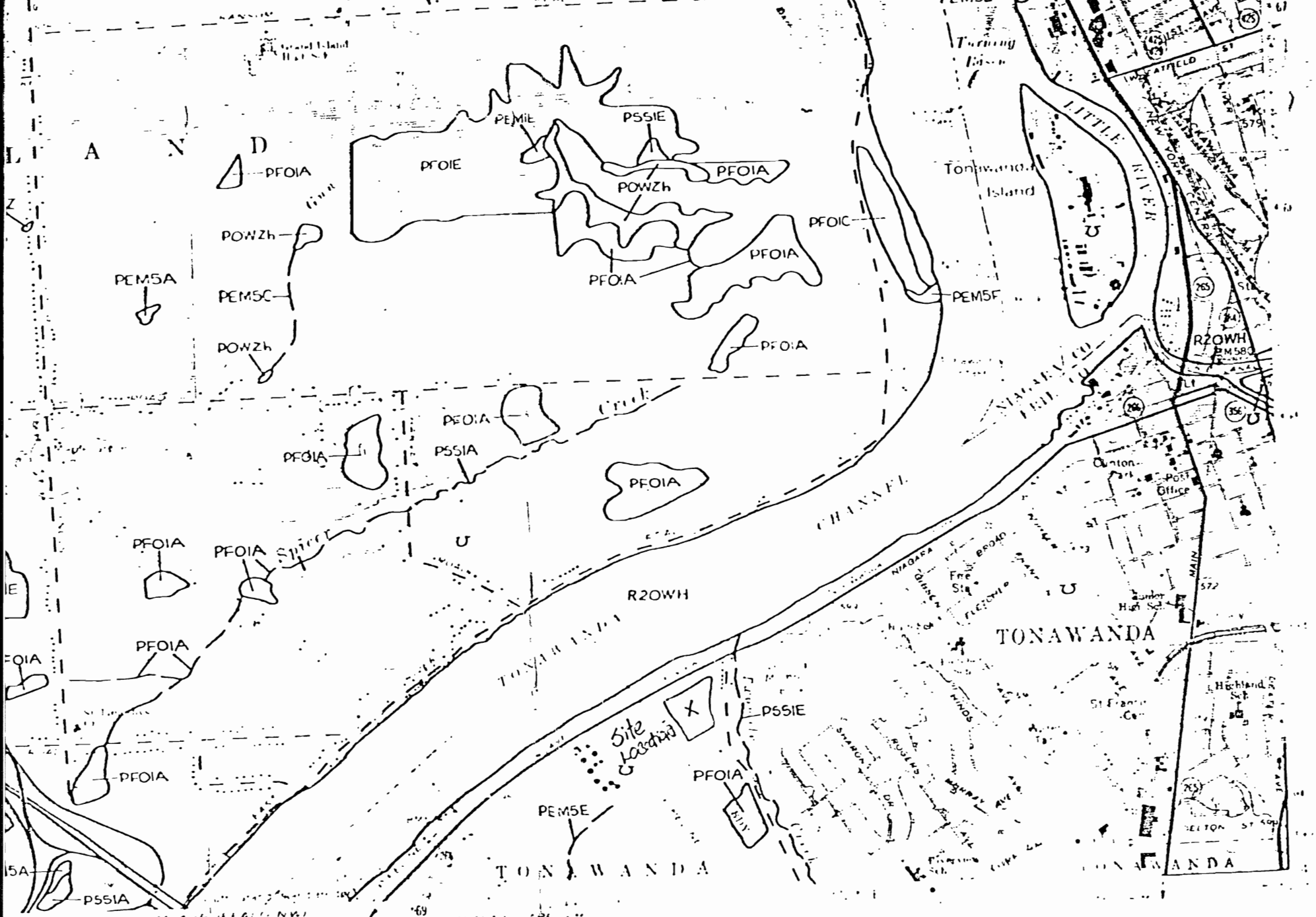
f) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the permit.

g) Unless otherwise specified, all information submitted on the Discharge Monitoring Form shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Blank Discharge Monitoring Report Forms are available at the above addresses.

REFERENCE NO. 13


NATIONAL WETLANDS INVENTORY
UNITED STATES DEPARTMENT OF THE INTERIOR
PFO1E
PFO1A
PEM5A
R2OWZx
POWZh
NIAGARA FALLS
AIR FORCE BASE
R2OWZx
POWHx
PEM5F
PEM5E
PFO1Ad
PFO1A
R2OWZx
PFO1A
PFO1Ad



NOTES TO THE USER

[illegible] been field examined are indicated

REFERENCE NO. 14

ORG

EPA POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION

REGION: II | SITE NUMBER: NY0000010184

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME	B. STREET (or other identifier)		
CONSOLIDATED FREIGHTWAYS	RIVER ROAD		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
TONAWANDA	N.Y.		ERIE

G. OWNER/OPERATOR (if known)

1. NAME: CONSOLIDATED FREIGHTWAYS
2. TELEPHONE NUMBER:

H. TYPE OF OWNERSHIP (if known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

INACTIVE, OPEN DUMP SITE. CHEVROLET METAL CASTING DUMPED FOUNDRY SAND ON SITE.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)

HAZARDOUS WASTE DISPOSAL SITES IN NEW YORK STATE (LIST OF 6/1980)

K. DATE IDENTIFIED (mo., day, & yr.)

4/15/80

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

FOUNDRY SAND CONTAINING (POSSIBLY!) PHENOLIC BINDERS

ENVIRONMENTAL PROBLEMS: NONE KNOWN

HEALTH PROBLEMS: NONE KNOWN

M. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
GEORGE B. RADIAN	212 264-1576	11/12/80

EPA Form 2070-8 (5-80)

REFERENCE NO. 15

Consolidated Freightways
Tonawanda, New York

9/19/90
OZ-9007-24-I35
NYLRI#

Weather: Rain and Cool 60° North winds 10-15 mph

OVA: 307137 F
HNU: 192120 A 10.2 probe 307147
Camras:
Slides - 307127
Photos - # 469770
MiniRad. 418688
CFS - 19

SCBA's serial numbers
Bob (629758) Kurkjian
Jess (192034) Tecson
Dave (Backup) Bonfer 307172

Site Contacts: Mike Schliecher and Mr Owen Glenn

Dave Bonfer (Site Manager)	DB	9/19/90
Jess Tecson (Safety officer)	JT	9-19-90
Tony Culmone (Support)	TC	9/19/90
Bob Kurkjian (Support)	BK	9-19-90

The above personell have read and understand the work and safety plan

Dave Bonfer 11-21-90

Consolidated Freightways
877 Niagara Street
Tonawanda, New York

9-19-90
02-9007-24/NYLR

1000 Arrive at Consolidated Freightways. Talked with Mr Owen Glenn and Mike Schwiecher. They said that they are aware of fly ash behind the facility. Mike said that he has heard reports of buried drums but he is not certain if it is true. The land next door is owned by New K Reality Company and the I.N.S equipment Company. Mike said he would open the gate for us. (No one from the company will join us.)

1030 Set up on pavement in back of office buildings in front of gate opening to grounds behind the facility.

P_1S_1, P_2S_2, P_3S_3, P_4S_4: Panoramic view from SW to NE of the site

1043 Jess and Bob go on air proceed into site. Ground and asphalt cover ground appear to be fresh tire tracks. Dave follows a good distance (20') behind as back-up.

1050 P_5S_5 - View looking SW at low area. This low area is low area located west of site. owned by New K Reality

P_6S_6 View South into low area. There is an old rusty drum laying on the surface in this low area. Area appears to be sand. It was previously mentioned that this low area is where a large pipe was laid between the Niagara River and the sewage plant 1 mile behind the site.

1055 P_7S_7 View down embankment in a due south direction. Embankment app. 30 feet behind fence. app 20' embankment down to stream

P_8S_8 View down embankment in a southeast direction

No readings above background on OVA and HNu.

Dale Bush 11/21/90

Consolidated Freightways
877 Niagara Street
Tonawanda, New York

9-19-90
029007-24 / NYLR

Pg 9 View down embankment of drainage stream - very little if any flow observed in stream. This stream is a tributary to the two mile creek which flows to the Niagara stream along the
1059 western border of the site. Two mile Creek Road seperates the
P 10 S 10 Construction debri along embankment creek and the site
NO readings above background on OVA or HNU
Approximately 20' embankment to the stream. This embankment is composed of hardfill, Blacktop, concrete and other debri.
1105 NO readings above background on the HNU or OVA.
P 11 S 11 NE Corner of site looking towards 2-mile Creek Rd.
EROSION is evident along the embankment bordering 2-mile Creek Road, mainly due to the lack of vegetation. Besides the steep embankment the site area is flat
NO readings above background on OVA or HNU
1112 P 12 S 12 View from 2-mile Creek Rd ~~debris~~ of 2-mile creek ON
(Two mile creek has low to moderate stream flow) the west side of 2-mile Creek looking west (downstream). A boom is streched across 2 mile Creek, which as is required by DEC of Consolidated Freightways.
P 13 S 13 View of culvert and drainage stream intersection off 2-mile Creek Rd
No readings above background on OVA or HNU
1115 Bob and Jess go off air

P 14 S 14 View of the site from the Northeast corner.

David C. Bush 11/21/90

September 19, 1990

Consolidated Freightways 02-9007-24 / NYLCIS

1125 Arrive back at Decon pad Dave and Bob go back into office building to let Mike Bevan that we are finished

Site Summary: Consolidated Freightways is a trucking freight and terminal yard. The site is bordered to the North by Niagara Road, to the east by Two Mile Creek Road, to the south by a steep embankment and to the West by wooded and open areas. A 6' chain link fence surrounds the active area of the site. Consolidated Freightways is located in a ~~Commercial~~ Industrial area Title 38

The site (landfilled area) appears to cover about 3 acres. Flat areas and the steep embankment are covered with concrete, asphalt and topsoil/gravel. A stream - very little if any flow - lies along the southern boundry at the base of the site. This stream joins with Two Mile Creek on the east side of Two Mile Creek. The Niagara River is approximately 4000 feet North-Northwest of the site. There are NO residents within 200 feet of the site. There are NO schools, day care or stores within 200 feet. There are also NO visible terrestrial sensitive environments. There are about 60 full time employees at Consolidated Freightways

There were are NO readings above background on OVA or HNu. The slope of the site is trending in a southeast direction.

David C Berger
11-21-90

Consolidated Freightways
Tonawanda, New York

Sept. 19, 1990
02-9007-24 / NYLE

Photo Log
All photographs taken by Dave Benfer

Photo Number	Description	Time
1P-1	Part of a panoramic view looking southwest	1030
1P-2	Part of a panoramic view looking south	1030
1P-3	Part of a panoramic view looking southeast	1030
1P-4	Part of a panoramic view looking east	1030
1P-5	Low area located southwest of the site	1050
1P-6	Low area located south of site	1050
1P-7	View down embankment along southern border of the site	1055
1P-9	View of the drainage stream located at the base of the embankment	1055
1P-10	Construction debris along the embankment	1059
1P-11	View of the northeast corner of the site	1105
1P-12	View of Two Mile Creek from Two Mile Creek Road	1112
1P-13	View of the culvert located in the southeast corner of the site	1112
1P-14	View of the site from the northeast corner	1115

David C. Benfer
11-21-90

REFERENCE NO. 16

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9007-24	8-30-90	1330

DISTRIBUTION:

Consolidated Freightways

BETWEEN:	OF:	PHONE:
Mr Bundo	City of Tonawanda Water Pumping Station	ext 233 (716) 695-1800

AND:

Dave Benter (NUS)

DISCUSSION:

Mr Bundo said that Tonawanda is broken into three sections: North Tonawanda, City of Tonawanda and just Tonawanda. He said that all the surrounding towns receive drinking water from the Niagara River; everyone is on surface water Not groundwater. There are no wells used for drinking in this section of New York.

Uses of surface water include, drinking, industrial and recreation.

ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 17

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9007-24	9-12-90	1130

DISTRIBUTION: Consolidated Freightways

BETWEEN:	OF:	PHONE:
Ron Koczoja	Erie County Department of Health	(716) 858 6966

AND: (NUS)

DISCUSSION:

All drinking water in the Tonawanda Area is supplied from surface Wate - Niagara River. The only private well in the area is owned by Dupont and is used as industrial supply. User of groundwater is industrial and irrigation

There are several water intakes north of the Grand Island Bridge

ACTION ITEMS:

REFERENCE NO. 18

REFERENCE NO. 19

02-9007-24
Rev. No. 0

SIGNIFICANT HABITAT OVERLAY NO. 1 OF 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF FISH AND WILDLIFE
BUREAU OF WILDLIFE

PREPARED FOR: SIGNIFICANT HABITAT UNIT
WILDLIFE RESOURCES CENTER
DELMAR, NEW YORK 12054
(518) 457-5782

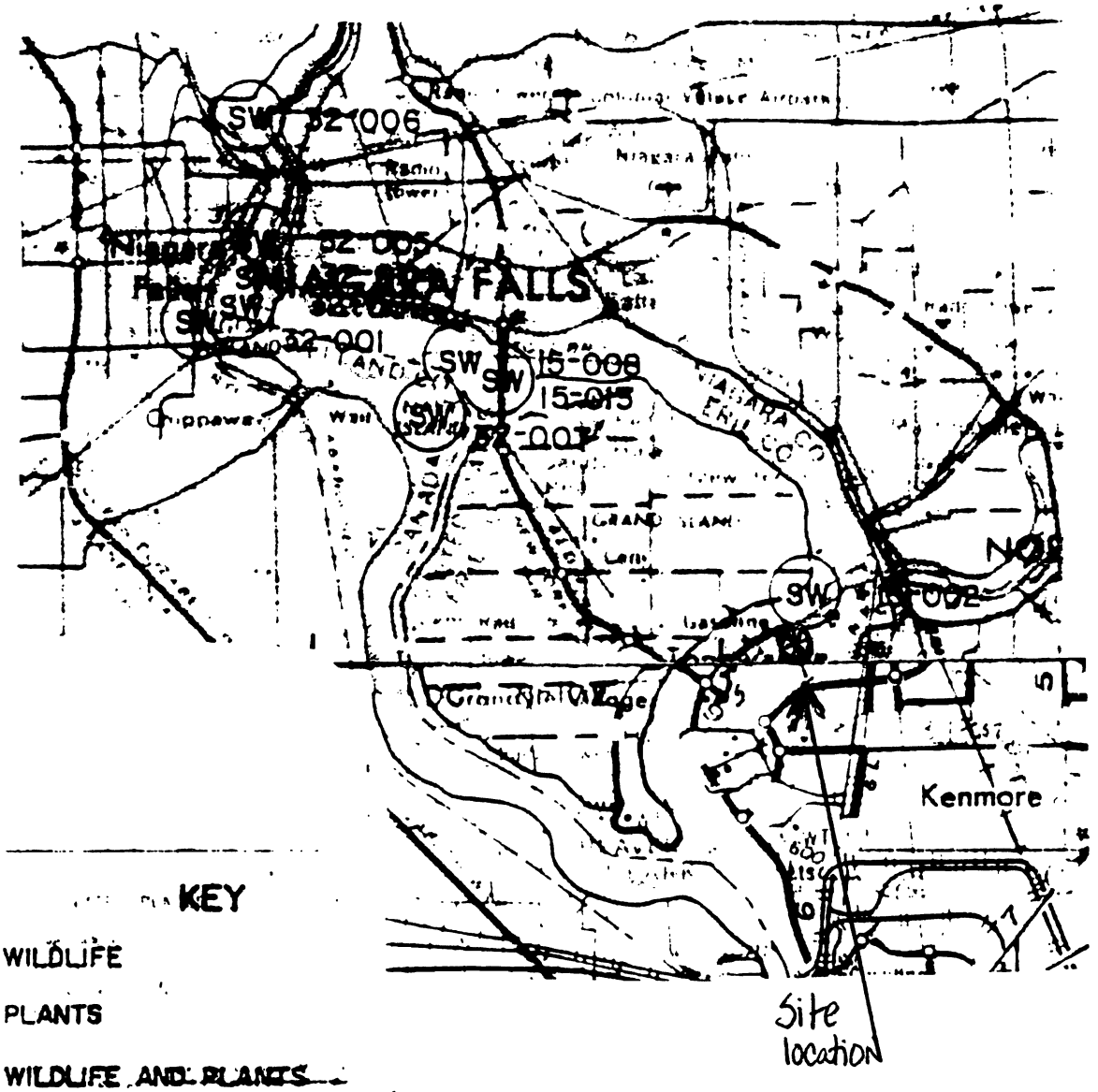
PREPARED BY: HABITAT INVENTORY UNIT

QUAD: TORONTO

SCALE: 1:250,000

AUGUST, 1980

REVISED: 11/6/85



KEY

- (SW) SIGNIFICANT FOR WILDLIFE
- (SP) SIGNIFICANT FOR PLANTS
- (SB) SIGNIFICANT FOR WILDLIFE AND PLANTS
- (PW) POTENTIALLY SIGNIFICANT FOR WILDLIFE
- (PP) POTENTIALLY SIGNIFICANT FOR PLANTS
- (PB) POTENTIALLY SIGNIFICANT FOR WILDLIFE AND PLANTS
- (OT) OTHER (e.g. UNIQUE GEOLOGICAL FORMATIONS)

REFERENCE NO. 20

New York State Department of Environmental Conservation

Information Services
Wildlife Resources Center
700 Troy-Schenectady Road
Latham, New York 12110-2400

Thomas C. Jorling
Commissioner

November 19, 1990

Dave Benfer
NUS Corporation
1090 King Georges Post Road, Suite 1103
Edison, New Jersey 08837

Dear Mr. Benfer:

We have reviewed the Significant Habitat Unit and the NY Natural Heritage Program files with respect to your request for biological information on a hazardous waste site in the Town of Tonawanda, Erie County, New York State.

Enclosed is a computer printout covering the area you requested to be reviewed by our staff. The information contained in this report is confidential and may not be released to the public without permission from the Significant Habitat Unit.

Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we can only provide data which have been assembled from our files. We cannot provide a definitive statement on the presence or absence of species, habitats or natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals, plants and natural communities and/or significant wildlife habitats. You should contact our regional office(s), Division of Regulatory Affairs, at the address(es) enclosed for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under State law.

If this project is still active one year from now we recommend that you contact us again so that we may update this response.

Sincerely,

B. Buffington

Burrell Buffington
Significant Habitat Unit

Encs.
cc: Reg. 9, Wildlife Regional Mgr.

New York Heritage Program is supported in part by The Nature Conservancy

USERS GUIDE NUMBER 2

(For use with NY Natural Heritage Program and Significant Habitat Unit Reports)

CONFIDENTIAL STATEMENT: The information provided in these reports is for your in-house use only. It is of a sensitive nature and may not be released to the general public or be incorporated in any public document without prior written permission.

NATURAL HERITAGE REPORTS: Explanation of codes and column headings:

CO. - first 4 letters of the county name.

TOWN NAME - first 4 letters of the town name.

USGS 7 1/2' TOPOGRAPHIC MAP: name of US Geological Survey map (1:24,000 scale).

LAT. - latitude of the location of the element. Composed of degrees, minutes and seconds; for example, 42 degrees, 30 minutes and 33 seconds. The latitude & longitude coordinate gives the centrum of the occurrence only; the outer boundary of the occurrence is often much larger. Important: latitude/longitude must be used with Precision (see below). For example, the location of an occurrence with M (minute) Precision is not precisely known at this time and is thought to occur somewhere within a 1.5 mile radius of the given latitude/longitude.

LONG. - longitude of the location of the element. See LATITUDE above.

SIZE IN ACRES - approximate acres occupied by the element.

SCIENTIFIC NAME - scientific name of the rare plant or animal or the name of the community.

COMMON NAME - common name of the rare plant or animal.

TYPE (of element) - A or I=animal, C=community, I=invertebrate, P=vascular plant, N=non-vascular plant, O=other

PRECISION: the locational PRECISION of a mapped occurrence.

S - SECONDS. location known precisely - within a 3-second radius of the latitude & longitude given.

M - MINUTE. location within 1-minute radius (1.5 mi.) of the latitude & longitude given.

YEAR LAST OBS. - year the element was last observed at this site.

ELEMENT OCCURRENCE RANK - comparative evaluation summarizing the quality, condition, viability and defensibility of the element occurrence at this site.

A-D = Extant: A=Excellent, B=Good, C=Marginal, D=Poor, E=Extant but with insufficient data to assign a rank of A-D

F = Failed to find. Did not locate species, habitat still extant, further field work is justified.

H = Historical. Historical occurrence without any recent field information.

X = Extirpated. Field/other data indicates element/habitat destroyed so it can no longer exist at site.

NYS LEGAL STATUS - protected status of the plant, animal or community.

ANIMALS: categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E = Endangered Species: any species which meet one of the following criteria:

1) Any native species in imminent danger of extirpation or extinction in New York.

2) Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened Species: any species which meet one of the following criteria:

1) Any native species likely to become an endangered species within the foreseeable future in New York or

2) Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC = Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P = Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U = Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a licence to take may be required.

G = Game (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

PLANTS: The following catagories are defined in regulation 6NYCRR part 193.3 (amendment pending) and apply to New York State Environmental Conservation Law section 9-1503.

E = Endangered Species: listed species are those with: 1) 5 or fewer extant sites, or 2) fewer than 1,000 individuals, or 3) restricted to fewer than 4 U.S.G.S. 7 1/2 minute topographical maps, or 4)species listed as endangered by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened: listed species are those with: 1) 6 to fewer than 20 extant sites, or 2) 1,000 to fewer than 3,000 individuals, or 3) restricted to not less than 4 or more than 7 U.S.G.S. 7 and 1/2 minute topographical maps, or 4) listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

R = Rare: listed species have: 1) 20 to 35 extant sites, or 2) 3,000 to 5,000 individuals statewide.

V = Exploitably vulnerable: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked. (The attached list does not contain a complete listed of the species in this category.

COMMUNITIES: At this time there are no categories defined for communities.

U = unprotected

NATURAL HERITAGE PROGRAM DATABASE REPORT (IR2.frm)
RARE PLANTS, ANIMALS, AND NATURAL COMMUNITIES
*****CONFIDENTIAL INFORMATION*****
(refer to Users Guide for explanation)

CO.	TOWN NAME	USGS 7 1/2' TOPOGRAPHIC MAP	LAT.	LONG.	SIZE IN ACRES. (0 = UNKNOWN)	SCIENTIFIC NAME	COMMON NAME	A/I=anim C=commun P=plant O=other	PRECISION S=second M=minute	YEAR LAST OBS.	EO RANK	NYS LEGAL STATUS	FED. STATUS	HERITAGE GLOBAL/STATE RANK		OFFICE USE
ERIE	TONAWANDA	BUFFALO NW			0	CARPIODES CYPRINUS	QUILLBACK	A	M	1975		U		G5	S2	42078882
ERIE	TONAWANDA	BUFFALO NW			0	MOXOSTOMA VALENCIENNESI	GREATER REDHORSE	A	M	1975		U		G3	S2	42078883
ERIE	TONAWANDA	TONAWANDA WEST			0	SOLIDAGO RIGIDA	STIFF-LEAF GOLDENROD	P	M	1924	H	T		G5	S1	43078181
ERIE	TONAWANDA,TONAW	TONAWANDA WEST, BUFFALO NW			0	CALAMINTHA ARKANSANA	CALAMINT	P	M	1926	H	U		G5	SH	43078182

SIGNIFICANT HABITATS

DATE : 11/16/90

	REPORT ID#	NAME OF AREA	TYPE OF AREA	COUNTY	TOWN OR CITY	QUADRANGLE	LATITUDE (DEG MIN SEC)	LONGITUDE
	SW 15-002	Grand Island & Vicinity of Upper River	Waterfowl Wintering Area	Erie	Grand Island	Tonawanda West		
*	SW 15-003	Strawberry Island, Motor Island Shallows	Fish Spawning Area-Warm Water	Erie	Tonawanda	Buffalo NW		
	DC 15-102	Grand Island	Deer Winter Conc. Area	Erie	Grand Island	Tonawanda West		
*	SW 15-506	Grand Island Tributaries	Northern Pike Spawning Area	Erie	Grand Island	Buffalo NW		
	DC 32-101	East Robinson Street	Deer Winter Conc. Area	Niagara	North Tonawanda - City	Tonawanda East		

* Northern Pike spawning Area / Fish spawning Area - Warm Water ; both areas located upstream of site.

REFERENCE NO. 21

EPA ID NO.	SITE NAME / STREET / CITY / COUNTY CODE AND NAME	STATE ZIP / CONG DIST.	NFA. FLAG	OPRBLE UNIT	EVENT TYPE	ACTUAL START DATE	ACTUAL COMPL DATE	CURRENT EVENT LEAD
NYD000511469	CONRAIL-HARLEM DIVISION (METRO)		NFA	00	DS1		02/24/87	STATE(FUND)
	METRO NORTH BREWSTER YARD				PA1	02/25/87	03/05/87	STATE(FUND)
	BREWSTER	NY 10509						
	079 PUTNAM							
NYD084006477	CONRAIL-HARMON YARD			00	DS1		03/01/80	EPA (FUND)
	CROTON POINT RD				PA1		06/01/80	EPA (FUND)
	CROTON ON HUD	NY 10520			SI1	01/17/90	03/23/90	STATE(FUND)
	119 WESTCHESTER							
NYD074023979	CONSOLID FREIGHTWAY			00	DS1		04/01/80	EPA (FUND)
	877 NIAGARA STREET				PA1	09/03/86	09/30/86	STATE(FUND)
	TONAWANDA	NY 14150						
	029 ERIE							
NYD980532337	CONSOLIDATED EDISON /COKING STATION		NFA	00	DS1		06/01/81	EPA (FUND)
	110 ST				PA1		12/29/87	EPA (FUND)
	NEW YORK	NY 00000						
	061 NEW YORK							
NYD981141252	CONSOLIDATED EDISON-ECHO AVE. SITE			00	DS1		04/19/88	EPA (FUND)
	ECHO AVE							
	NEW ROCHELLE	NY 10801						
	119 WESTCHESTER							
NYD980531933	CONSOLIDATED PKG MACHINERY CORP		NFA	00	DS1		06/01/81	EPA (FUND)
	1400 WEST AVE				PA1		03/24/86	EPA (FUND)
	BUFFALO	NY 14213						
	029 ERIE							
NYD980528442	CONSTANTINE SEW/DISP			00	DS1		04/01/80	EPA (FUND)
	BUTTON ROAD				PA1		09/25/87	STATE(FUND)
	HALFMOON	NY 12188						
	091 SARATOGA							
NYD080457542	COPELAND COATING CO. INC			00	DS1		07/20/89	STATE(FUND)
	COLUMBIA TNPK RTE 20				PA1	10/10/89	12/19/89	STATE(FUND)
	NASSAU	NY 12123			SI1	10/10/89	12/19/89	STATE(FUND)
	083 RENSSELAER							

REFERENCE NO. 22

National 45-625 Ever-Ease 45-725 20 20 Ruled Made in U.S.A.

SPDES PERMIT #NY0109878

CONSOLIDATED FREIGHTWAYS 877 NIAGARA ST TONAWANDA, NY

EFFLUENT MONITORING RESULTS

		1	2	3	4	5	6	7
		FLOW	OIL & GREASE	P.H.	IRON	ZINC	BENZENE	TOLUENE
1	1982							
2	JULY							
3	AUGUST	21 GPH	<7mg/L	6.80				
4	SEPTEMBER *	166PH	<4mg/L	7.70				
5	OCTOBER	196PH	<5mg/L	6.90				
6	NOVEMBER	226PH	<5mg/L	6.40				
7	DECEMBER *	176PH	<5mg/L	7.09	1.0mg/L	0.15mg/L	370ppb	<1ppb
8								
9	1983							
10	JANUARY	56PH	<4mg/L	6.40				
11	FEBRUARY	136PH	<6mg/L	7.70				
12	MARCH *	226PH	<7mg/L	6.80	1.4mg/L	0.163mg/L	320ppb	<1ppb
13	APRIL	186PH	<5mg/L	7.80				
14	MAY	196PH	<5mg/L	7.60				
15	JUNE *	166PH	<1mg/L	7.60	0.9mg/L	0.25mg/L	0.003mg/L	0.322mg/L
16	JULY	216AH	<1mg/L	7.00				
	AUGUST	136PH	<3mg/L	7.40				
18	SEPTEMBER *	216PH	14.4mg/L	7.09	3.1mg/L	0.6ppm	0.017ppm	0.011ppm
19	OCTOBER	176PH	7mg/L	7.30				
20	NOVEMBER	156PH	5mg/L	7.10				
21	DECEMBER *	186PH	5.5mg/L	7.10	1.40mg/L	0.12mg/L	<0.001mg/L	0.002mg/L
22								
23	1984							
24	JANUARY	216PH	5.mg/L	6.80				
25	FEBRUARY	188PH	7.mg/L	9.07				
26	MARCH *	239PH	5.5mg/L	7.90	1.2mg/L	0.007mg/L	0.001mg/L	0.002mg/L
27	APRIL	219PH	6.5mg/L	6.80				
28	MAY	199PH	7.mg/L	7.90				
29	JUNE *	129PH	0.8mg/L	7.56	0.9mg/L	<0.10mg/L	<0.001mg/L	<0.001mg/L
30	JULY	199PH	2.3mg/L	8.06				
31	AUGUST	139PH	1.5mg/L	4.40				
32	SEPTEMBER *	189PH	0.8mg/L	4.80	0.045mg/L	<0.10mg/L	<0.001mg/L	<0.001mg/L
33	OCTOBER	179PH	1.2mg/L	6.5				
34	NOVEMBER	209PH	20mg/L	7.0				
35	DECEMBER *	169PH	1.9mg/L	6.9	0.19mg/L	0.4mg/L	<0.001mg/L	<0.001mg/L
36								
37								
38								
39								
40								

WORK SHEET
(12/63)

Consolidated Freightways Buffalo NY.

	1985	FLOW	OIL & GREASE mg/L	P.H. SU	IRON mg/L	ZINC mg/L	BENZENE mg/L	TOLUENE mg/L
1	JAN	—	2.67	7.00	1.1 mg/L	<0.10 mg/L	0.001 mg/L	0.001 mg/L
2	FEB		3.50	6.50				
3	MARCH		4.80	7.00				
4	APRIL	13	3.88 mg/L	7.25	2.6 mg/L	0.8 mg/L	<0.001 mg/L	<0.001 mg/L
5	MAY	18GPH	2.60	7.00				
6	JUNE	8	1.50	6.90				
7	JULY	9	8.6 mg/L	7.50	0.48 mg/L	<0.10 mg/L	<0.001 mg/L	<0.001 mg/L
8	AUG	11	7.67	7.00				
9	SEP	12	5.30	7.10				
10	OCT	—	4.8 mg/L	7.50	0.28 mg/L	0.06 mg/L	0.01 mg/L	0.007 mg/L
11	NOV	356GPD	2.60 mg/L	7.0				
12	DEC	235GPD	2.50 mg/L	6.9				
13								
14								
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31								

	FLOW	OIL & GREASE	P.H.	IRON	ZINC	BENZENE	TOLUEN
1986							
JANUARY	211 GPD	8.60 mg/L	7.50				
FEBRUARY	291 GPD	7.67 mg/L	7.0				
MARCH	276 GPD	5.30 mg/L	6.5	1.5 mg/L	0.10 mg/L	<0.001 mg/L	<0.201 mg/L
APRIL	332 GPD	2.60 mg/L	7.0				
MAY	192 GPD	1.50 mg/L	6.90				
JUNE	210 GPD	3.80 mg/L	7.0	1.6 mg/L	0.42 mg/L	<0.001 mg/L	<0.201 mg/L
JULY	285 GPD	2.50 mg/L	6.9				
AUGUST	212 GPD	3.80 mg/L	6.5				
SEPTEMBER	356 GPD	2.60 mg/L	7.0	0.49 mg/L	0.04 mg/L	<0.201 mg/L	<0.201 mg/L
OCTOBER	232 GPD	5.60 mg/L	7.00				
NOVEMBER	310 GPD	7.60 mg/L	7.0				
DECEMBER							

REFERENCE NO. 23

BUFFALO TESTING LABORATORIES INC.

CHEMISTS - METALLURGISTS
902 Kenmore Avenue
Phone (716) 873-2302

BIOLOGISTS - ENGINEERS
Buffalo, NY 14216-1452
FAX (716) 873-9914

RECEIVED

Report No.: 94596
P.O. No.:

August 23, 1990

Attn: Mike Schleicher
Consolidated Freightways
877 Niagara Street
Tonawanda, NY 14150

Gentlemen:

Following are the results of the tests performed on the specimens which you submitted to us on August 21, 1990.

Specimens Submitted: Sampling and quarter test of discharge water.

Object: Analyze for pH, Flow, Oil & Grease, Iron and Zinc.

Method: The Standard Methods for the Examination of Water and Wastewater, 16th Edition.

Results:

pH	7.43
Flow	1423 gal/day
Oil & Grease	9.4 ppm
Iron	0.26 ppm
Zinc	0.035 ppm

Very truly yours,
BUFFALO TESTING LABORATORIES, INC.

Joseph M Martin

JOSEPH M. MARTIN

REFERENCE NO. 24

NUS CORPORATION
1090 KING GEORGES POST ROAD
SUITE 1103
EDISON, NEW JERSEY 08837
201-225-6160

C-584-10-90-103

November 27, 1990

Mr. Charles Ciehomski
Foot of Sheraton Road and River Road
Town of Tonawanda, New York 14150

Dear Mr. Ciehomski:

Per our conversation on October 23, 1990 please provide information concerning surface water intakes on the Niagara River. Any information you might have would be greatly appreciated. A self addressed and stamped envelope has been enclosed for your convenience. Thank you for your time.

Very truly yours,

Dave Benfer

Reviewed and Approved: _____

DB/bgp

Enclosure

Mr. Charles Ciehomski
Foot of Sheration Road and River Road
November 27, 1990 - Page Two

Surface Water Intakes:

Owner of Intake	Population Served	CFS Values for each Intake
1. Tn. of Tonawanda	100,000	200,000 gpd 3
2. City of Buffalo	upstream	
3. Erie County Water Authority	upstream	
4. City of Tonawanda	20,000	
5. City of North Tonawanda	20 30,000	
6. City of Lockport	25,000	
7. Tn. of Grand Island	upstream	

Other Information:

NUS CORPORATION
SUPERFUND DIVISION

PROJECT NOTES

TO: File

DATE: 12-20-90

FROM: Dave Benfer

COPIES:

SUBJECT: location of TOWN of TONAWANDA intake.

REFERENCE:

The surface water intake for the Town of TONAWANDA is located upstream of the Consolidated Freightways site location.

REFERENCE NO. 25

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
029007-24	12-3-90	1500

DISTRIBUTION:

Consolidated Freightways

BETWEEN:	OF: DEC	PHONE:
Angelo Sartkees	Water Department	(716) 847-4590

AND: Dave Benfer (NUS)

DISCUSSION:

Spoke with Angelo Sartkees about the locations of the surface water intakes near TONAWANDA. Of the seven intakes on the NIAGARA River only 3 are downstream of the Consolidated Freightways site. From south to North they are

1. City of TONAWANDA
2. City of North TONAWANDA
3. City of Lockport

ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 26

RECRA RESEARCH, INC

4248 Ridge Lea Road
Amherst, New York 14226

NYS SUPERFUND
PHASE I INVESTIGATION
FOURTH ROUND

CONSOLIDATED FREIGHTWAYS, INC.
TONAWANDA, ERIE COUNTY, NEW YORK
SITE NO. 915083

DRAFT

1.0 EXECUTIVE SUMMARY

The Consolidated Freightways site, formerly known as the William Strassman Property, is located on Niagara Street in the City of Tonawanda, Erie County, New York (Figure 1). In the late 1960's, foundry sand, flyash and other materials were landfilled in an approximately three-acre section of the 25-acre site for property development prior to the construction of the Consolidated Freightways facility (Figure 2). The foundry sands are suspected of containing phenolic compound residues.

Aerial photographs of the site were reviewed by the Erie County Department of Environment and Planning for the years 1959, 1966 and 1972. The photographs indicated that landfilling activities had commenced by 1966. In 1972, the Consolidated Freightways terminal and yard were completed and no further landfilling was observed.

In 1982, the U.S. Geological Survey drilled four test borings at the site. A subsurface soil sample was obtained from each borehole and analyzed for organic compounds. The test results cannot be considered valid because the holding times for some of the samples were exceeded and the surrogate recoveries were outside acceptable limits.

The Phase I effort included a thorough compiling of information gathered from the New York State Department of Environmental Conservation (NYSDEC), the Erie County Department of Environment and Planning, the New York State Department of Health and personnel associated with site operations. Recra Research, Inc. (Recra) personnel conducted an inspection of

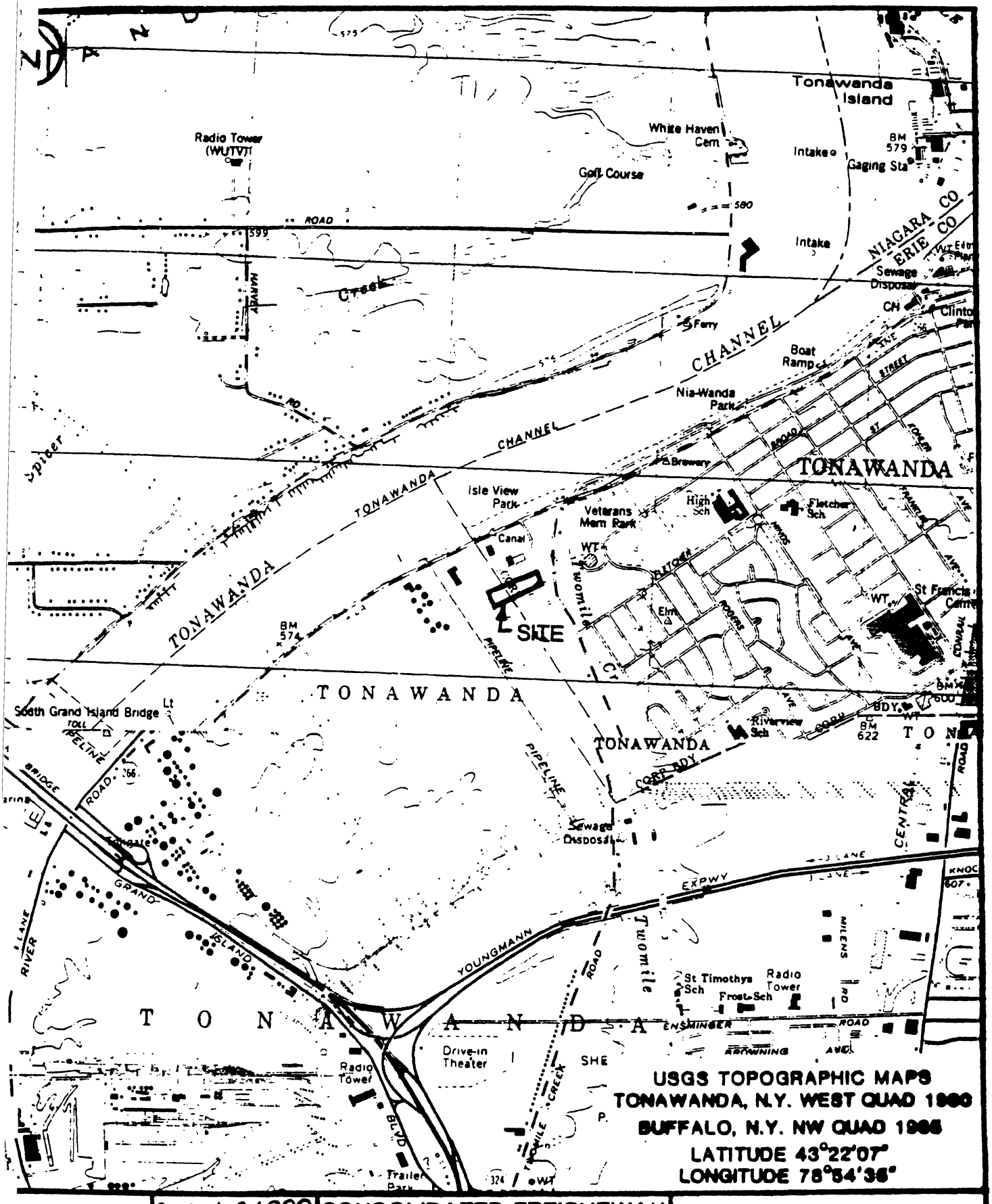
the site on November 20, 1985.

The intent of the Hazard Ranking System (HRS) is to provide a method by which uncontrolled hazardous waste sites may be systematically assessed as to the potential risk that a site may pose to human health and the environment. The HRS is designed to provide a numerical value through an assessment of technical data and information, and relating that information with respect to:

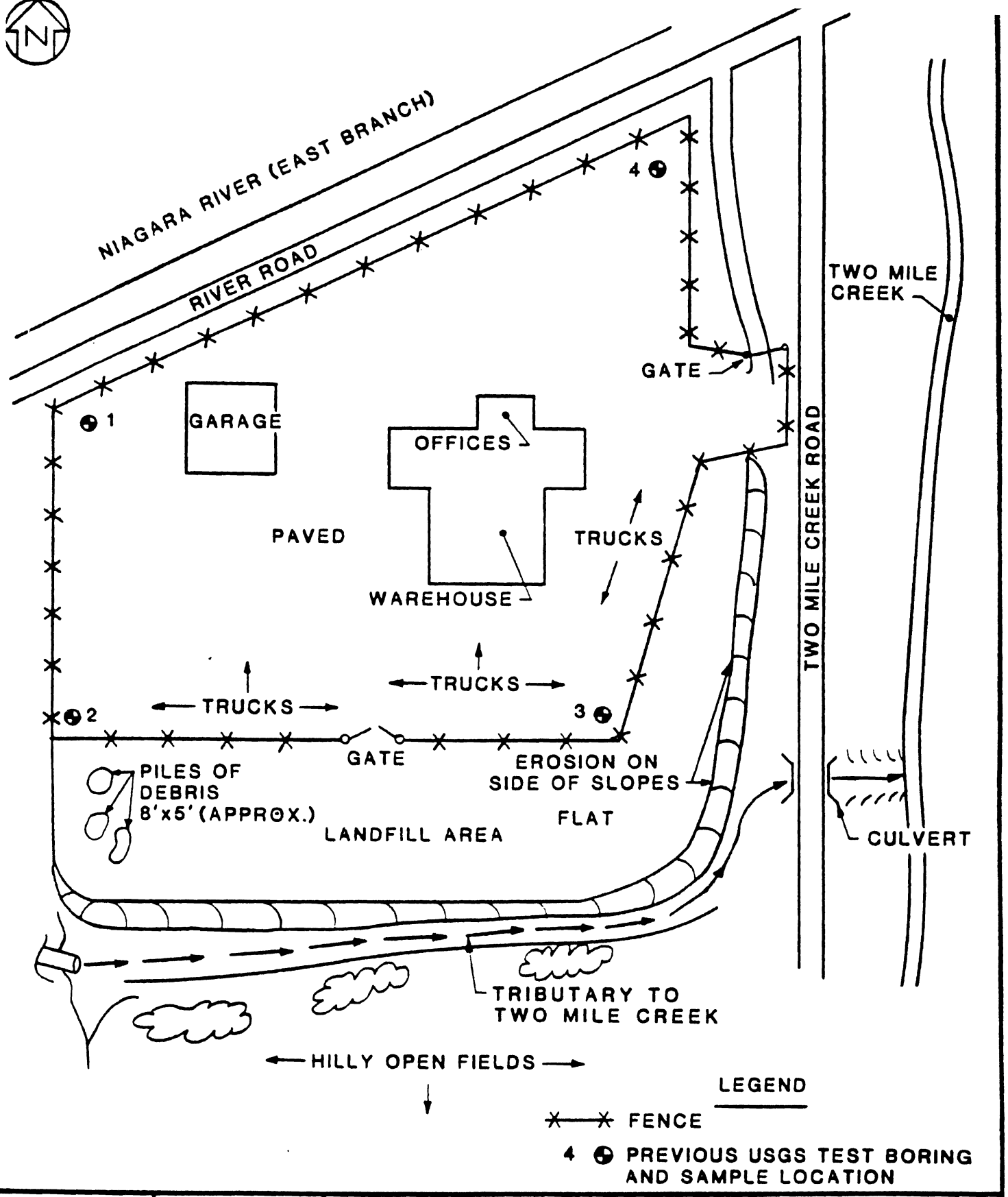
- o migration of hazardous substances from the site (Sm)
- o risk involved with direct contact (Sdc)
- o the potential for fire and explosion (Sfe).

The risks involved with direct contact (Sdc) and the potential for fire and explosion (Sfe) are evaluated according to site specific information including toxicity of waste, quantity, site demographics, location with respect to sensitive habitats of wildlife, etc. Migration potential (Sm) is evaluated through the rating of factors associated with three routing modes: groundwater (Sgw), surface water (Ssw) and Air (Sa). The scored value for each route is composited to determine the risk to humans and/or the environment from the migration of hazardous substances from the site (Sm).

Based on information gathered during this investigation, the Consolidated Freightways site was scored according to the Mitre Corporation Hazard Ranking System (HRS) and received a migration potential score (Sm) of 3.64.



ICRA RESEARCH INC. BUFFALO, NEW YORK	Scale: 1:24000	CONSOLIDATED FREIGHTWAY TONAWANDA, N.Y. N.Y.S. SUPERFUND PHASE I
	By / Date	
	Dwn. MJS 12/85	VICINITY MAP
	Ckd.	
	Ap'vd.	
	Rev.	
	Project No. 5C280414	A FIGURE 1



RECRA RESEARCH INC. BUFFALO, NEW YORK	Scale: NTS	CONSOLIDATED FREIGHTWAYS TONAWANDA, N.Y. N.Y.S. SUPERFUND PHASE I	SITE MAP
	By / Date		
	Dwn. MJS 1/86		
	Ckd.		
	Ap'vd.		
	Rev.	Project No. 5C280414	A FIGURE 2

BRUNING 61160-1

4.0 SITE ASSESSMENT

4.1 Site History

During construction of the Consolidated Freightways facility in the late 1960's, waste materials including foundry sands from Chevrolet and flyash from the Niagara Mohawk Huntley Station were landfilled in an approximately three-acre section in the southern portion of the 25-acre site. The landfilled area was adjacent to and abutting a tributary to Two Mile Creek (Ref. 1 and 12). Filling activities at the site were intended to raise the grade of lowlying areas prior to construction of the facility.

Aerial photographs indicate that landfilling activities had begun by 1966 (Ref. 1). The Erie County Department of Environment and Planning interpreted the color and texture of the fill materials in the photo to indicate clean fill or foundry sand (Ref. 1). In the 1972 photo, the terminal and freight yard were completed and no further landfilling was observed. Consolidated Freightway moved into the new facility in 1970 (Ref. 12).

In the period 1975-1976, the existing freight yard was excavated and replaced. Storm drains were added to facilitate drainage of site run-off to the tributary of Two Mile Creek. Excavation materials including pavement, concrete rubble and scrap metal were surface piled in the southern portion of the site abutting the tributary stream (Ref. 1 and 12).

Minor erosion on the eastern slope of the landfilled area abutting the tributary stream was observed by County personnel on January 4, 1982 (Ref. 1). During the Recra inspection on November 11, 1985, surface

piles of excavation rubble and minor erosion on the landfill eastern slope were still in evidence.

4.2 Site Area Surface Features

4.2.1 Topography and Drainage

Topography in the vicinity of the site is generally flat with a gentle slope (<1%) trending to the west (Ref. 1). Being located in an urbanized area, surface drainage from much of the site eventually enters municipal storm sewers. Some surface water run-off enters Two Mile Creek which eventually discharges into the East Channel of the Niagara River (Ref. 1).

4.2.2 Environmental Setting

The site is located in a mostly industrial area in the City of Tonawanda, New York. Isle View Park lies directly across the street from the site (Ref. 10). The landfilled area lies to the south of the company buildings and is adjacent to a tributary of Two Mile Creek (Figure 1). A chain link fence surrounds the terminal and the parking area, but there is no barrier to limit access to the southern portion of the landfilled area or the eastern portion which is adjacent to Two Mile Creek Road.

The nearest residents are located approximately 1000 feet southeast of the site. All residents in the area are serviced by municipal water. The City of Tonawanda water intakes are located in the Niagara River approximately 1.25 miles downstream of the site (Ref. 6).

The site is located approximately 400 feet south of the Niagara River and

(Ref. 11).

Permeability of lacustrine deposits consisting of clay, silt and sand are frequently very low. Permeability tests conducted in association with the U.S. Geological Survey study of the Tonawanda area indicated low vertical permeability ranging from 10^{-6} to 10^{-8} cm/sec. Horizontal permeability was believed to be more variable, especially due to sand stringers in the unconsolidated deposits (Ref. 11).

4.4 Previous Sampling and Analysis

4.4.1 Groundwater Quality Data

There is no groundwater quality data available for the site.

4.4.2 Surface Water Quality Data

There is no surface water quality data available for the site.

what about SPDES permit?

4.4.3 Air Quality Data

There is no air quality data available for the site.

4.4.4 Other Analytical Data

In 1982, the U.S. Geological Survey collected four subsurface soil samples from the site. The results cannot be considered valid because the holding times for some of the samples were exceeded and the surrogate recoveries were outside acceptable limits (Ref. 11).

5.2 HRS WORKSHEET

Facility name: Consolidated Freightways, Inc.

Location: 877 Niagara Street, Tonawanda, New York

EPA Region: II

Person(s) in charge of the facility: Frank D. Solberg

Superintendent, Building Maintenance

Name of Reviewer: Recra Research, Inc. Date: April 29, 1986

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

In the late 1960s, a three acre section of the site was landfilled with waste materials for property improvement. The waste material included foundry sands and fly ash. No analytical data is available for the site. The foundry sands are suspected of containing phenolic binders. A tributary of Two Mile Creek flows adjacent to the landfilled area. Two Mile Creek is 600 feet east of the site and the Niagara River is 400 feet to the northwest.

Scores: $S_M = 3.64$ ($S_{gw} = 0$ $S_{sw} = 6.30$ $S_a = 0$)

$S_{FE} = N/A$

$S_{DC} = 50$

FIGURE 1
HRS COVER SHEET

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	915083

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A NPDES				
☐ B UIC				
☐ C AIR				
☐ D RCRA				
☐ E ~~RCRA INTERIM STATUS~~				
☐ F SPCC PLAN	SALES ?			
☐ G STATE				
☐ H LOCAL				
☐ I OTHER				
☒ J NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (APPLY MORE THAN ONE)	02 AMOUNT	03 UNIT OF MEASURE
☐ A SURFACE IMPOUNDMENT		
☒ B PILES	SEVERAL SMALL SURFACE PILES	
☐ C DRUMS, ABOVE GROUND		
☐ D TANK ABOVE GROUND		
☐ E TANK BELOW GROUND		
☒ F LANDFILL	UNKNOWN	
☐ G LANDFARM		
☐ H OPEN DUMP		
☐ I OTHER		

04 TREATMENT (APPLY MORE THAN ONE)
N/A
☐ A INCINERATION
☐ B UNDERGROUND INJECTION
☐ C CHEMICAL/PHYSICAL
☐ D BIOLOGICAL
☐ E WASTE OIL PROCESSING
☐ F SOLVENT RECOVERY
☐ G OTHER RECYCLING/RECOVERY
☐ H OTHER

05 OTHER
☒ A BUILDINGS ON SITE
5

06 AREA OF SITE
3 acres

07 COMMENTS

A THREE ACRE SECTION WAS LANDFILLED WITH MATERIALS TO FILL LOW LYING AREAS. THE WASTE MATERIALS INCLUDED FOUNDRY SANDS AND FLY ASH.
AT PRESENT, THE SITE CONTAINS PILES OF RUBBLE FROM THE DEMOLITION OF A PARKING LOT

IV CONTAINMENT

01 CONTAINMENT OF WASTES

☐ A ADEQUATE, SECURE ☐ B MODERATE ☒ C INADEQUATE, POOR ☐ D INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

NO LINERS USED

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☐ YES ☒ NO

02 COMMENTS

VI. SOURCES OF INFORMATION (CITE REFERENCES, E.G., STATE FILES, SAMPLE ANALYSIS, REPORTS)

NYS DEC REGION 9
DEP

EPA FORM 2070-13 (7-81)

REFERENCES

1. Summary Report for Consolidated Freightways Prepared by the Erie County Department of Environment and Planning. February 1982.

2. U.S. Environmental Protection Agency, Hazard Ranking System. June 10, 1982.

3. General Soil Map and Interpretations, Erie County, New York. U.S. Department of Agriculture Soil Conservation Service. May 1979.

4. State of New York Offical Compilation of Codes, Rules, and Regulations. Department of State. Title 6 Conservation, Volume C, Article 8, Part 837.

5. New York State Water Laws. Bureau of National Affairs, Inc., Washington, D.C., August 17, 1979.

6. New York State Atlas of Community Water System Sources. New York State Department of Health, Division of Environmental Protection, Bureau of Public Water Supply Protection. 1982.

7. Letter to Sheldon S. Nozik of Recra Research Inc., from Gorden R. Batcheller, NYSDEC Region 9. December 18, 1985

8. Buehler, Edward J., and Irving H. Tesmer. Geology of Erie County, New York. Buffalo Society of Natural Science Bulletin, Vol. 21, No. 3. 1963.

9. La Salla, Jr. A.M., Groundwater Resources of the Erie-Niagara Basin, New York. Prepared for the Erie-Niagara Basin Regional Water Resources Planning Board. 1968.

10. U.S. Geological Survey. Topographic Map, Tonawanda, New York West, Quadrangle, 7.5 minute, 1980.

11. Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites. EPA (905/4-85-001) March 1985.

12. Letter to Frank D. Solberg, Consolidated Freightways, from Thomas P. Connare, Recra Research, Inc. April 29, 1986.

REFERENCE NO. 27

Ashland

Ashland Chemical Company

DIVISION OF ASHLAND OIL, INC.

5200 PAUL G. BLAZER MEMORIAL PARKWAY, DUBLIN, OHIO 43017 • (614) 889-3333

Subject: Water Leachables from Foundry Sands

The attached report represents data generated at our laboratories on certain extractables isolated by water wash of cured and uncured resin coated sand, and also of shakeout sand.

The tests and procedures used are a combination of standard procedures and modifications developed in our laboratory to date. The tests and data therefore, are preliminary, and accordingly these tests should be carried out in your laboratory for confirmation. Also consideration should be given to the need for tests in addition to those reported here. This data is supplied to you for your information only, without guarantee that the type of tests or the specific tests are exhaustive, or that all leachables were isolated or detected.

R. H. Toeniskoetter

Dr. R. H. Toeniskoetter
Manager, Inorganic Chemistry

RHT/ff

Attch.

Summary of Results of Water Leachables from Foundry Sands

Sand Mix[1]	PPM[2] Phenol	PPM[2] CH_2O	PPM[2] CN^-	Total N[2] as NH_3	% LOI
2.0% CHEM-REZ 158					
Uncured - Aged 1 week +	158	13	<0.2	--	1.66
Uncured - Fresh	42	3800	<0.2	2900	--
Uncured - Aged 24 hrs.	72	1900	<0.2	1600	--
Cured - Aged 24 hrs.	8	12	<0.2	66	1.55
Shakeout - 6" core[3]	<0.04	1	<0.2	3	0.53
Shakeout - 7" core[4]	<0.04	2	<0.2	3	0.64
1.5% CHEM-REZ 224					
Uncured - Aged 1 week +	5.2	7	<0.2	--	1.50
Partially cured - Mix 1 to 2 hrs. old	55	56	<0.2	55	--
Cured - Aged 24 hrs.	9	24	<0.2	18	--
Shakeout - 6" core	<0.04	1	<0.2	3	0.52
Shakeout - 7" core	<0.04	2	<0.2	1	0.67
2.0% ISOCURE, I306/II 606					
Uncured - Aged 1 week +	64	<1	<0.2	--	1.59
Uncured - Fresh	220	2	<0.2	0.6	--
Uncured - Aged 24 hrs.	70	<1	<0.2	2	--
Cured - Aged 24 hrs.	9	<1	<0.2	3	1.54
Shakeout - 6" core	<0.04	<1	<0.2	4	0.47
Shakeout - 7" core	<0.04	<1	<0.2	3	0.54
1.8% LINO-CURE; A-15					
Uncured - Aged 1 week +	0.2	<1	<0.2	--	1.64
Cured - Aged 24 hrs.	<0.2	<1	<0.2	1	--
Shakeout - 6" core	<0.04	<1	<0.2	3	0.41
Shakeout - 7" core	<0.04	<1	<0.2	3	0.49
1.5% PEP SET 1505/2590					
Uncured - Aged 1 week +	9.4	6	<0.2	--	1.07
Cured - Aged 24 hrs.	5.7	<1	<0.2	0.2	--
Shakeout - 6" core	<0.04	<1	<0.2	2.2	0.35
Shakeout - 7" core	<0.04	<1	<0.2	3.5	0.41
2.0% CHEM-REZ 105					
Uncured - Aged 1 week +	1.1	224	<0.2	--	1.90
Uncured - Fresh	0.2	5000	<0.2	4600	--
Uncured - Aged 24 hrs.	4	1800	0.24	1200	--
Cured - Aged 24 hrs.	1	44	<0.2	36	1.85
Shakeout - 6" core	<0.04	<1	<0.2	2	0.50
Shakeout - 7" core	<0.04	<1	<0.2	5	0.79
1.5% CHEM-REZ 480					
Cured - Aged 4 hrs.	27	<1	<0.2	<1	--
Cured - Aged 24 hrs.	35	3	<0.2	<1	--
Cured - Aged 1 week	3	3	<0.2	1	1.84
Shakeout - 6" core	<0.2	3	<0.2	<0.3	0.65
Shakeout - 7" core	<0.2	2	<0.2	<0.3	0.64

(1) Port Crescent Lake sand used for all tests.
(2) All results are based on the weight of sand.
(3) Disc core, 6" dia. x 1" thick; Gray iron poured at 2700°F to produce hollow disc with 1" metal thickness.
(4) Disc core, 7" dia. x 2" thick; Gray iron poured at 2700°F to produce hollow disc with 1/2" metal thickness.

PROCEDURES

Leach Water Preparation

Generally 100 ml of water was added to 50 g of sand. After mixing well with a glass rod the sand was allowed to settle and the water to remain in contact with the sand overnight. Then the water was filtered away from the sand, and an additional 100 ml of water was filtered through the sand. Except for the formaldehyde analysis the entire sample was used in the subsequent analysis. For formaldehyde the sample was made to 200 ml and a 5 ml aliquot taken (when necessary further diluted from a 5 ml aliquot taken).

Alternately 250 g of sand was treated as above with 400 ml of water. In this case after filtering the leach water, the total volume was made to 1000 ml by filtering additional water through the sand, and a 200 ml aliquot (equivalent to 50 g of sand) taken for the analysis. Again the formaldehyde analysis requires adjustments so that a 5 ml aliquot can be taken.

Phenol Analysis

In general the method of the Environmental Protection Agency (EPA) for phenolics was followed (Methods for Chemical Analysis of Water and Wastes, Environmental Pollution Agency, 1971). The method measures distillable phenolic compounds only. For convenience a smaller distillation apparatus and sample were used. Recovery of a standard phenol sample using these modifications was excellent.

Cyanide

In analyzing the cyanide (CN^-) the EPA procedure (ibid.) for cyanide was followed.

Nitrogen

Samples equivalent to 50 g of sand were digested with 5 ml concentrated sulfuric acid until a clear solution was obtained. For the cured and uncured samples one drop of 30% H_2O_2 was added to aid in the oxidation of the organic material. This treatment should be sufficient for urea and similar materials. In the case of the 6" and 7" samples mercuric oxide was added as catalyst. The mercuric oxide treatment will convert the nitrogen in some of the more difficult to oxidize

materials to ammonium sulfate. With this treatment slightly higher results might be obtained on these samples in the low ppm range than would be obtained without the catalyst.

After digestion of the sample the sulfuric acid was diluted with water, allowed to cool, and made to 100 ml total volume. A suitable aliquot was taken (sometimes further diluted) for the analysis. When more than 2 ml aliquot of the original solution was needed to complete the analysis, it was necessary to adjust the pH of the solution to 3-6 before continuing the analysis.

To detect the ammonia the method of Tetlow and Wilson (Analyst 1964, 89, 453) was used on the (neutralized) aliquot of the digested sample. This is essentially the chemistry used in the EPA's automated total Kjedahl nigrogen method. Interferences and dilution errors can be expected in use of this method, which however is generally satisfactory.

Formaldehyde

The method used to determine the formaldehyde (CH_2O) is that of Bricker and Johnson (Industrial and Engineering Chemistry Analytical Edition, 1945, 17, 400). This method measures both free and combined formaldehyde. Adjustment of reagents to allow a 5 ml aliquot was necessary in order to obtain the desired sensitivity. Known interferences include furfural which produces a positive interference. Due to the high acid concentration and heat used to develop the color there are other possible positive interferences. The usual interferences which are likely to be present in the samples under consideration would produce high results.

Loss on Ignition

The loss on ignition was determined by heating a sand sample to 900°C for three hours and weighing it before and after heating.

COMMENTS

Theoretical total formaldehyde content of a sand mix containing 2% Chem Rez 105 or Chem Rez 158 binder is approximately 6000 ppm. Formaldehyde results obtained on leaching indicate that the bulk of these resins can be extracted from

fresh sand mixes by simple contact with water. Nitrogen results also show that essentially all of the nitrogen-bearing materials in fresh sand mixes of Chem Rez 105 and Chem Rez 158 binders are readily leachable with water.

Measurement of leachable phenol from the Chem Rez 158 mix shows a value greatly less than the total phenolic content of the sand mix. This is a result of the analytical procedure which measures only distillable phenolic components. Leach waters from these sand mixes must, in addition, contain substantial quantities of phenolic resin materials which are not distillable.

Similar comments are applicable to the leachable phenol results from fresh sand mixes of Chem Rez 224 and Isocure. In the case of Isocure mixes, however, the less water-soluble nature of the phenolic component suggests that the measured phenol value should be a closer estimate of total phenolic components in the leach water.

As expected, curing of the various binders results in substantial reduction of the amounts of leachable constituents. Shakeout sands, in general, are shown to contain negligible or very small amounts of leachable components.

Leachable cyanide was less than the detectable concentration in all but one of the sand samples tested. It is suspected that the single result showing a positive cyanide concentration may be in error.

REFERENCE NO. 28

Phenols in Foundry Waste Sand

New regulations on solid waste disposal have focused attention on the makeup of foundry waste sands. Here is a reassuring look at one chemical constituent of such sands.

Dr. Calvin K. Johnson
Vice President &
Technical Director
Acme Resin Corporation
Forest Park, IL

There has been debate about the potential environmental problems associated with use of phenolic foundry binders for years. Some in the industry specify use of phenol-free binders in the belief that this will eliminate all potential phenol-related environmental problems. Others have used phenolic-containing binder systems for years and have not experienced any environmental problems.

Often decisions on binder selection have been made based on little factual information about potential environmental problems. However, decision-making based on inadequate information, personal opinion, or unfounded assumptions is no longer adequate. The new federal EPA regulations[1] under the Resource Conservation and Recovery Act of 1976 make it the responsibility of all generators of solid waste to determine if the waste is hazardous and to dispose of solid waste in accordance with government regulations. Foundries are responsible for knowing what is in their waste sand and being certain that it is disposed of properly.

This has raised new questions about the potential hazards of phenols in waste sands. This article provides some basic information on phenols and their presence in foundry waste sands, which should help foundrymen make good decisions on binder selection and waste disposal.

First, let's clarify why the EPA and other regulatory agencies are so concerned about phenol leaching into waterways and other drinking water sources. It is not because phenol is extremely toxic or because it is a permanent pollutant like chlorinated biphenyls (PCBs) that do not break down to harmless by-products in nature. In fact, the phenols are readily biodegradable in nature to harmless by-products.[2-7]

The maximum permissible concentration of phenol in drinking water of 1 ppb (part per billion) is far below the levels of 2000 ppb that is toxic to fish[8-10] or 7,000,000 ppb that is toxic to man. The low phenol limits are set because chlorination of drinking water converts any phenols present to chlorophenols, which give water a bad taste. Consequently, landfill sites should be selected which minimize any possible leaching or run-off of phenols into waterways or drinking water sources.

Sources of Phenols

What foundry waste sands contain phenols anyway? Does it make a difference what type of binder is used? Do phenolic binders necessarily give waste sands containing more leachable phenols than non-phenolic binders?

The answers to these questions will surprise many foundrymen. Essentially any waste sand from a foundry core or mold process that uses organic binders or additives may contain phenols. This is true even if the binders or additives used to make cores or molds are phenol-free. Phenols can be formed as a result of high-temperature thermal decomposition and rearrangement of organic binders during the pouring process.[11-16] Thus, most foundry waste sands are likely to contain traces of phenols. This includes waste green sand, dry sand, shell sand, alkyd oil urethane sand, phenolic urethane sand, furan nobake sand, and even organic modified sodium silicates.

We have run phenol leaching tests using the new federal EPA test method at a pH 5 on a number of foundry waste sands. The results summarized in Table 1 show a wide range of results. It is interesting that waste sand from the phenolic shell mold process, which contains the highest initial phenolic content, is lower in leachable phenols than green sand and some of the other binders tested. Waste shell sands probably have the low leachable phenol values because of their very low sand-to-metal ratio (0.3:1 to 1:1), which results in very complete burning of the binder during pouring. Maintaining low sand-to-metal ratios and low LOIs on reclaimed chemically bonded sand should reduce phenol levels in waste sand.

The leachable phenol levels are expected to vary from one waste sand to the next depending upon:

- Sand-to-metal ratio.
- Binder type.
- Binder level.
- Degree of cure.
- Phenol content in the binder.
- Extent of binder thermal decomposition and rearrangement.
- Metal pouring temperature.
- Reclaim sand loss on ignition (LOI).
- Cooling time between pouring and shakeout.

The only way to know the quantity of phenols in a waste sand is to run leaching tests on representative samples.

The results in Table 1 are from typical waste sands. However the amounts of leachable phenols may vary significantly from foundry to foundry depending on foundry practices. Table 1 is presented simply to demonstrate the point that phenols are present in waste sands from a variety of binder systems. The limited data should not be used to predict leachable phenol contents of sands.

Environmental Effects

Why have there been so few, if any, reported environmental problems related to phenol-containing waste sands if essentially all foundry waste sands contain traces of phenols? There are a number of reasons why leachable phenols have not been a significant problem to date.

First of all, phenols are readily biodegradable in nature[2-7] to harmless by-products. The degradation of natu-

Table 1. Leaching Test on Waste Sand.[1]

Waste Sand Type / Foundry Process	Phenolic No-Bake, BSA Cat. Cores and Molds, Grey Iron Castings	Shell Molds, Steel Castings	Shell Molds, Grey Iron Castings	Shell Core Butts, Grey Castings	Green Sand Molds, Grey Iron Castings	Phenolic Urethane Molds & Cores, Steel	Furan No-Bake (Phenol Free) BSA Cat. Molds & Cores, Steel	Furan No-Bake Phenolic Modified H_3PO_4 Cat. Molds & Cores, Grey Iron	Alky-Oil Urethane Molds & Cores Aluminum	EPA Standard[3]
Leachable Phenol parts per million (ppm)	0.03 to 0.10	0.01	0.01	0.03 to 0.09	0.26	0.73	0.10	0.49	0.04	none
pH of Leachate[2]	6.97	6.73	-	5.5	5.09	5.93 to 7.58	4.7	4.03	6.6	greater than 2 and less than 12.5
Leachable Metal concentrations mg/l										
Arsenic	<0.0045	<0.0045	-	<0.0045	<0.005	<0.0032	-	-	-	5 mg/l
Barium	0.1	<0.1	<0.1	<0.01	<0.2	<0.1	<0.1	<0.1	<0.1	100 mg/l
Cadmium	<0.01	<0.01	-	<0.01	<0.01	<0.01	-	-	-	1 mg/l
Chromium	<0.03	<0.03	-	<0.03	<0.03	<0.03	-	-	-	5 mg/l
Lead	<0.05	<0.05	-	<0.05	<0.05	<0.05	-	-	-	5 mg/l
Mercury	-	-	-	-	-	<0.0005	-	-	-	0.2 mg/l
Selenium	<0.0047	<0.0047	<0.0043	<0.0043	<0.0047	<0.0042	-	-	-	1.0 mg/l
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	5.0 mg/l

1) Leaching tests run according to EPA method Federal Register, Vol. 43, No. 243 at pH of 5.
2) pH taken after suspension of 100 gm of sand in 1600 ml of water and stirred for 15 minutes.
3) Federal Register, Vol. 45, May 19, 1980, 40 CFR Part 261.

rally-occurring phenols is an integral part of nature's carbon cycle. Many micro-organisms, yeasts, molds, algae and higher marine plants are capable of degrading phenols.

Biodegradation of phenols is known to occur under both aerobic and anaerobic conditions. It also occurs under a variety of conditions of pH and temperature.[15-16] In studies designed to simulate degradation of phenol and cresols in surface waters, it was shown that 95 to 100% degradation occurs in 7 days.[17-18] Phenols added to water samples of two estuarine rivers along the Atlantic coast of the United States rapidly degraded to CO_2 in an aquatic environment.[19]

Nature is well-equipped to handle phenols, which are present in nature from a wide variety of sources. In domestic sewage, phenols are normally present at concentrations of 70 to 100 ppb.[20] Human and animal urines contain phenols.[21-23] The sum total of cresols, particularly p-cresols, released to the environment through human urine has been estimated to be over 4 million pounds per year. The amounts released from animals must be far larger than that.

Another major source of naturally-occurring phenols is in foods and flavoring agents.[24] Humans have consumed phenols for centuries from such common foods as coffee, tea, butter, whiskey, wine, beer, and eggs.

Decaying vegetation such as oak leaves produces phenols. Phenols have been characterized as components of leaves and flowers.[25-26] Phenols from decaying vegetation can be a major source of phenols in rivers following run-off from heavy rainfalls. When monitoring possible phenol discharge from a landfill or industrial source it is important to sample and test the water both upstream and downstream from the site. The phenols present in the upstream samples measure the amounts from natural sources or from other industrial sources.

A fourth natural source of phenols is secretions from insects and other arthopods. For example, the defensive secretion of the cockroach contains phenols.[27] It has been estimated that as much as 11 million pounds of phenols are released annually into the environment by insects.

The second reason why phenol leaching from waste sands has not generally been a serious problem is that both the concentrations and the total amounts of phenols present are low. The total amount of phenols released to the environment from foundry waste sand can be estimated by using results from appropriate leaching tests combined with the total tons of foundry sands used annually in the United States (the Bureau of Mines 1979 figure is 9,846,000 tons). Our own calculations show an estimated 94,500 lb of leachable phenols annually. This is a very small quantity relative to the amounts released by other natural sources of phenols. Nature apparently can handle the very small incremental amounts of phenols released from waste foundry sands.

Another way to estimate the amounts of phenols in waste sand from foundries is to use the average quantities of solid waste published in the American Foundrymen's Society Solid Waste Disposal Manual of 0.32 tons of solid waste per ton of ferrous castings and 0.6 pounds of solid waste per pound of nonferrous metal cast. Using these values and the phenol levels in Table 1, the amounts of leachable phenols in foundry waste sands can be estimated. This approach also shows that the quantity of phenols from foundry waste sands is very small.

It should also be pointed out that leachate from foundry waste sand is generally no more hazardous than the leachate from domestic garbage.[28, 29]

Classification of Waste Sands

Foundry waste sands are not specifically listed as hazardous waste from either specific or non-specific sources in the new EPA regulations of May 19, 1980.[1] (Articles 261.31 and 261.32). There are no specific standards for leachable phenols in foundry waste sands in the regulations. The foundry generating the waste sand is, however, required to determine if the solid waste is hazardous by testing for the characteristics of corrosivity, reactivity, ignitability, or EP toxicity (Articles 261.22, 261.23, 261.21, and 261.24).

Foundries should pay particular attention to the EP toxicity test with regard to certain heavy metals listed in the regulation. Leach test results listed in Table 1 indicate that most foundry sands should be way below the limits for metals. Generally, foundry waste sands are expected to be classed as non-hazardous under the federal EPA regulations. State regulations must also be considered, as they may be more stringent than the federal rules.

For a free copy of this article with references, circle no. 308 on the Reader Action Card.

REFERENCE NO. 29

New York State Department of Environmental Conservation

MEMORANDUM

TO: Mr. Tygert
FROM: Mr. Clare
SUBJECT: Consolidated Freight
Site No. 915083
DATE: August 4, 1986

On Tuesday, July 29, 1986, an inspesction was made of the Consolidated Freight site in the Town of Tonawanda.

At 11:50 a.m., a white (milky) discharge was observed in an unnamed tributary to Two Mile Creek. Due to the short distance (75-100') of the downstream edge of discoloration to the 36" storm sewer outfall, the discharge began no later than 11:30 a.m. The inspection was interrupted to report the spill (?) to Mr. Hinton of the Water Section. Mr. Sarkees of the Water Unit left the Office to investigate shortly after 13:00 hours. This storm sewer is a SPDES outfall point for Consolidated Freight.

A diagram of the landfill area, outside of the security fence is attached. The following observations are pertinent:

1. The landfill area is very sparsely vegetated. Most of the surface is clay, broken concrete and stone. The slope shown on the diagram is approximately 10' in elevation. It is also barren.

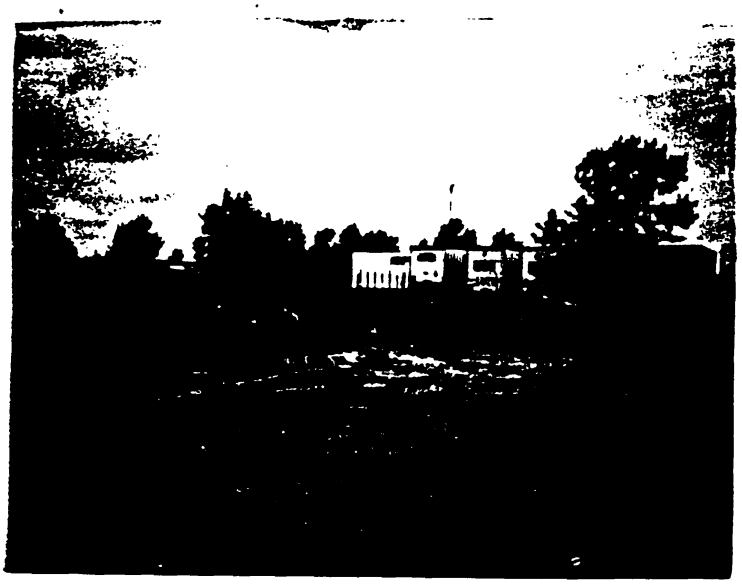
2. No foundry sand or other suspicious type waste material was observed. No leachate was found.

3. Three drums were located. Two (2) rusted metal drums are in the tributary. One black, plastic drum is half way up the fill (and partially buried). None of the drums contain any suspicious material (at least now). (See attached pictures)

4. The tributary stream did not appear to harbor a healthy aquatic population. There were very few frogs, no fish and only a few insects observed. No muskrat or rat tracks were seen although there are fairly extensive flat, muddy areas. This does not seem normal.

5. The piles of debris shown on the attached sketch appear to be paving rubble. No suspicious material was evident.

LGC:ec
ATT.



Picture No. 1

Piles of debris behind (EAST) of Consol. Freight fence

PICTURE 2

Black, plastic drum on slope of fill at Consol. Freight (empty). About opposite Gate

PICTURE NO 3

Empty drum in tributary behind Consol Freight.

CONSOLIDATED FREIGHT

915083 - 7/29/86

L. Clare

REFERENCE NO. 30

Consolidated Freightways, Inc.
Site No. 915083

Draft Phase I Report
Region 9 Comments
August 4, 1986

1. Water Program

There is no indication in this report that the consultant discussed this site with any Water Program personnel either in this Office or at the Erie County Department of Environment and Planning.

NOTE:

a. A SPDES Permit exists for Consolidated Freightways

b. Several spills and investigations related to spills are on record. Refer to the attached inspection report.

c. Water quality data is probably available for this tributary in the Niagara River Study.

The SPDES file must be reviewed! This report is incomplete without including the information contained in it. See red marks in Draft report.

d. A map of the on-site storm drainage system is available. See attached map. This should be included in this Phase I Study.

2. Site Inspection

The consultant's November 20, 1985 inspection report does not mention any drums on site. Refer to attachment. It appears that a more thorough inspection could be expected.

3. Municipal Storm Sewers (Page 8)

The consultant refers to "municipal storm sewers". Where did this information come from? Does not Consolidated Freight, Inc. own all storm sewers on site? There is no information in our files to indicate any municipal ownership or responsibility for storm sewers on or abutting this site.

4. Site Vicinity Map

The vicinity map (Figure 1) seems to indicate the site extends southwest of the Consolidated Freightways property. The site map is confined to the property itself.

5. New K Realty

The land parcel immediately behind (southeast) of the P.I.E. property (and abutting the Consolidated Freight property) was found to have drums containing PCB's in 1983/84.

-- drums were observed in the tributary next to Consolidated Freight on July 29, 1986

-- the possibility seems to exist that PCB's could have migrated to,

run off to, also been deposited on) the Consolidated Freight property. It is immediately downhill.

-- the possibility of offsite PCB contamination in surface and/or groundwater must be recognized.

6. Phase II Work Plan

-- See #1, #5 above -- neither is recognized in formulating the proposed Phase II work plan

-- Work plan is too generic

*Storm sewer sampling on site should be included

*Monitoring of SPDES outfall must be performed concurrently with surface water sampling if the data is to be correctly interpreted.

REFERENCE NO. 31

Site
Consol. Freightways

COUNTY OF ERIE
DEPARTMENT OF ENVIRONMENT & PLANNING
DIVISION OF ENVIRONMENTAL CONTROL

MEMORANDUM

TO Robert G. Speed, P.E., attn: Dan Judd DATE 3/1/84

FROM Donald Campbell, P.E.

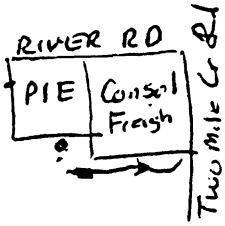
SUBJECT REMOVAL OF PCB CONTAMINATED OIL FROM NEW K REALTY PROPERTY

Attached is a copy of Complaint # 02392 (NYSDOT # 830235)

for your information.

8/4/86 Old Comp

20 empty drums
1 partially full → 730ppm PCM
Hole in drum indicate spill on ground
There may be PCB Contamination Upstream of Consolidated Freightways on trib of Two Mile Creek
L. Clare



DONALD CAMPBELL, P.E.
Sr. Env. Quality Engineer
Division of Environmental Control

DC:RR

Attachment

cc: J. Hennessey, NYSDOT

02392

ERIE COUNTY ENVIRONMENTAL CONTROL - COMPLAINT CARD

File: NEW K. REALTY - T/T ON.

Name of Person, Company, or Institution Complained against: NEW K REALTY

Address: _____ Phone Number: _____

DOT SPILL # 830235

Month Date Year

Date: 4 29 83 Time: 3:15 P.M.

Name of Complainant: R. Rutkowski (DEP)

Address: 95 Franklin St Phone Number: 846-7472

Bflo NY

DESCRIPTION OF COMPLAINT

Happening Now: Yes (X) No ( ) Emergency: Yes ( ) No (X)

Old sheen on ditch upstream of Consolidated Freightways outfall at Two mile Creek Rd (observed by RR at final inspection for clean-up of diesel oil spill at Consolidated Freightways - 2/3/83 - Complent Card # 2303)

COMPLAINT CATEGORY/COUNTY RULE (STATE RULE)

A.	Open Burning/Rule (Part 215)	( )	H.	Solid Waste (Part 360, 364)	( )
B.	Fuel Burning/Rule 3 (Part 227)	( )	I.	Oil Spill	(X)
C.	Incinerators/Rule 4 (Part 219)	( )	J.	Chemical Spill (17-0701)	( )
D.	Process Equipment/Rule 5 (Part 212)	( )	K.	Sewerage	( )
E.	Nuisance/Rule 7.5 (Part 211)	( )	L.	Water Pollution	( )
F.	Internal Combustion/Rule 8 (Part 217-218)	( )	M.	Other _____	( )
G.	Odors	( )			

Person taking complaint: R Rutkowski

Person handling complaint: R Rutkowski

Contact Complainant Date: _____ Time: _____ Field: YES ☒ NO ☐ *(If YES see back)

Referral to: _____

INSPECTOR'S REPORT: 5/6/83 - 2:20 PM arr. at site - sorbent boom in tributary of Two mile Creek ~~partially washed~~ broken loose from moorings - reinstalled followed tributary upstream to outfall (P.I.E?) - no significant quantities of oil seen in creek - very slight sheen ≈ 5'-0'-10' from outfall - appears to be surfacing from bottom of creekbed. 55 Gallon drums were seen behind fence lines (Consolidated Freightways + P.I.E) along Two mile Creek Tributary. All

MANDATORY NOTIFICATION:

	DATE	TIME	REASON	STATUS:
N.Y.S. DEC	~~5/2/83~~ 5/2/83	11:30 AM	DON GOLBA	( ) Abated
U.S.C.G.	~~5/2/83~~	~~11:40 AM~~		( ) Resolved
~~OTHER~~ DOT	5/2/83	11:40 AM	J. HENNESSEY	(X) Referred To D.E.C.

Richard Rutkowski 9/7/83
Inspector's Signature

[signature] 9/7/83
Supervisor's Signature and Date

ARB-9 (Rev. 12/82) ECA-WB

1. FACILITY # _____ SOURCE # _____
COMPANY _____
SOURCE _____
GROUP CODE ( )

2. FIELD INVESTIGATION: Type 5 ( )
Other _____

3a. DATE OF INSPECTION ___ ___ ___
TOTAL NUMBER OF VISITS
VIOLATION: Yes ☐ No ☐ P (Rule 10) ☐
DATE OF VIOLATION NOTICE ___ ___ ___
REPLY OR CONFERENCE DUE ___ ___ ___

3b. PLEASE SCHEDULE INSPECTION FOR ___ ___ ___
TYPE ___

4. COMPLIANCE SCHEDULE REQUIRED Yes ☐ No ☐
DATE REQUIRED ___ ___ ___

FIELD REPORT AND FOLLOW UP:
(Include Sketch as needed)

were empty except for one drum (behind P.I.E. fence line) which was sealed + contained a liquid. Owners of the property ~~not~~ that the drums are on ~~on~~ is not ~~known~~ known at this time.

5/9/83 - 2:30 PM - Tax maps at Erie Co. Dept. of Real Properties indicate that
① Consolidated Freightways property is 1350' deep (from River Rd)
② P.I.E. property is 900' deep (from River Rd)
③ New K Realty - 2944 Niagara Falls Blvd - N. Tonawanda owns property behind P.I.E.
These are the 3 logical possibilities for ownership of the land that the barrels are on

5/13/83 - 4:15 PM - Called Frank Solberg (Cons. Freight) - 695-3110 - not in - will call 5/16

5/16/83 - 1:45 PM - Called P.I.E (877-3600) (Mgr - Gene Kraczykowski) - out for the rest of the day

2:35 PM - Called Frank Solberg (Cons Freight) - not in - he will return call

3:05 PM - Telecons w/ F. Solberg - he noticed a deer on the water behind Consolidated Freightways this afternoon - it was being stopped by his culvert boom - he asked him to remove any empty drums that are on his property within one week - he agreed to do so

5/17/83 - 10:25 AM - Telecons w/ Gene Kraczykowski - he will check the dimensions of P.I.E.'s property + find out if the barrels are ~~on~~ within the property boundaries - if so, he agreed to properly dispose of the ~~full~~ empty barrels - the barrel w/ the liquid in it - he will call me back

5/18/83 - 8:40 AM - Telecons w/ Frank Solberg - he has pulled all of the drums up from the ditch - area (yesterday) + will dispose of them today - he

POST INVESTIGATION NOTIFICATION:

	DATE	TIME
Complainant	N/A	
N.Y.S. DEC	9/7/83	1:45 PM - D. Field
Specify Other	9/7/83	1:05 PM J. Hennessey (DOT)

TOTAL HOURS

5/6 - 7.0 - 25 miles
all other May, June, July ~~dates~~ - 5.0 hrs ~~33 miles~~
9/26 - 3.5 hrs 33 miles
all Aug + Sept dates - 5 hrs
Total - 15.5 hrs 57 min

9/19/83 - 1.0 hrs 20 min

had seen a small pocket of oil in the discharge & asked me if he should clean it. I told him that wasn't necessary since his sorbent boom downstream of that point would catch any oil coming down from a discharge point upstream

5/24/83 - 2:00 PM - Telecons w/ D. Kraczykowski - he believes that the barrels are not on P.I.E.'s property, but is awaiting confirmation. He will call back later today when he receives confirmed data.

5/24/83 - 10:55 AM - Telecons w/ Dave Kraczykowski - he said that PIE's property extends up to 1' maximum beyond the back fence - the area where the barrels are located is not on their property

11:40 AM - Attempt to call New K Realty - not listed in telephone directory or with operator assistance

11:50 AM - Called T/Tona Assessors office - re: ownership of property behind PIE - They say that New K Realty owns the property - they do not have a phone # - the mailing address is: New K Realty, Box 118, Tona NY 14150 - ATTN: Jim Sandonato

-/3/83 - 1:15 PM - Called Jim Sandonato (773-6597) - not in - he will return the call

1/3/83 - PM - Jim Sandonato called - (D. Campbell took the call & told him not to move the drum until he contacted R. Ratkowski & that we would decide on how to dispose of the drum

1/9/83 - 2:50 PM - Telecons Mr Sandonato - he agreed to meet me next week to discuss sampling & disposal of the barrel - I will call him next week If he's not at the above phone #, his office # is 876-1192

1/12/83 - Called Mr. Sandonato - not in - asked to have him return the call

1/13/83 - 10:50 AM " " " " " " " " " "

1/18/83 - 10:55 AM - Jim Sandonato called - he has a full schedule this week - I agreed to call him on 7/25/83 - AM

1/25/83 - 9:40 AM - Telecons w/ Jim Sandonato - agreed to a 9:00 AM meeting at the site on 7/26

1/26/83 - 9:00 AM - met J. Sandonato at site - only found 1 barrel containing a small residue (≈ 1-2 gals) of a black oil - took sample, will analyze for PCB's - Sandonato will be informed of results

11:45 AM - Sample Taken to E.C. Lab

2/8/83 - Lab results show 730 PPM PCB's (attached)

11:00 AM - Called Mr. Sandonato - not in - left a message for him to call me D. Campbell would like some soil sampling done in the immediate area (3 samples) - also, I should let D. Barry know of these results

3/9/83 - 9:15 AM - Called J. Sandonato - busy

3/9/83 - Send Memo to D. Barry - E.C.H.D. re: sampling results

3/9/83 - 9:30 AM - Called from Sandonato re. Sampling results - I will send him a letter w/ our requirements for remedial action

11:45 AM - Status to D. Judd

3/24/83 - 11:40 AM - Called from Sandonato - not in - left message for him to return the call - talk to myself or D. Campbell

3/30/83 1:10 PM - Called from Sandonato - not in - left a message for him to return the call (talk to myself or D Campbell)

4/6/83 - 11:10 AM - Telecon w/ J. Sandonato - he will leaving for ≈ 1 week for his first wedding anniversary/vacation + will be back Tuesday evening (9/13) - he will call D. Campbell on Wednesday (9/14) AM to discuss clean-up actions

4/6/83 - 12:10 PM - D. Campbell requests legal referral

4/19/83 - 9:15 AM - Arr. at site - barrel remains on site - location is 30' South of [redacted] P.I.E. fence, close to 2nd telephone pole from S.E. fence corner of P.I.E. (compl

REFERENCE NO. 32

County of Erie

EDWARD J. RUTKOWSKI
COUNTY EXECUTIVE

DEPARTMENT OF ENVIRONMENT AND PLANNING

JOAN E. LORING
COMMISSIONER

ANTHONY T. VOELL
DEPUTY COMMISSIONER
ENVIRONMENTAL CONTROL

May 31, 1983

Mr. Jim Sandonato
New K Realty
Box 118
Tonawanda, New York 14151

Re: Complaint #2392

Dear Jim:

On April 29, 1983, Mr. Richard Rutkowski of this office conducted an investigation of the properties behind Pacific Intermountain Express Co. at 5555 River Rd. (T/Tona.). During this investigation Mr. Rutkowski observed approximately 20 empty 55 gallon drums on this property. However, one full drum was observed (intact) and contained materials which may be in a liquid state. Through the Town of Tonawanda Assessor's office it was determined that this property is owned by New K Realty.

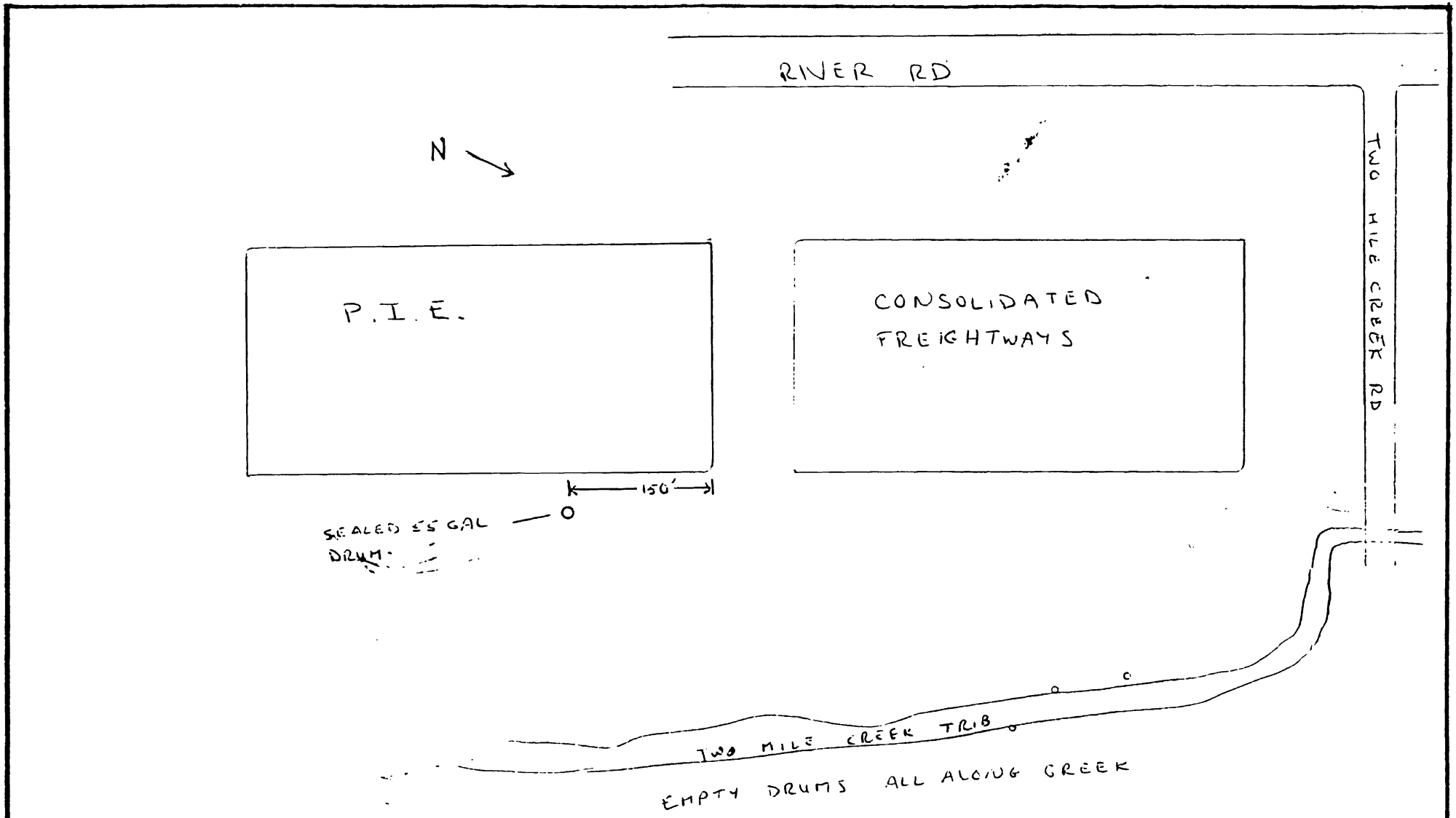
Since this drum may contain hazardous waste materials, we would request that you have the contents samples and analyzed. A diagram of the location of this drum has been included. Please advise this office, in writing, of your plans for sampling and laboratory analysis within 15 days.

If you have any other questions concerning this matter, our office may be able to advise you. Please contact Mr. Richard Rutkowski of this office at 846-7472.

Very truly yours,

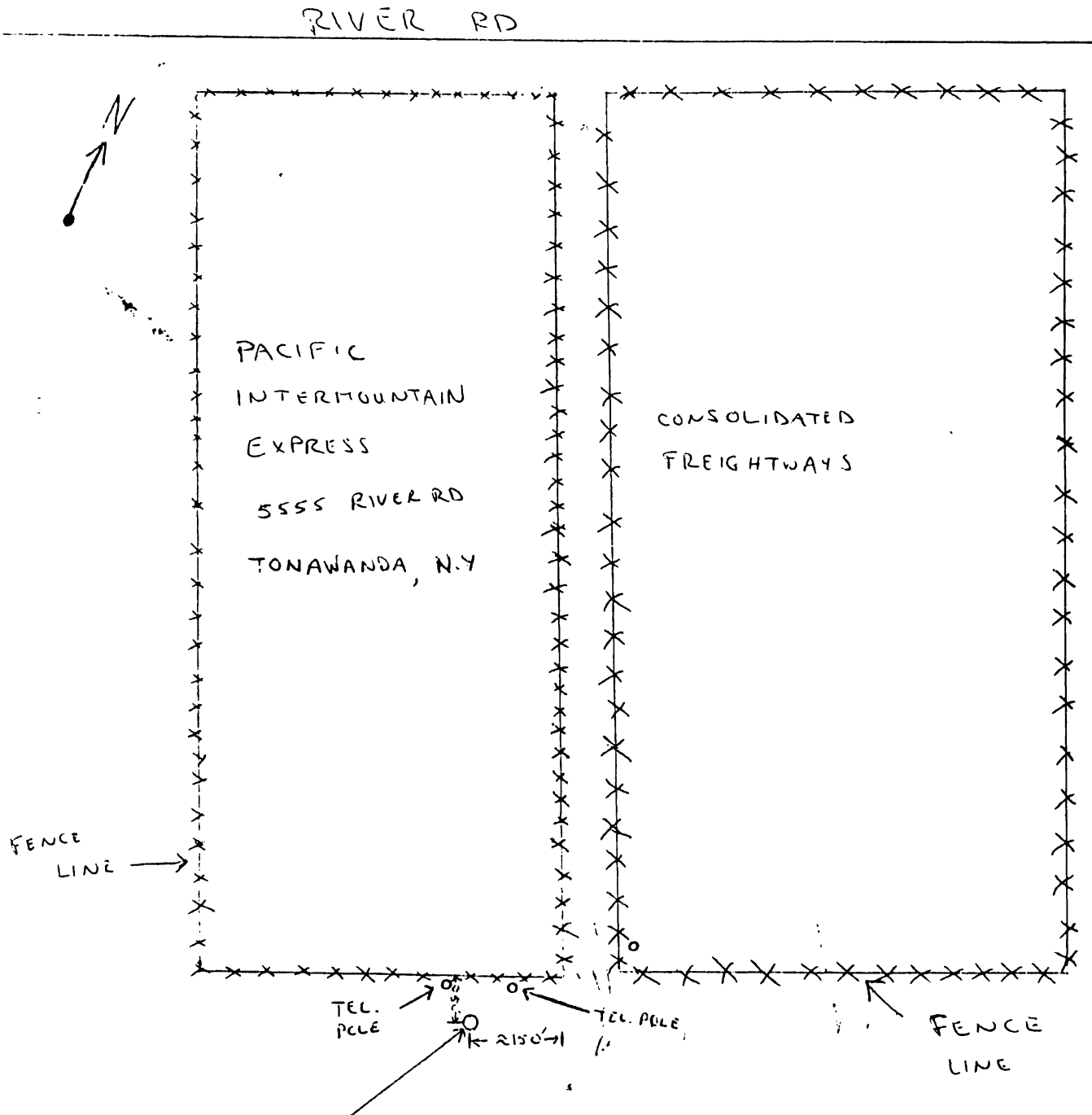
Donald Campbell, P.E.
Sr. Env. Quality Engineer
Environmental Control

DC:RR:aj



COMPLAINT #2392
5/6/83
T. TONAWANDA

R.R



COMPLAINT # 2392
MAY 1983
E. C. O. E. P.

REFERENCE NO. 33

600 Delaware Avenue, Buffalo, New York 14202-1073

February 27, 1986

Consolidated Freightways
877 Niagara Street
Tonawanda, New York 14151

Attention: Patrick J. Brady

Spill Number 853828
Consolidated Freightways
Erie County

Dear Mr. Brady:

As per our previous discussions, this Department is requesting any sampling results for the "red" material that was spilled in your trucking facility on January 31, 1986. The sampling results must be sufficient for the Department to identify any hazardous characteristics or constituents as well as to determine the material's chemical makeup.

Your immediate attention to this matter will be appreciated. If you have any questions, please feel free to call me at 847-4590.

Very truly yours,

Robert N. Leary, P.E.
Senior Sanitary Engineer

RNL:vu

cc: Robert Mitrey

REFERENCE NO. 34

HAZARDOUS WASTE SITE PROFILE

Consolidated Freightways - Former Wm. Strassman Property

City of Tonawanda

Site # 915083

Dept. of Env. & Planning
Div. Environmental Control
February 1982

Consolidated Freightways - Former Wm.
Strassman Property. Site # 915083
River Road - C. of Tonawanda

Background Information

The Interagency Task Force (IATF), in Volume 3 of Hazardous Waste Disposal Sites in New York State, reported that this site received foundry sand, possibly containing phenolic binders, from Chevrolet. This site is coded F indicating that preliminary investigation showed no in place toxics in dangerous amounts and that no further action would be required.

Site Location

Formerly known as the William Strassman Property, the site is now owned by Consolidated Freightways and is composed of a trucking terminal, repair shops and parking area for the firm. The site is located in the City of Tonawanda bounded on the west by the City/Town Corporate boundary, on the north by River Road and on the east by Two Mile Creek Road (Exhibit 1).

Aerial Photography

Aerial photography was reviewed for the years 1959, 1966 and 1972.

No landfilling was observed in 1959. The site was flat, well drained, with drainage from the site flowing northeast to Two Mile Creek.

In 1966 landfilling was observed in the southern portion of the property. The fill was light and uniform in texture suggesting clean fill or foundry sand.

By 1972 the Consolidated Freightway terminal was completed and no further filling was observed.

Site Inspection

On January 4, 1982, a site investigation was conducted. The only areas of the former landfill area which are not covered by the terminal

building or paving are in the southern and eastern section of the property (Exhibit 2). The toe of the southern boundary of the landfill abutts a tributary stream of Two Mile Creek and is approximately 10 feet above the original grade. Material observed during the inspection included earth, concrete, wood, asphalt, scrap metal and pipe. No leachate was observed. Minor erosion, due to lack of vegetation, was observed on the landfills eastern slope (Exhibit 2).

Environmental Profile

The General Soil Map and Interpretations for Erie County prepared by the USDA Soil Conservation Service (1979) identifies this area as having Cazenovia-Cayuga Soils.

The Cazenovia soils are formed in loamy, reddish-colored, glacial till deposits with a moderate amount of soft shale fragments. The Cayuga soils are formed in a thin layer of gravel-free, clay sediments about 2 feet thick that mantle loamy glacial till deposits. Both soils are well drained or moderately well drained. They have a seasonal high water table perched at depths of 1.5 to 4.0 feet below the soil surface during early spring and other excessively wet periods.

The rate of water movement (permeability) through the subsoil of Cayuga soils is slow, and in the subsoil of Cazenovia soils it is slow or moderately slow. Downward percolation of contaminants, (if present), to groundwater are more likely to occur in the Cazenovia soils which are formed in glacial till deposits. These deposits are more vaiable in size and texture and localized sand depostis may increase permeability.

There is no specific information indicating the type of soils that are directly beneath the landfill area.

The Niagara River is approximately 400 feet northwest of the site and Two Mile Creek is approximately 600 feet east of the site. A tributary stream of Two Mile Creek, which is also a wetland protected by Article 24 of the Environmental Conservation Law, is adjacent to the toe of the landfill. Any drainage or leachate leaving the site would enter this tributary and eventually flow to the Niagara River.

The site is not in a flood hazard or flood plain area.

There is no known use of groundwater as a private drinking water supply. All residents in the area use a municipal water supply.

Exhibit 2 shows the site and the surrounding area within a 1 mile radius. The land use in this area is mostly industrial with some residential. The industrial areas are southwest of Two Mile Creek Road and the residential areas are south and east of Two Mile Creek Road.

Direct Contact

There is a security fence completely surrounding the terminal and parking area. There is no access control to the southern portion of the landfill which is adjacent to the tributary stream or the eastern portion which is adjacent to Two Mile Creek Road.

Fire or Explosion Potential

No evidence exists indicating that this area represents a fire or explosion hazard.

Conclusion

This area was landfilled in order to increase grade and eliminate low areas prior to the construction of the Consolidated Freightway facilities. Information (published reports) and observations indicate that a material used to fill in the property consisted of earth, construction and demolition material and foundry sand.

With the exception of possible phenolic binders in the foundry sand, there is no evidence to indicate that this area was used for the disposal of hazardous waste. Low levels of phenol may leach into the tributary of Two Mile Creek; however, weak phenol solutions are decomposed by bacterial and biological action in streams. Consequently it is unlikely that any environmental degradation can be associated with this site.

Recommendation

This department concurs with the IATF report and recommends that no further action is necessary for this site.

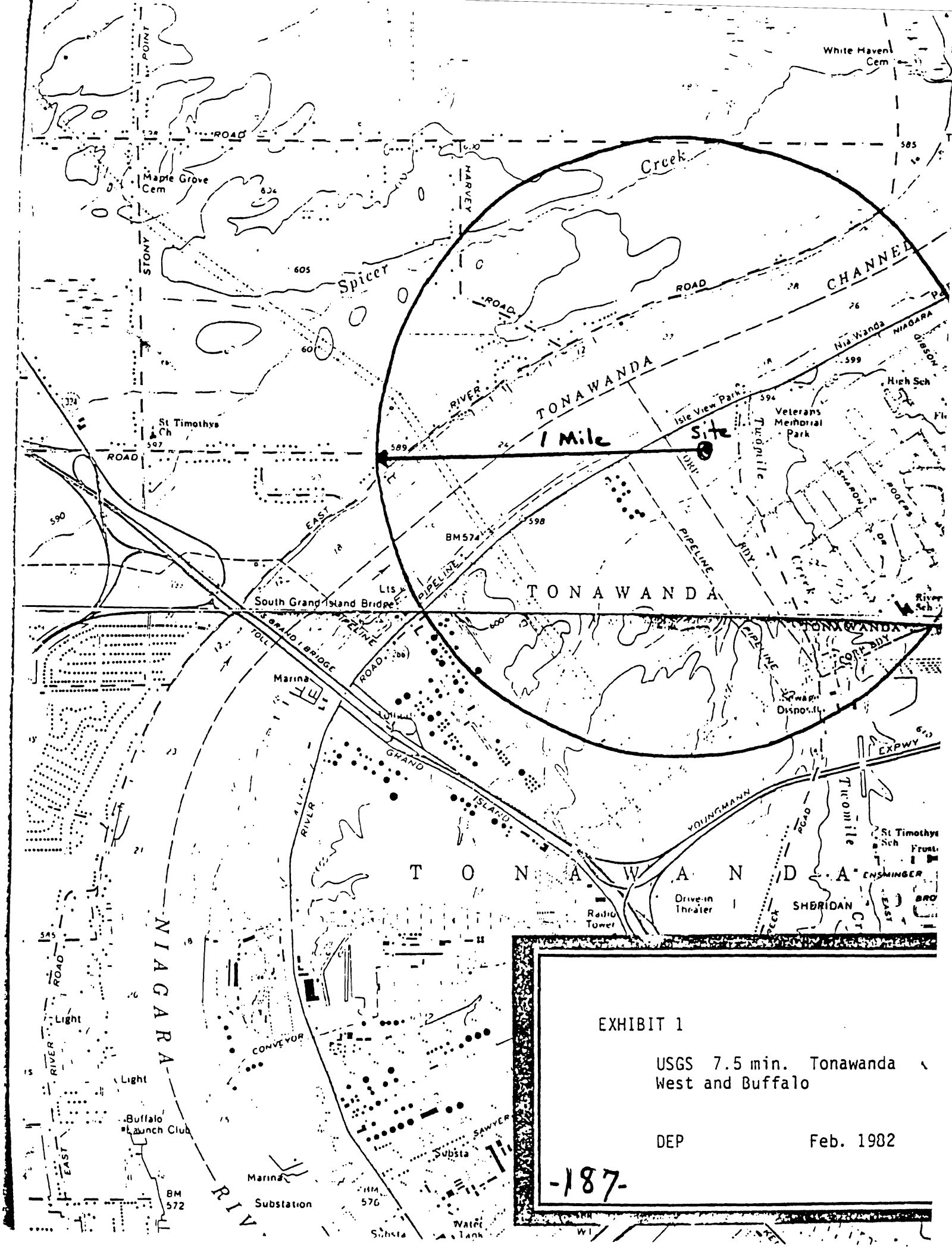


EXHIBIT 1

USGS 7.5 min. Tonawanda West and Buffalo

DEP Feb. 1982

-187-

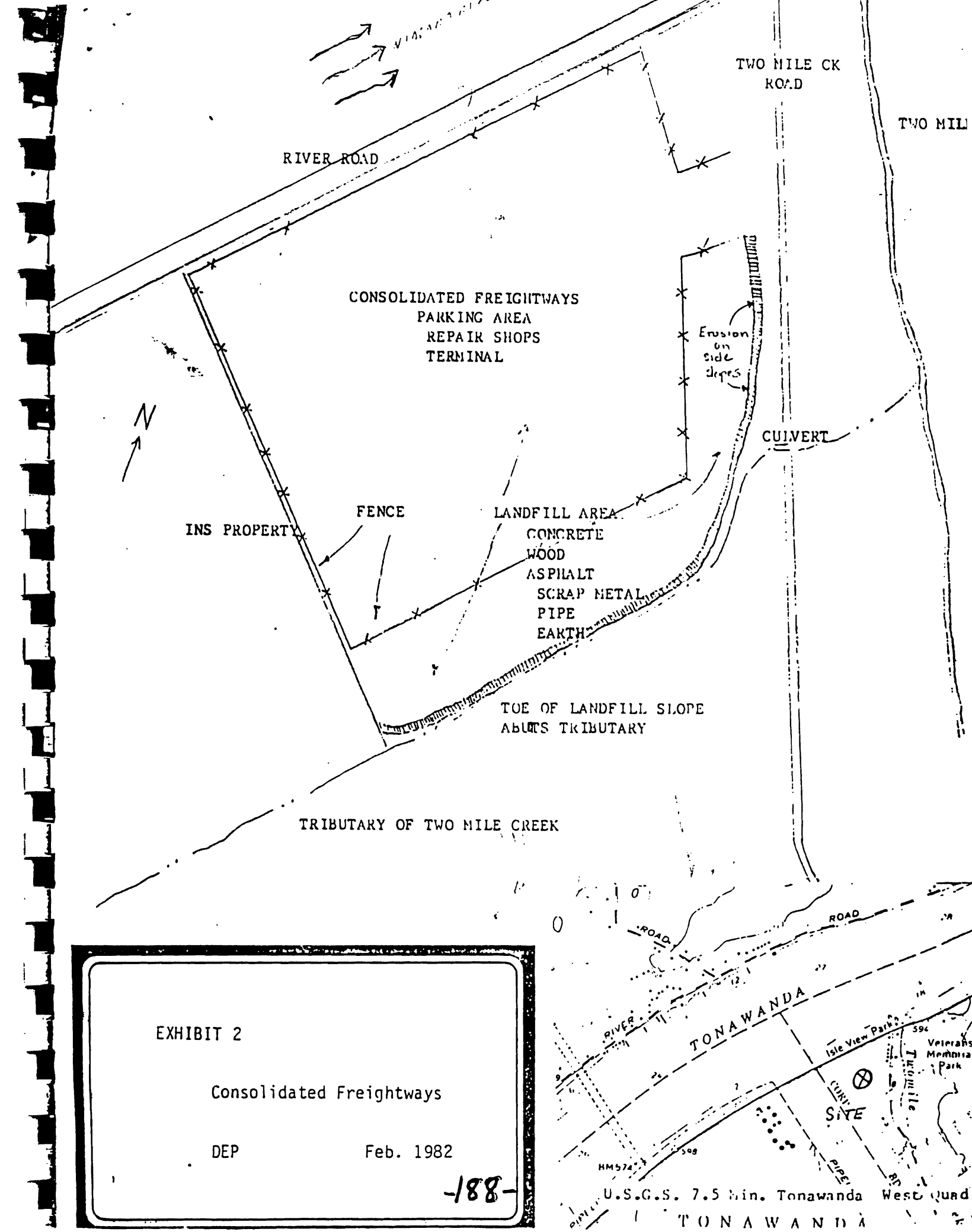


EXHIBIT 2

Consolidated Freightways

DEP Feb. 1982

REFERENCE NO. 35

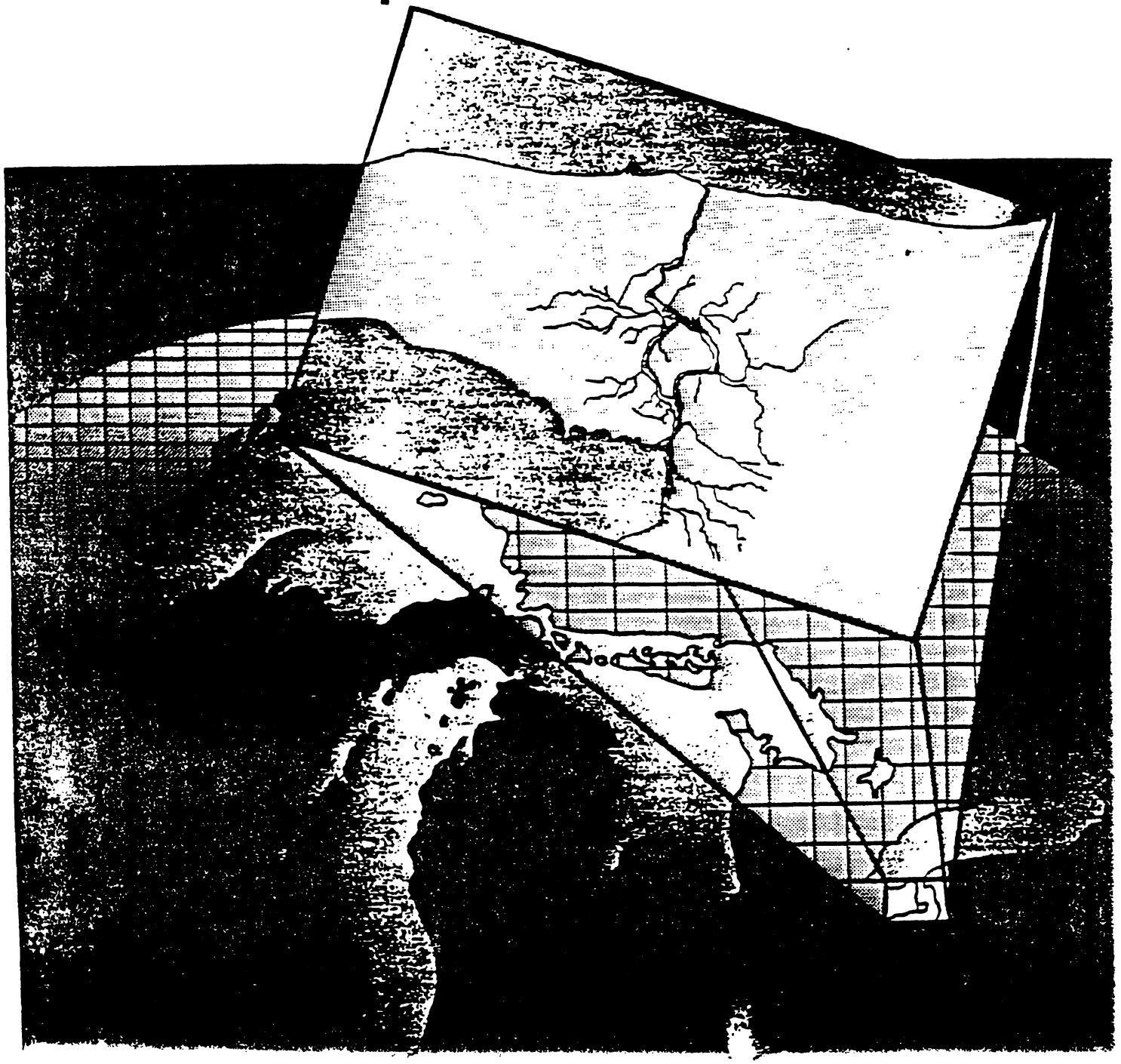
United States
Environmental Protection
Agency

Great Lakes National
Program Office
536 South Clark Street
Chicago, Illinois 60605

EPA-905/4-85-001
March 1985

EPA

Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste-Disposal Sites



TONAWANDA AREA

Geology

The Tonawanda study area (pl. 2) consists of unconsolidated deposits of clay, sand, and till of Pleistocene and Holocene age overlying Camillus Shale bedrock of Silurian age.

Bedrock Units.—The Camillus Shale is the only bedrock unit encountered in the area. As described previously, it is a gray, red, and green thin-bedded unit with massive mudstone and also contains beds and lenses of gypsum. Thickness of the shale is estimated to be 400 ft but decreases to the north near the contact with the Lockport Dolomite.

Unconsolidated Deposits.—The unconsolidated units consist of glacial material deposited during the latter part of the Pleistocene epoch and lacustrine material deposited during the early Holocene. The distribution of unconsolidated deposits in the area is shown in figure 5.

The Pleistocene materials are similar to those in the Buffalo area except for a ground-moraine deposit, which consists mainly of lodgment till, silty clay till, and sandy till. This deposit was formed by the transport and deposition of material beneath the southward flowing continental ice sheet (Muller, 1977) and is thus compacted and relatively impermeable.

The northern part of the area contains a Holocene lacustrine deposit consisting primarily of clay with stringers of sand and silt. Most stringers are less than 3 inches thick and are discontinuous throughout the area.

The U.S. Geological Survey drilled five test holes in 1982 to obtain additional data on the subsurface geology of the area. (Locations of these holes, SA-4 through SA-8, are shown on pl. 2.) The geologic logs are as follows:

Boring No.	Depth (ft)	Description
SA-4	0 - 1.5	Topsoil
	1.5 - 6.5	Clay, sand, green
	6.5 - 18.5	Clay, pink
	18.5	Bedrock
SA-5	0 - 6.5	Road fill, rubble
	6.5 - 19.0	Clay, pink
	19.0 - 24.5	Sand
	24.5	Bedrock
SA-6	0 - 3.0	Topsoil, rubble
	3.0 - 28.0	Clay, pink
	28.0 - 44.0	Sand, silty
	44.0	Bedrock
SA-7	0 - 1.5	Topsoil
	1.5 - 16.5	Clay, gray-green
	16.4 - 19.0	Clay, pink
	19.0 - 27.0	Clay, sandy pink
	27.0	Bedrock

Boring No.	Depth (ft)	Description
SA-8	0 - 1.5	Topsoil
	1.5 - 31.5	Clay, red
	31.5 - 63.0	Clay, red, interbedded with gravel
	63.0	Bedrock

The information obtained from these test borings, together with the data from the disposal sites, can be used to characterize the geology of the area in general terms. The unconsolidated deposits, primarily the Pleistocene and Holocene lacustrine clays, are encountered within 6 ft of land surface. Their thickness, which seems to be dependent upon the depth to bedrock, ranges from 18.5 to 63.0 ft. The test drilling confirmed the boundaries of the unconsolidated deposits as drawn by Muller (1977). Also, the Pleistocene and Holocene clay units are similar except in color and the presence of sand stringers in the latter.

Aquifer Lithology and Water-Bearing Characteristics

The hydrologic system of the Tonawanda area is similar to that of the Buffalo area--a bedrock aquifer consisting of Camillus shale overlain by an aquifer of unconsolidated deposits.

Water within the bedrock aquifer flows through the joints, fractures, and solution cavities within the unit. The Camillus Shale is estimated to have a transmissivity ranging from 7,000 to 70,000 (gal/d)/ft (LaSala, 1968). Regionally, under nonpumping conditions, ground water in the shale moves west and south. Ground water in shallow bedrock discharges into Tonawanda Creek, Ellicott Creek, and the Niagara River (pl. 2)

The overlying aquifer consists of unconsolidated morainal and clay deposits. The morainal material is generally a clayey till whose permeability is as low as that of the lacustrine clays. During the test drilling, ground water was encountered at various depths within the clayey units; also encountered were stringers of permeable sand that initially yielded considerable amounts of water. The yield diminished with time, however, as the stringers became dewatered.

The low permeability of the deposits causes a seasonal perched water table, similar to that of the Buffalo area, during periods of high precipitation. This water table discharges into areas of low topography and eventually into nearby surface-water bodies.

The hydrologic properties of the unconsolidated aquifer have been discussed in several consultant reports on the geohydrology of the major disposal sites; these reports are cited in the site descriptions (appendix B).

Permeability tests done by consultants on clay samples from several of the disposal sites indicate that the vertical permeability is low, ranging from 10^{-6} to 10^{-8} cm/s. This is probably the reason for the nearly steady water levels in monitoring wells screened in this aquifer. Horizontal permeability may be orders of magnitude greater than vertical permeability.

204. WILLIAM STRASSMAN PROPERTY (CONSOLIDATED FREIGHTWAYS) NYSDEC 915083
(USGS field reconnaissance)

General information and chemical-migration potential.--The William Strassman property, in the City of Tonawanda, was used as a landfill to receive foundry sand, possibly containing phenolic binders, from an automobile-manufacturing plant in Tonawanda.

Geologic data indicate limited potential for chemical migration. If migration does occur, it would be during periods of high precipitation and would be in the permeable surface material. The potential for contaminant migration is indeterminable, but the presence of contaminants and the site's proximity to the Niagara River suggest changing the potential to major.

Geologic information.--The site consists of glacial lacustrine clay and till overlying bedrock of Camillus Shale. The U.S. Geological Survey drilled four test borings on the site in 1982; the locations are shown in figure B-31. The geologic logs are as follows:

Boring no.	Depth (ft)	Description
1	0 - 8.0	Clay, red, tight, dry. SAMPLE: 4 ft.
2	0 - 5	Clay, red, tight, dry. SAMPLE: 5 ft.
3	0 - 11.5	Clay, red, damp. Hit dark green clay at about 10 ft. Green clay is about 6 in thick and is probably between fill material and natural grade. SAMPLE: 10 ft.
4	0 - 2.0	Clay, red.
	2.0 - 2.5	Clay, green, damp.
	2.5 - 6.5	Clay, red, tight, dry. SAMPLE: 2.5 ft.

Hydrologic information.--No ground water was encountered in the drilling. The regional direction of ground-water flow in the unconsolidated material is westward toward the Niagara River.

Chemical information.--The Geological Survey obtained a soil sample from each borehole for organic-compound analyses; results are given in table B-33. The samples contained 19 priority pollutants, six nonpriority pollutants, and some unknown hydrocarbons.

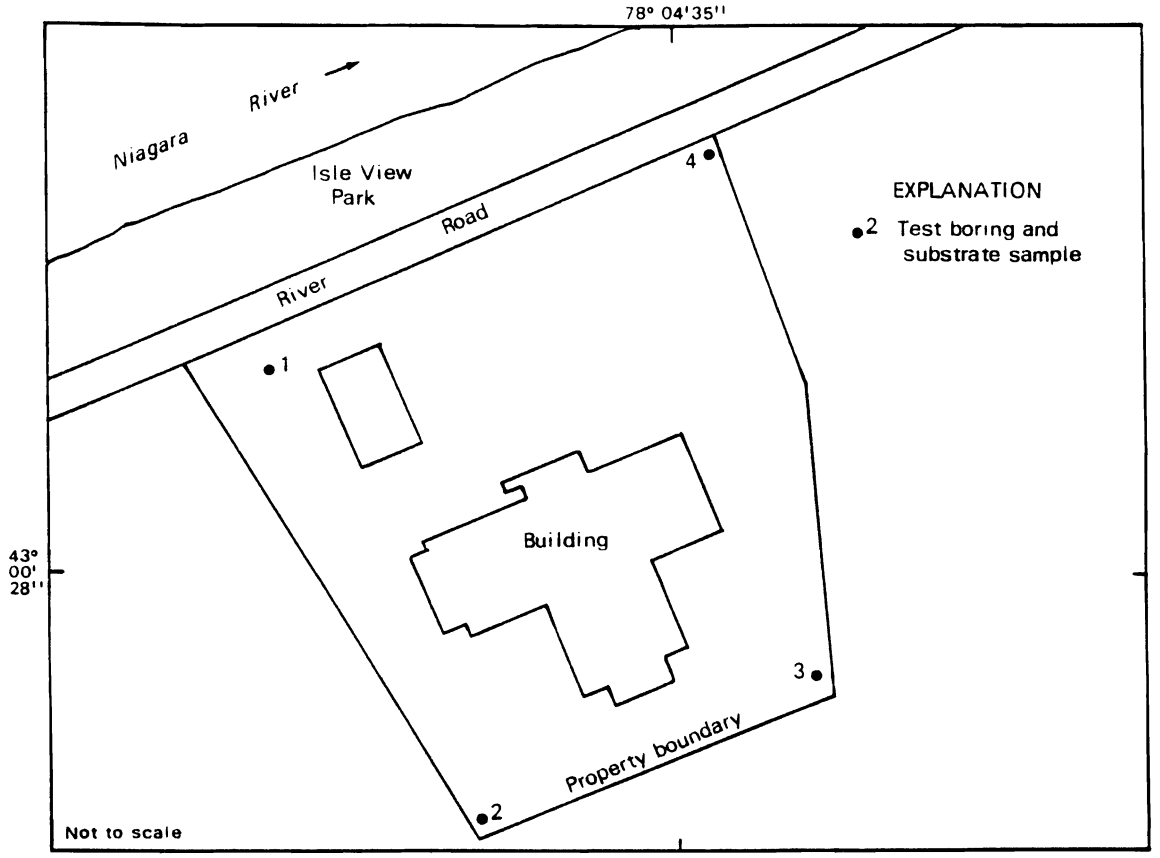
Table B-33.--Analyses of substrate samples from William Strassman Property, site 204, Tonawanda, N.Y., May 24, 1983.
[Locations shown in fig. B-31. Concentrations are in µg/kg; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

	Sample number and depth below land surface (ft)			
	1 (2.0)	2 (2.0)	3 (2.0)	4 (2.5)
Inorganic constituent				
Molecular sulfur[1]	--	--	--	390
Organic compounds				
Priority pollutants				
Benzene	* **	*	--	--
Toluene	LT	LT	--	--
Phenol	*	--	--	--
Acenaphthene	--	--	*	--
Fluoranthene	*	* **	*	*
Naphthalene	*	--	*	--
N-nitrosodiphenylamine	--	--	*	--
Bis(2-ethylhexyl) phthalate	--	--	*	*
Di-n-octylphthalate	--	--	*	--
Benzo(a)anthracene	*	--	*	--
Benzo(a)pyrene	--	--	*	--
Benzo(b)fluoranthene and benzo(k)fluoranthene	*	*	*	--
Chrysene	*	* **	--	--
Benzo(ghi)perylene	--	*	*	--
Phenanthrene	*	--	--	--
Fluorene	--	--	*	--
Dibenzo(a,h)anthracene	--	--	*	--
Indeno(1,2,3-cd)pyrene	--	--	*	--
Pyrene	*	* **	*	--
Nonpriority pollutants				
Dibenzofuran	*	--	*	--
2-Methylnaphthalene	*	--	*	--
Benzoic acid[1]	--	--	--	*
1-Methylpyrene[1]	--	--	*	--
Benzo(c)phenanthrene[1]	--	--	*	--
2-Octadecanol[1]	--	--	*	*
Hexadecanol[1]	--	--	--	*
Unknown hydrocarbons[1]	--	--	*	*

[1] Tentative identification based on comparison with the National Bureau of Standards (NBS) library. No external standard was available. Concentration reported is semiquantitative and is based only on an internal standard. GC/MS spectra were examined and interpreted by GC/MS analysts.

* Compounds detected but not quantified--Holding time exceeded before GC/MS acid- and base neutral-extractable compounds were extracted.

** Surrogate recoveries were outside the acceptance limits.



Base from USGS field sketch, 1982

Figure B-31. Location of sampling holes at William Strassman Property, site 204, Tonawanda.

207. CITY OF TONAWANDA LANDFILL (USGS field reconnaissance) NYSDEC 915079

General information and chemical-migration potential.--The City of Tonawanda landfill, in the northern part of the City of Tonawanda, began operation in 1940 and is still active. The site has been used for disposal of industrial and municipal wastes, incinerator ash, and sewage sludge and has also accepted unknown quantities of waste from several chemical and manufacturing firms. Currently the landfill accepts only construction and demolition material and nonputrescible household waste.

Offsite migration of contaminants is indeterminable. The analyses of 10 soil and water samples from along the perimeter of the disposal area showed no significant concentrations of organic compounds; however, the leachate sampled in the wooded wetlands adjacent to the site contained high concentrations of phenol. Additional testing would be needed to confirm offsite migration.

Geologic information.--The disposal area consists of fill and a thin mantle of sandy material overlying a lacustrine clay unit of Holocene age. The unconsolidated material overlies bedrock of Camillus Shale. The U.S. Geological Survey drilled two test borings on the site in 1982; locations are shown in figure B-32. The geologic logs are as follows:

REFERENCE NO. 36

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
02-9007-24	December 19, 1990	1100

DISTRIBUTION:

Consolidated Freightways

BETWEEN:	OF:	PHONE:
Michael Schleicher	Superintendent Consolidated Freightways	(716) 695-3110

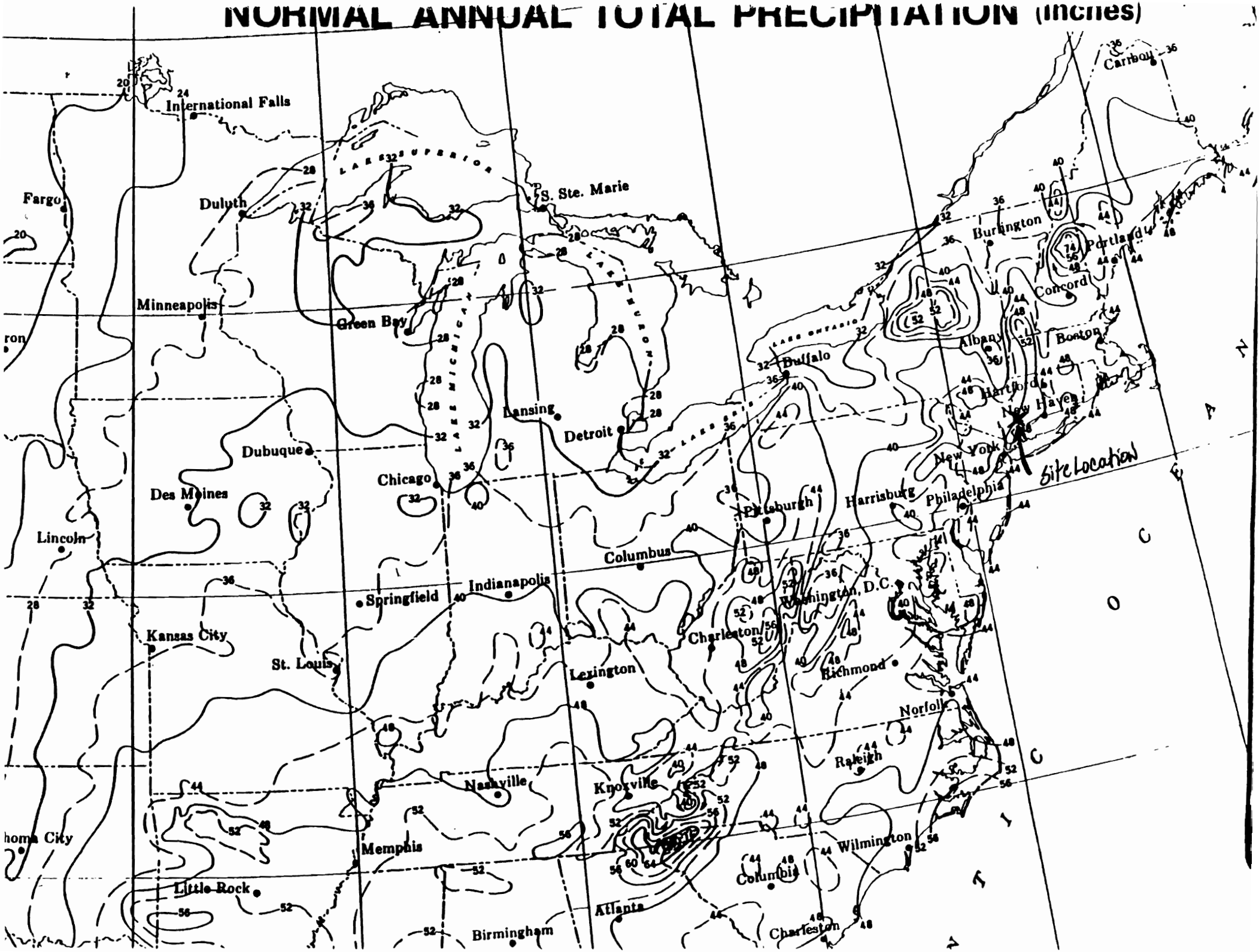
AND: Dave Benfer (NUS)

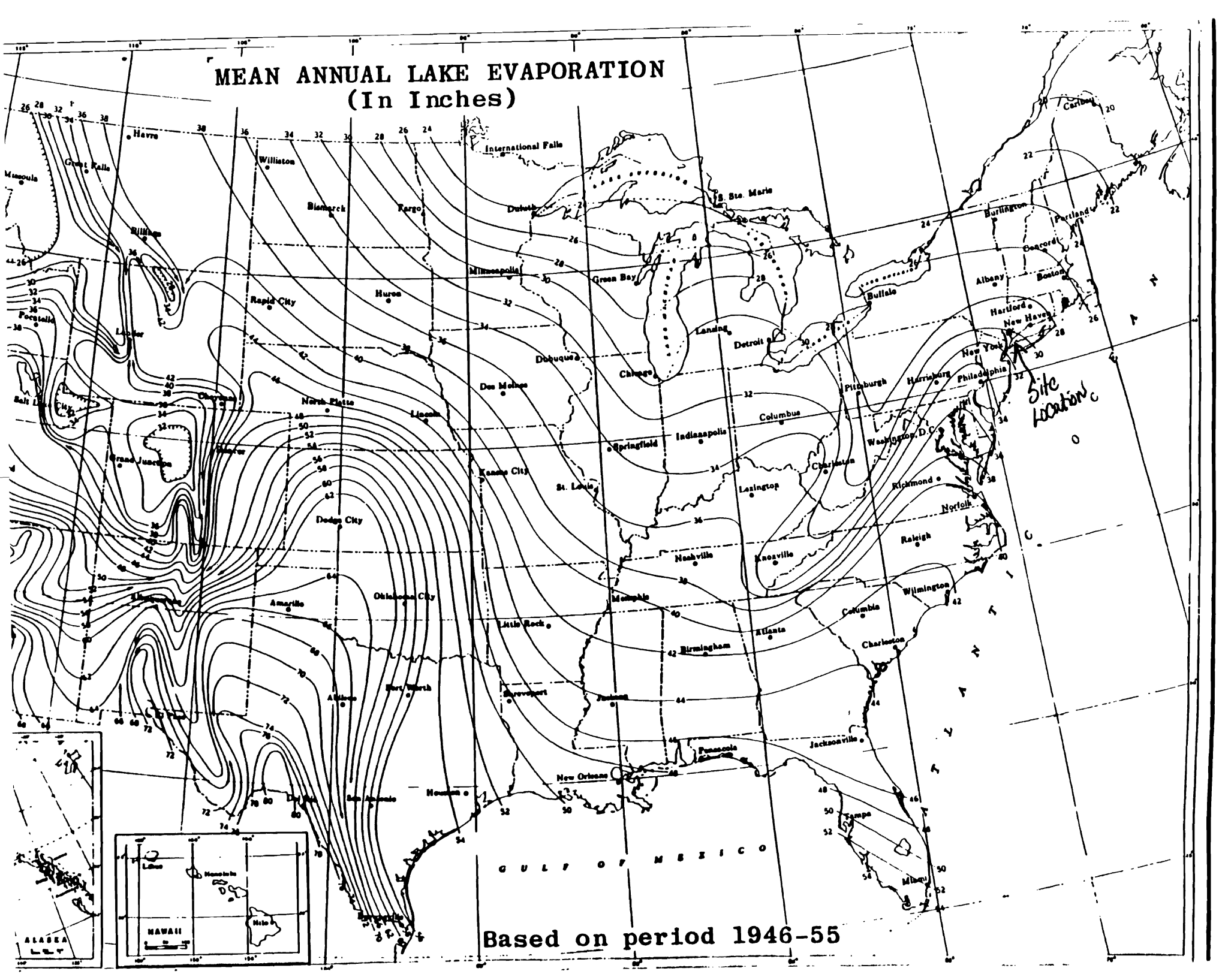
DISCUSSION:

Mr Schleicher verified that the owner of Consolidated Freightways is Consolidated Freightways of Delaware, 175 Linfield Drive, Menlo Park, CA. 94025 Tel Number 415-~~695~~ 1750 326-1700.

ACTION ITEMS:

REFERENCE NO. 37


NORMAL ANNUAL TOTAL PRECIPITATION (inches)
International Falls
Fargo
Duluth
S. Ste. Marie
Minneapolis
Green Bay
Lansing
Detroit
Dubuque
Chicago
Des Moines
Lincoln
Kansas City
St. Louis
Springfield
Indianapolis
Columbus
Pittsburgh
Buffalo
Harrisburg
Philadelphia
New York
Site Location
Hartford
New Haven
Albany
Boston
Concord
Portland
Burlington
Carribou
Charleston
Lexington
Richmond
Norfolk
Raleigh
Wilmington, D.C.
Knoxville
Nashville
Memphis
Little Rock
Atlanta
Birmingham
Columbia
Wilmington
Charleston
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ONTARIO
LAKE ERIE


MEAN ANNUAL LAKE EVAPORATION
(In Inches)
Based on period 1946-55
Site Location
GULF OF MEXICO
ATLANTIC OCEAN
HAWAII
ALASKA
Havre
Great Falls
Williston
Bismarck
Fargo
International Falls
Duluth
Sault Ste. Marie
Minneapolis
Green Bay
Billings
Miles City
Rapid City
Huron
Pocatello
Lander
Dubuque
Chicago
Lansing
Detroit
Buffalo
Burlington
Portland
Concord
Albany
Boston
Hartford
New Haven
New York
Philadelphia
Harrisburg
Pittsburgh
Des Moines
North Platte
Lincoln
Springfield
Indianapolis
Columbus
Washington, D.C.
Richmond
Norfolk
Charleston
Lexington
St. Louis
Kansas City
Grand Junction
Denver
Salt Lake City
Dodge City
Oklahoma City
Amarillo
Nashville
Knoxville
Raleigh
Memphis
Little Rock
Atlanta
Birmingham
Wilmington
Columbia
Charleston
Fort Worth
Abilene
Shreveport
Houston
New Orleans
Pensacola
Jacksonville
Tampa
Miami
San Antonio
Brownsville

REFERENCE NO. 38

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

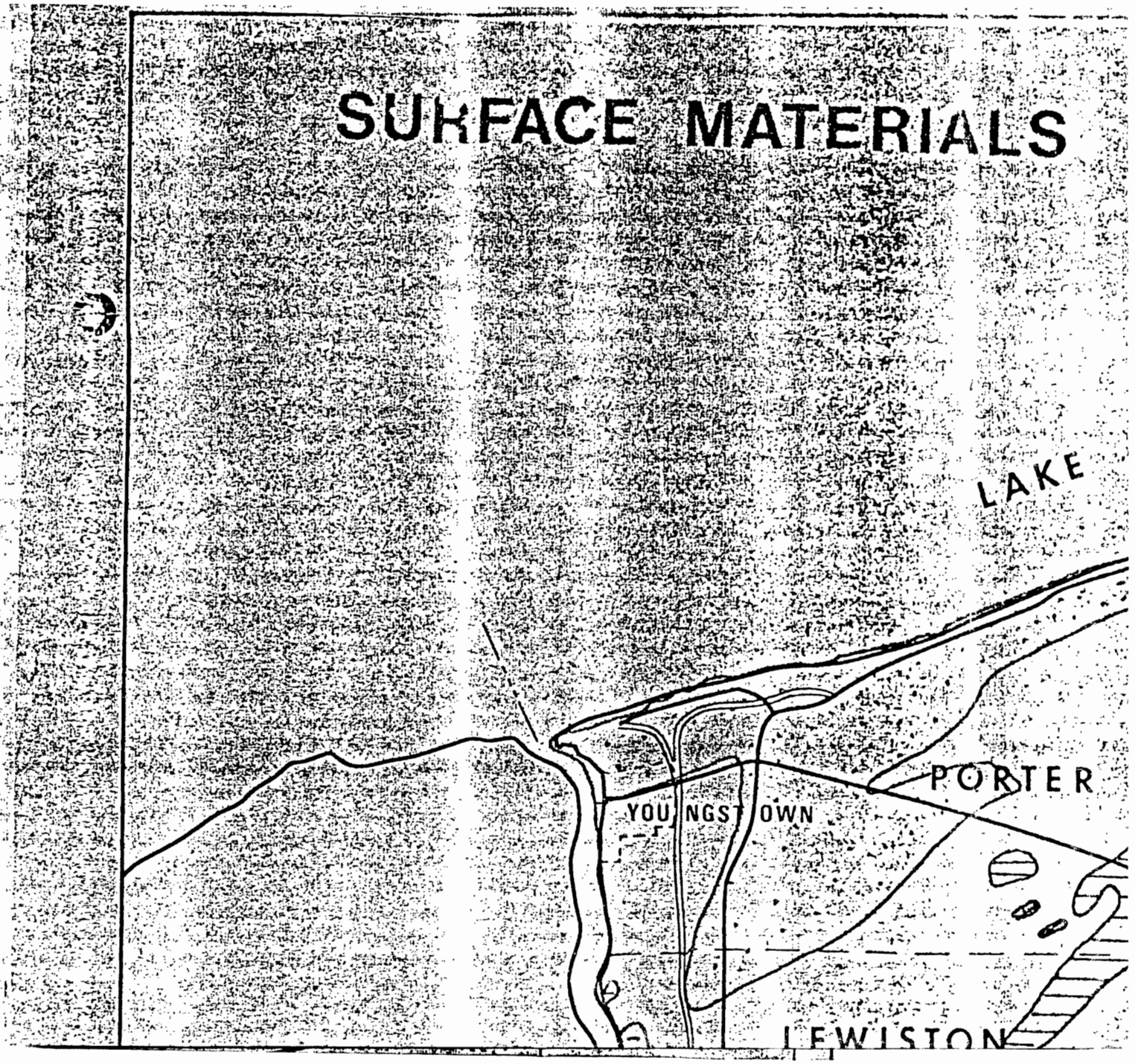
Type of Material	Approximate Range of Hydraulic Conductivity	Assigned Value
Clay, compact till, shale; unfractured metamorphic and igneous rocks	$<10^{-7}$ cm/sec	0
Silt, loess, silty clays, silty loams, clay loams; less permeable limestone, dolomites, and sandstone; moderately permeable till	$10^{-5} - 10^{-7}$ cm/sec	1
Fine sand and silty sand; sandy loams; loamy sands; moderately permeable limestone, dolomites, and sandstone (no karst); moderately fractured igneous and metamorphic rocks, some coarse till	$10^{-3} - 10^{-5}$ cm/sec	2
Gravel, sand; highly fractured igneous and metamorphic rocks; permeable basalt and lavas; karst limestone and dolomite	$>10^{-3}$ cm/sec	3

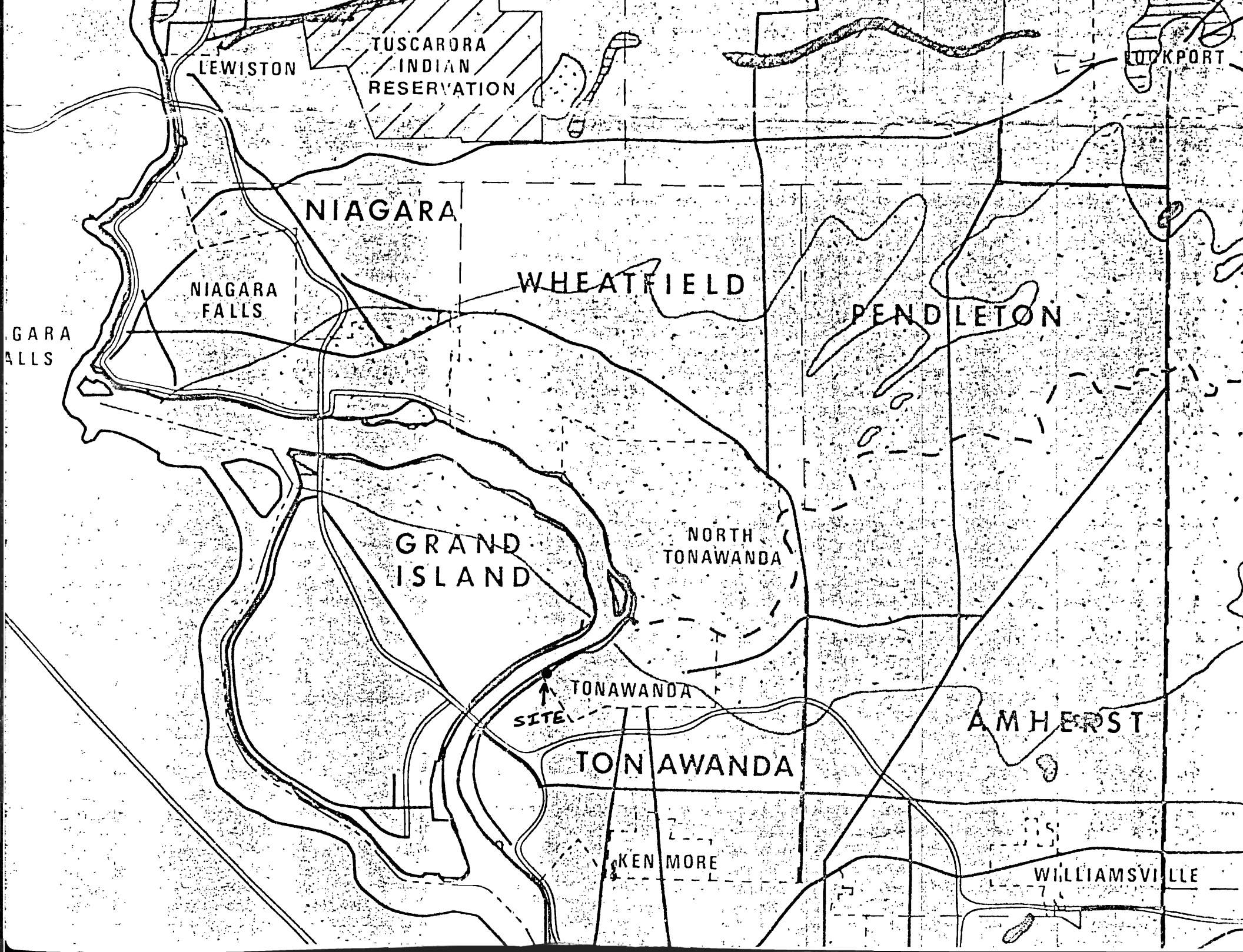
*Derived from:

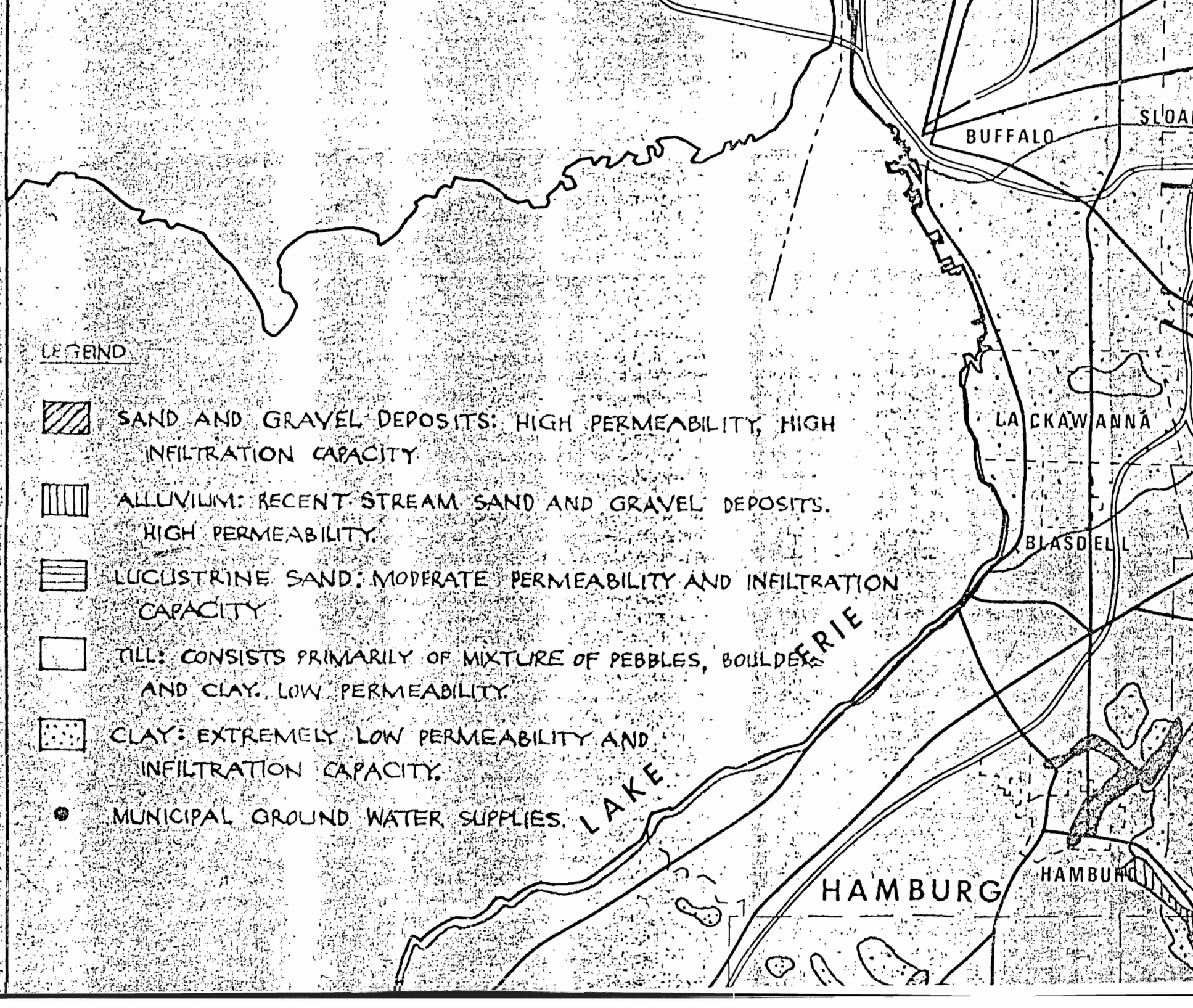
Davis, S. N., Porosity and Permeability of Natural Materials in Flow-Through Porous Media, R.J.M. DeWest ed., Academic Press, New York, 1969

Freeze, R.A. and J.A. Cherry, Groundwater, Prentice-Hall, Inc., New York, 1979

REFERENCE NO. 39


SURFACE MATERIALS
LAKE
PORTER
YOUNGSTOWN
LEWISTON


LEWISTON
TUSCARORA
INDIAN
RESERVATION
LOCKPORT
NIAGARA
NIAGARA
FALLS
WHEATFIELD
PENDLETON
GARA
ALLS
GRAND
ISLAND
NORTH
TONAWANDA
TONAWANDA
SITE
AMHERST
TONAWANDA
KENMORE
WILLIAMSVILLE


BUFFALO
SLOA
LACKAWANNA
BLASDELL
HAMBURG
HAMBURG
LAKE ERIE
LEGEND
SAND AND GRAVEL DEPOSITS: HIGH PERMEABILITY, HIGH INFILTRATION CAPACITY
ALLUVIUM: RECENT STREAM SAND AND GRAVEL DEPOSITS. HIGH PERMEABILITY.
LUCUSTRINE SAND: MODERATE PERMEABILITY AND INFILTRATION CAPACITY
TILL: CONSISTS PRIMARILY OF MIXTURE OF PEBBLES, BOULDERS AND CLAY. LOW PERMEABILITY.
CLAY: EXTREMELY LOW PERMEABILITY AND INFILTRATION CAPACITY.
MUNICIPAL GROUND WATER SUPPLIES.

REFERENCE NO. 40

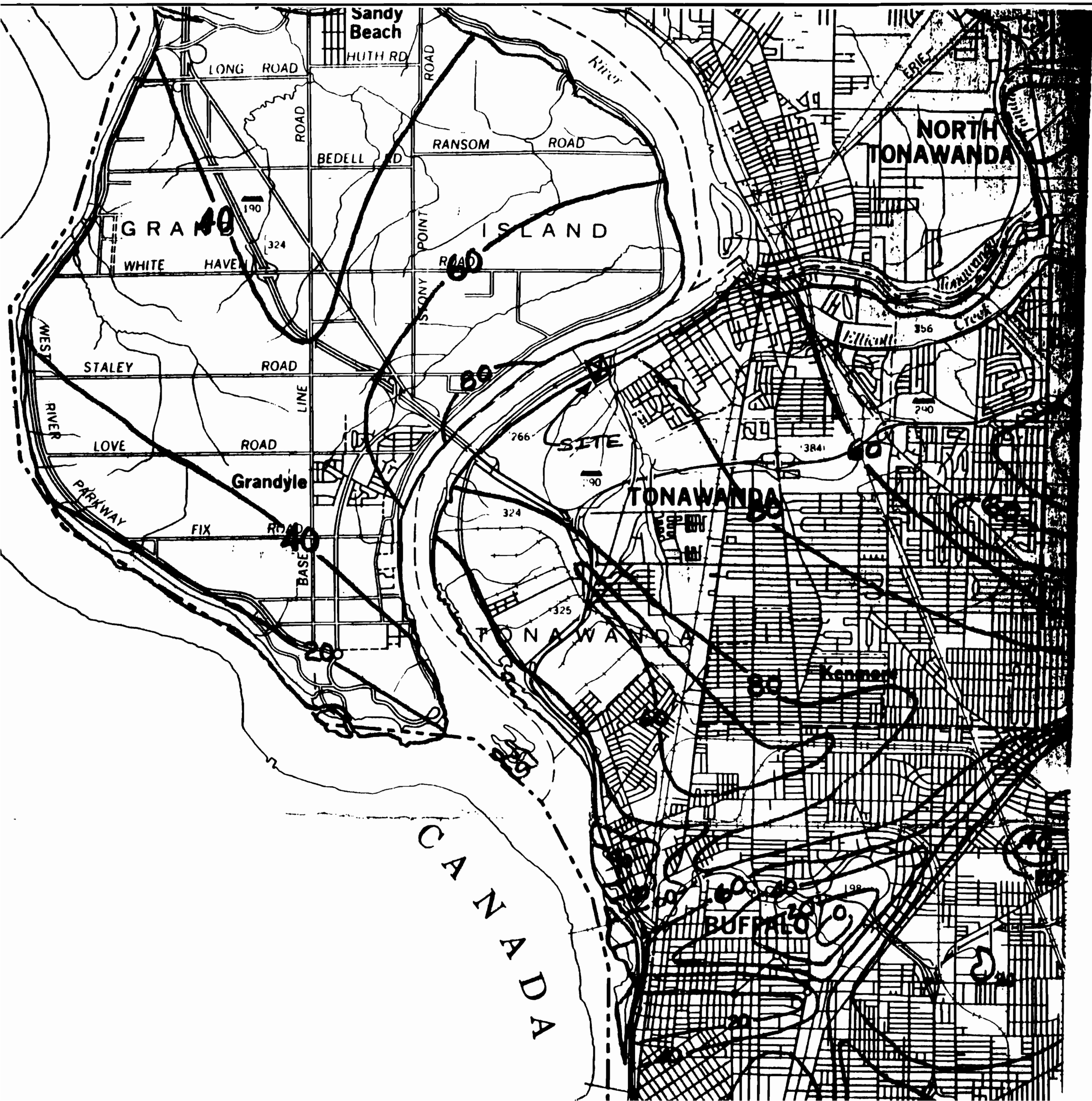
ERIE AND NIAGARA COUNTIES
REGIONAL PLANNING BOARD

DEPTH TO BEDROCK

SCALE: 0 1 2 3 4

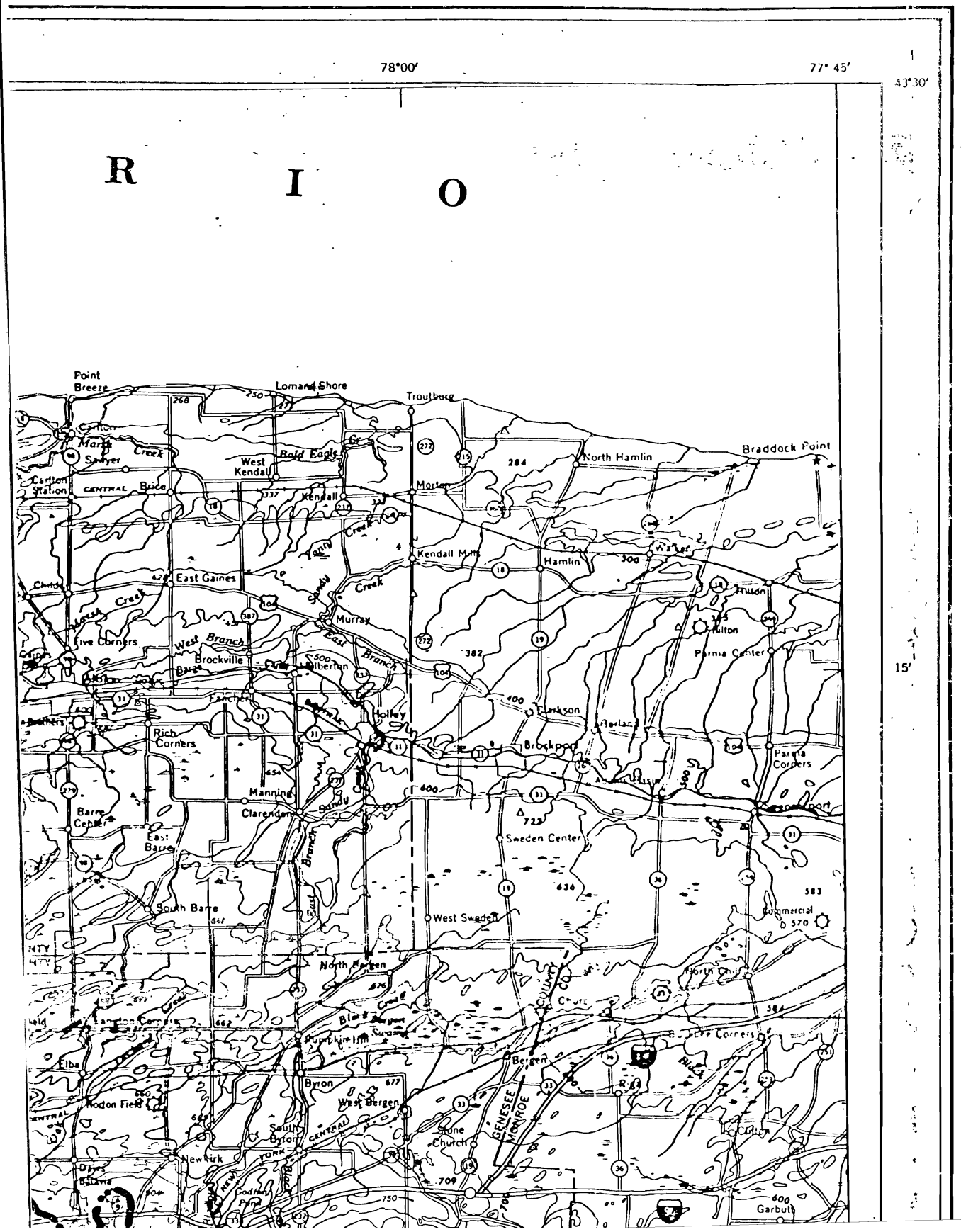
OCTOBER 1967

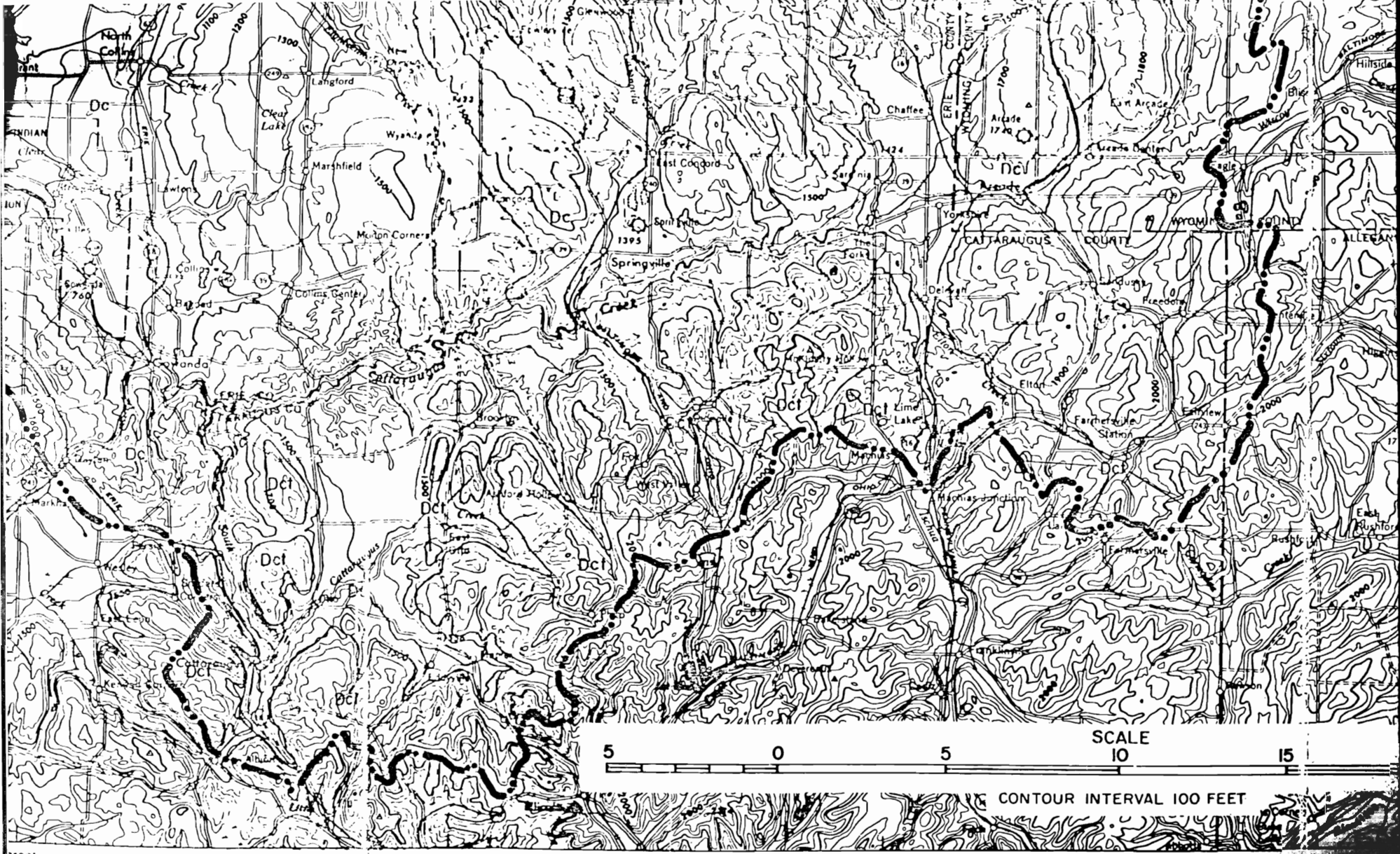
ERIE AND NIAGARA COUNTIES
REGIONAL PLANNING BOA


Sandy Beach
HUTH RD
LONG ROAD
ROAD
RANSOM ROAD
BEDELL RD
River
NORTH TONAWANDA
ERIE
GRAND ISLAND
190
324
WHITE HAVEN
ROAD
STONY POINT ROAD
WEST RIVER PARKWAY
STALEY ROAD
LOVE ROAD
FIX ROAD
BASE LINE
Grandyle
Tonawanda Creek
Ellicott
356
290
266
SITE
384
TONAWANDA
324
325
TONAWANDA
Kenmore
BUFFALO
198
CANADA
20
40
60
80

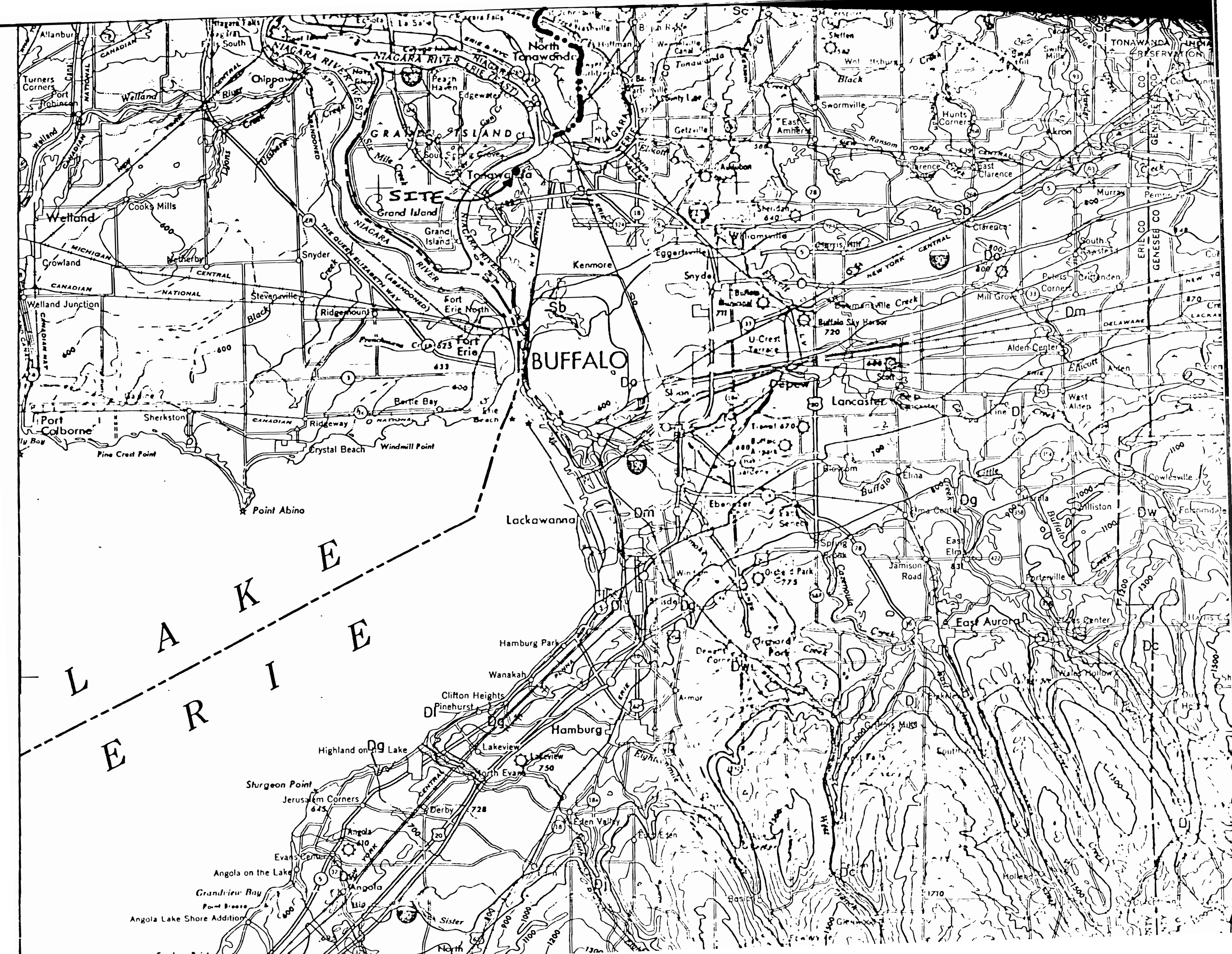
BASIN PLANNING REPORT ENB 3 PLATE 2

Published by NEW YORK STATE WATER RESOURCES COMMISSION
CONSERVATION DEPARTMENT , DIVISION OF WATER RESOURCES





BEDROCK GEOLOGIC MAP OF THE ERIE-NIAGARA BASIN, NEW YORK


SITE
BUFFALO
LAKE ERIE
NIAGARA RIVER
GRAND ISLAND
North Tonawanda
Tonawanda
Grand Island
Kenmore
Lackawanna
Hamburg
Welland
Port Colborne
Fort Erie
Crystal Beach
Point Abino
Sherkston
Ridgeway
Stevensville
Snyder
Chippawa
Cooks Mills
Crowland
Welland Junction
Turners Corners
Port Robinson
Allanburg
Williamsville
Eggertsville
Snyder
Depew
Lancaster
Clarence
Akron
Swormville
Getzville
East Amherst
Sheridan 640
Buffalo Sky Harbor 720
U-Crest Terrace
Alden Center
Alden
West Alden
Mill Grove
Crittenden
Bowmansville
Elma
Elma Center
East Elma
Marilla
Williston
Cowlesville
Jamison Road
Porterville
East Aurora
Orchard Park
Orchard Park 775
Ebenezer
East Seneca
Spring Brook
Blossom
Armor
Wales Hollow
Eden Valley
East Eden
Derby
Lakeview
Lakeview 750
North Evans
Angola
Angola 610
Angola on the Lake
Evans Center
Jerusalem Corners
Sturgeon Point
Highland on the Lake
Clifton Heights
Pinehurst
Wanakah
Hamburg Park
Grandview Bay
Angola Lake Shore Addition
Pine Crest Point
Windmill Point
Bertie Bay
Erie Beach
Ridgemount
Fort Erie North
Netherby
TONAWANDA INDIAN RESERVATION
ERIE CO
GENESEE CO
Sb
Sc
Do
Dm
Dg
Dl
Dc
Dw
Dj

REFERENCE NO. 41

New York State Atlas of Community Water System Sources 1982

NEW YORK STATE
DEPARTMENT OF HEALTH

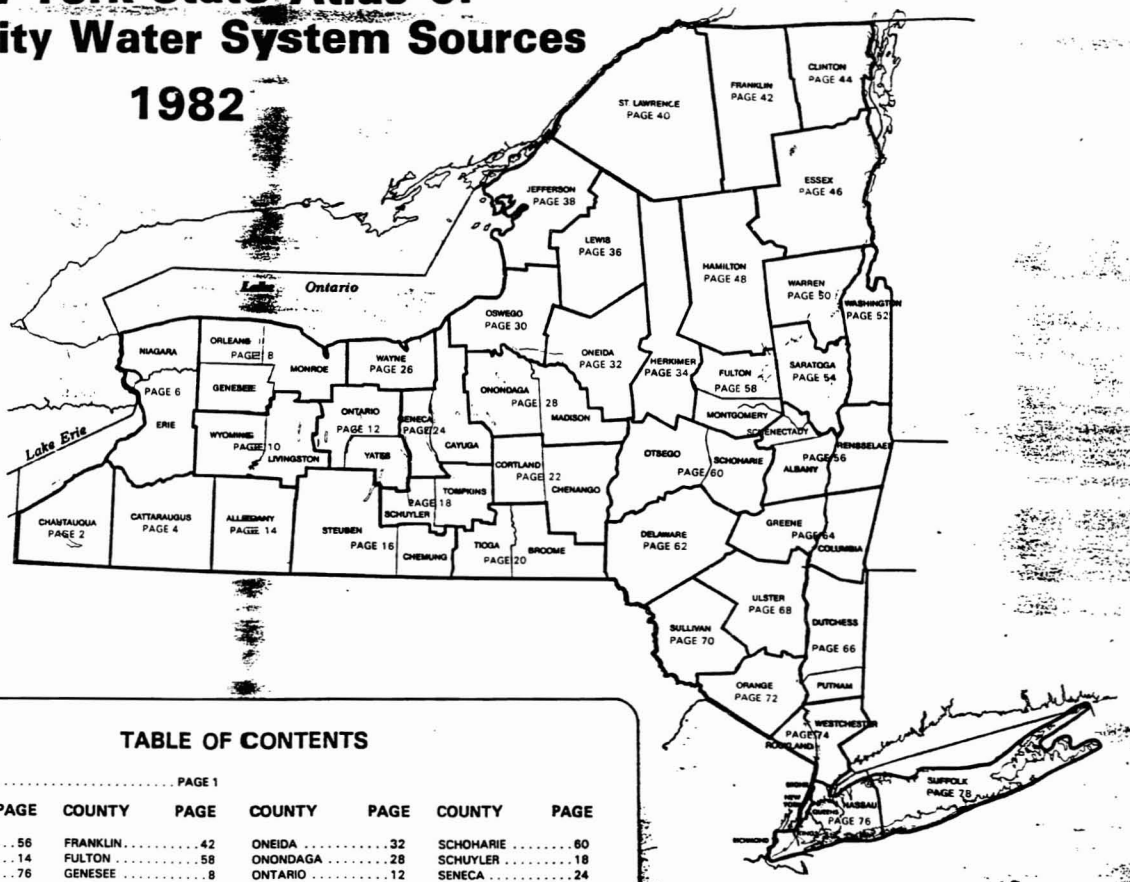


TABLE OF CONTENTS

LEGEND

BOUNDARIES AND PLACES

International
State
County
Town
Indian Reservation
City — Village
Unincorporated Place — Federal Reservation
Built-up Area (Over 25,000 population including any contiguous city or village)

CLASSIFICATION OF POPULATED PLACES

100,000 or more — YONKERS
50,000 to 100,000 — Levittown
12,500 to 50,000 — Poughkeepsie
2,500 to 12,500 — Hampton Bays
250 to 2,500 — Boonville
250 or less — Corbett

TRANSPORTATION

Highways
- Divided Highways — UNDER CONSTRUCTION
  - Full Control of Access
  - Partial or No Control of Access
- Undivided Highway
- Interchange — 23 INTERCHANGE NUMBER — FULL — PARTIAL
- Touring Route (State, U.S., Interstate) or State Parkway
- Touring Route Markers — State; U.S.; Interstate — 17 5 81

Railroads
- Operating Line — Service Discontinued
- Operator — DELAWARE AND HUDSON
- Owner (If Other than Operator) — (PENN CENTRAL)
- Company Having Trackage Rights — (CONRAIL)

Airports (Open to the Public, Military)
- Runway under 4000' — Runway over 4000'

Rest Areas
- Food, Gas, Rest Rooms — Rest Rooms
- Gas, Rest Rooms — Parking Only

RECREATION FACILITIES

State or National Recreation Area
State Campground
State Boat Launching Site
State Canal Park
State Fish Hatchery
Other State Recreation Site

FOREWARD

SOURCE LOCATIONS

The county maps in this atlas show the locations of surface water intakes and groundwater sources for community water systems in New York State. A community water system is defined in Part 5 of the New York State Sanitary Code as a public water system which serves at least five service connections used by year round residents or regularly serves at least 25 year round residents. Many different types of water systems are therefore included. Community water systems which purchase 100 percent of their water and have no sources of their own are not shown.

Each county map is accompanied by a list of the county's community water systems, population served, and source names. Systems are separated into MUNICIPAL COMMUNITY (program code 100) and NON-MUNICIPAL COMMUNITY (all other program codes) and listed alphabetically within each. MUNICIPAL COMMUNITY water systems are operated by a city, town, village, county or water authority or the water system may be a water district or privately owned. NON-MUNICIPAL COMMUNITY systems are primarily mobile home parks but also include apartments/condominiums, resident health care facilities, resident institutions, and federal facilities.

EXPLANATION OF SYMBOLS

Suface water intakes are designated on the county maps by a triangle (▲) accompanied by the corresponding water supply number.

Groundwater sources are designated by a dot (•) followed by the supply number. Multiple wells separated by less than 1000' and supplying the same water system are shown with one dot. Springs and infiltration galleries are shown as groundwater sources unless the local health unit has designated it a surface source. Therefore, springs and infiltration galleries are listed as wells (springs) or wells (infiltration galleries).

If a Community Water System has source(s) located outside the county, these sources are shown in the county list and show in parentheses the system number, county and page number. Conversely, when a county contains source(s) which supply community water systems located outside the county, the name of the system is also shown in that county's list of sources.

ACKNOWLEDGEMENT

Data compiled in this Atlas is based on location of community water system sources from visits, in 1979, to every county health unit in the State by technicians working for the Bureau of Public Water Supply Protection. This data was updated in 1982 through use of the Department of Health's SAFWATER computer inventory and through limited field review. The Bureau of Public Water Supply Protection wishes to acknowledge the following organizations who have made the Atlas possible:

To the United States Environmental Protection Agency for funding this Atlas as a part of the Underground Injection Control Program.

To the Cartography Section of the New York State Department of Transportation for providing the talent, time and effort in performing the necessary cartographic work to produce this Atlas.

To the engineers and technicians of the Bureau of Public Water Supply Protection of the New York State Department of Health for the painstaking work of gathering the basic data and cross-checking it, and for leading this project through to completion.

ERIE COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
	Akron Village (See No 1 Wyoming Co, Page 10)	3640	
1	Alden Village	3460	Wells
2	Angola Village	8500	Lake Erie
3	Buffalo City Division of Water	357870	Lake Erie
4	Caffee Water Company	210	Wells
5	Collins Water District #3	704	Wells
6	Collins Water Districts #1 and #2	1384	Wells
7	Erie County Water Authority (Sturgeon Point Intake)	375000	Lake Erie
8	Erie County Water Authority (Van DeWater Intake)	NA	Niagara River - East Branch
9	Grand Island Water District #2	9390	Niagara River
10	Holland Water District	1670	Wells
11	Lawtons Water Company	138	Wells
* 12	Lockport City (Niagara Co)		Niagara River - East Branch
13	Niagara County Water District (Niagara Co)		Niagara River - West Branch
14	Niagara Falls City (Niagara Co)		Niagara River - West Branch
15	North Collins Village	1500	Wells
* 16	North Tonawanda City (Niagara Co)		Niagara River - West Branch
17	Orchard Park Village	3671	Pipe Creek Reservoir
18	Springville Village	4169	Wells
* 19	Tonawanda City	18538	Niagara River - East Branch
20	Tonawanda Water District #1	91269	Niagara River
21	Wanakah Water Company	10750	Lake Erie
	Non-Municipal Community		
22	Aurora Mobile Park	125	Wells
23	Bush Gardens Mobile Home Park	270	Wells
24	Circle B Trailer Court	50	Wells
25	Circle Court Mobile Park	125	Wells
26	Creekside Mobile Home Park	120	Wells
27	Donnelly's Mobile Home Court	99	Wells
28	Gowanda State Hospital	NA	Clear Lake
29	Hillside Estates	160	Wells
30	Hunters Creek Mobile Home Park	150	Wells
31	Knox Apartments	NA	Wells
32	Maple Grove Trailer Court	72	Wells
33	Milligrove Mobile Park	100	Wells
34	Perkins Trailer Park	75	Wells
35	Quarry Hill Estates	400	Wells
36	Springville Mobile Park	114	Wells
37	Springwood Mobile Village	132	Wells
38	Taylors Grove Trailer Park	39	Wells
39	Valley View Mobile Court	42	Wells
40	Villager Apartments	NA	Wells

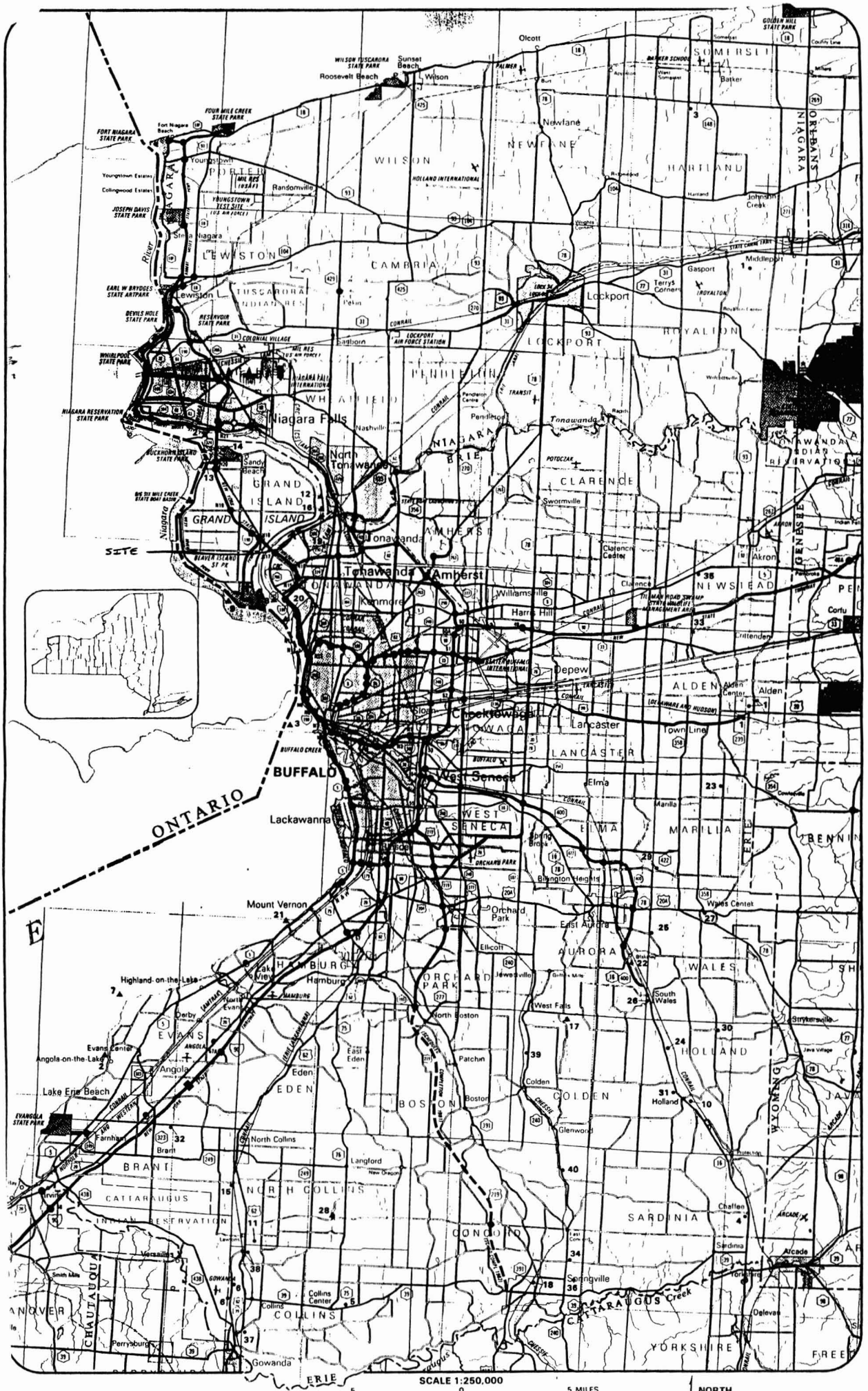
NIAGARA COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
	Lockport City (See No 12, Erie Co)	25000	
1	Middleport Village	2000	Wells (Springs)
	Niagara County Water District (See No 13, Erie Co)	48	
2	Niagara Falls City (See also No 14 Erie Co)	77384	Niagara River - East Branch
	North Tonawanda City (See No 16 Erie Co)	36000	
	Non-Municipal Community		
3	Country Estates Mobile Village	28	Wells

LOCATION OF COMMUNITY WATER SYSTEM SOURCES-1982

ERIE and NIAGARA COUNTIES

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION



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PA Scoresheets

PRELIMINARY ASSESSMENT

DRAFT NOV 06 1990

CERCLIS IDENTIFICATION NUMBER	
STATE: NY	SITE NUMBER: NYD074023979

SITE LOCATION

SITE NAME: Legal, common or descriptive name of site
Consolidated Freightways

STREET ADDRESS, ROUTE or SPECIFIC LOCATION IDENTIFIER
877 Niagara Street

CITY	STATE	ZIP CODE	TELEPHONE
Tonawanda	NY	14150	(716) 695-3110

COORDINATES: LATITUDE and LONGITUDE
LAT: 43° 00' 26" LONG: 78° 54' 36"

TOWNSHIP, RANGE, and SECTION
Block-1, Lot-1, Section 52.06

OWNER/OPERATOR IDENTIFICATION

OWNER	OWNER ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE
Consolidated Freightways of Delaware	175 Linfield Drive	Menlo Park	CA	94025	( )

OPERATOR	OPERATOR ADDRESS	CITY	STATE	ZIP CODE	TELEPHONE
Consolidated Freightways	877 Niagara Street	Tonawanda	NY	14150	(716) 695-3110

TYPE OF OWNERSHIP

- [X] PRIVATE
- [ ] FEDERAL: Agency name _____
- [ ] STATE
- [ ] COUNTY
- [ ] MUNICIPAL
- [ ] OTHER: _____
- [ ] NOT SPECIFIED

OWNER/OPERATOR NOTIFICATION ON FILE

- [X] NONE
- [ ] CERCLA 103 C, UNCONTROLLED WASTE SITE DATE: _____
- [ ] RCRA 3001 DATE: _____

SITE STATUS	YEARS OF OPERATION	APPROXIMATE SIZE OF SITE
[X] ACTIVE [ ] INACTIVE [ ] UNKNOWN	BEGINNING YEAR: 1970 ENDING YEAR: Present ~~[ ] UNKNOWN~~ Landfill Acquired 1966-1970	25 Acres 3 Acre Landfilled Area

SITE EVALUATION

AGENCY / ORGANIZATION
INVESTIGATOR
CONTACT
ADDRESS
TELEPHONE ( )
DATE

DRAFT

NOV 0 6 1990

Source Descriptions: Identify and describe all sources (for example, surface impoundments, landfills, underground tanks, drums, piles, areas of contaminated soil, etc.) at the site. Provide source dimensions and the best available waste quantity information. Indicate if there are any containment structures present (are the sources poorly contained?).

SOURCE TYPE DEFINITIONS

Landfill: a man-made (by excavation or construction) or natural hole in the ground into which wastes have come to be disposed by backfilling, or by contemporaneous soil deposition with waste disposal.

Surface Impoundment: a natural topographic depression, man-made excavation, or diked area, primarily formed from earthen materials (lined or unlined) which was designed to hold an accumulation of liquid wastes, wastes containing free liquids, or sludges that were not backfilled or otherwise covered; depression may be wet with exposed liquid, or dry if deposited liquid has evaporated, volatilized or leached; structures that may be more specifically described as lagoon pond, aeration pit, settling pond, tailings pond, sludge pit, etc. A surface impoundment that has been covered with soil after the final deposition of waste materials (i.e., buried or backfilled) is also considered a surface impoundment.

Drums: a portable container, designed to hold a standard 55-gallon volume of wastes.

Tanks and Non-Drum Containers: any device other than drums, designed to contain an accumulation of waste, that provides structural support and is constructed primarily of fabricated materials (such as wood, concrete, steel, or plastic); any portable or mobile device in which waste is stored or otherwise handled.

Contaminated Soil: an area or volume of soil onto which hazardous substances are suspected to have been spilled, spread, disposed, or deposited.

Pile: any non-containerized accumulation above the ground surface of solid, non-flowing wastes; includes open dumps. Some types of waste piles are: Chemical Waste Pile: a pile consisting primarily of discarded chemical products, by-products, radioactive wastes, or used or unused feedstocks; Scrap Metal or Junk Pile: a pile consisting primarily of scrap metal or discarded durable goods such as appliances, automobiles, auto parts, batteries, etc., composed of materials suspected to contain or have contained hazardous substances; Tailings Pile: a pile consisting primarily of any combination of overburden from a mining operation and tailings from a mineral mining, beneficiation, or processing operation; and Trash Pile: a pile consisting primarily of paper, garbage, or discarded non-durable goods which are suspected to contain or have contained hazardous substances.

Land Treatment: landfarming or other land treatment method of waste management in which liquid wastes or sludges are spread over land and tilled, or liquids are injected at shallow depths into soils.

Waste Characteristics: Evaluate hazardous waste quantity for all sources at the site to determine the Waste Characteristics factor category score (WC).

Use PA Table 1a (page 5) to determine the WC score for sites with only one source. If more than one source is present, you will need to calculate an intermediate waste quantity value (WQ) for each source using a divisor, then sum the WQ values to determine the total WQ for the site (see instructions opposite Table 1, page 5). Use PA Table 1b (page 5) to determine the WC score.

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Site Name: Consolidated Freightways
Date:

GENERAL INFORMATION (continued)

Source Descriptions:

- 3-acre landfill
- Drums

Waste Characteristics (WC) Calculations:
(See PA Table 1, page 5)

Landfill

3 acres × $\frac{1}{.078}$ ≈ 38.5

Drums

3 drums × $\frac{1}{10}$ = 0.3

Total: 38.8

WC = 18

Determining the Waste Characteristics (WC) Score: WC, based on waste quantity, may be determined by one or all of four measures called "tiers": constituent quantity, wastestream quantity, source volume, and source area. PA Table 1a (page 5) is structured according to these tiers. The amount and level of detail of information available to you determine which tier(s) you can use for each source. For each source, evaluate waste quantity for as many of the tiers as you have information to support, and select the result that gives you the highest WC score. For any one source or for all sources at a site, if no information is available regarding waste quantity, assign a WC score of 18 (minimum).

PA Table 1a has 6 columns: column 1 indicates the quantity tier; column 2 lists source types for the four tiers; columns 3, 4, and 5 provide ranges of waste amount for sites with only one source, which correspond to WC scores at the tops of the columns (18, 32, or 100); column 6 provides formulas to obtain source waste quantity (WQ) values at sites with multiple sources.

To determine WC for sites with only one source:

1. *Identify source type (see definitions).*
2. *Examine all waste quantity data available.*
3. *Estimate the mass and/or dimensions of each source.*
4. *Determine which quantity tiers you can use based on available source information.*
5. *Convert source measurements to appropriate units for each tier you can evaluate for the source.*
6. *Identify the range into which the total quantity falls for each tier evaluated (PA Table 1a).*
7. *Determine the highest WC score obtained for any tier (18, 32, or 100, at top of PA Table 1a columns 3, 4, and 5, respectively).*
8. *Use this WC score for all pathways.* •

To determine WC for sites with multiple sources:

1. *Identify each source type (see definitions).*
2. *Examine all waste quantity data available for each source.*
3. *Estimate the mass and/or dimensions of each source.*
4. *Determine which quantity tiers you can use for each source based on the available information.*
5. *Convert the measurements to the appropriate units for each tier you can evaluate for each source.*
6. *For each source, use the formulas in column 6 of PA Table 1a to determine the WQ value for each tier that can be evaluated. The highest WQ value obtained for any tier is the WQ value for the source.*
7. *Sum the WQ values for all sources to get the site WQ total.*
8. *Use the site WQ total from step 7 to assign the WC score from PA Table 1b.*
9. *Use this WC score for all pathways.* •

• The WC score is considered in all four pathways. However, if there are primary targets for ground water, surface water, or air migration pathways, assign the determined WC or a score of 32, whichever is greater, as the WC score for that pathway.

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Site Name: Consolidated Freightways 5
Date:

PA TABLE 1: WASTE CHARACTERISTICS (WC) SCORES

PA Table 1a: WC Scores for Single Source Sites and Formulas for Multiple Source Sites

TIER	SOURCE TYPE	SINGLE SOURCE SITES (assigned WC scores)			MULTIPLE SOURCE SITES
		WC = 18	*WC = 32*	*WC = 100*	Formula for Assigning Source WQ Values
CONSTITUENT	N/A	≤100 lbs	>100 to 10,000 lbs	>10,000 lbs	*lbs ÷ 1*
WASTESTREAM	N/A	≤500,000 lbs	>500,000 to 50 million lbs	>50 million lbs	*lbs ÷ 5,000*
VOLUME	Landfill	≤6.75 million ft³ ≤250,000 yd³	>6.75 million ft³ to 675 million ft³ >250,000 to 25 million yd³	>675 million ft³ >25 million yd³	*ft³ ÷ 67,500* *yd³ ÷ 2,500*
	Surface impoundment	≤6,750 ft³ ≤250 yd³	>6,750 ft³ to 675,000 ft³ >250 to 25,000 yd³	>675,000 ft³ >25,000 yd³	*ft³ ÷ 67.5* *yd³ ÷ 2.5*
	Drums	≤1,000 drums	>1,000 to 100,000 drums	>100,000 drums	*drums ÷ 10*
	Tanks and non-drum containers	≤50,000 gallons	>50,000 to 5 million gallons	>5 million gallons	*gallons ÷ 500*
	Contaminated soil	≤6.75 million ft³ ≤250,000 yd³	>6.75 million ft³ to 675 million ft³ >250,000 to 25 million yd³	>675 million ft³ >25 million yd³	*ft³ ÷ 67,500* *yd³ ÷ 2,500*
	Pile	≤6,750 ft³ ≤250 yd³	>6,750 ft³ to 675,000 ft³ >250 to 25,000 yd³	>675,000 ft³ >25,000 yd³	*ft³ ÷ 67.5* *yd³ ÷ 2.5*
AREA	Landfill	≤340,000 ft² ≤7.8 acres	>340,000 to 34 million ft² >7.8 to 780 acres	>34 million ft² >780 acres	*ft² ÷ 3,400* *acres ÷ 0.078*
	Surface impoundment	≤1,300 ft² ≤0.029 acres	>1,300 to 130,000 ft² >0.029 to 2.9 acres	>130,000 ft² >2.9 acres	*ft² ÷ 13* *acres ÷ 0.00029*
	Contaminated soil	≤3.4 million ft² ≤78 acres	>3.4 million to 340 million ft² >78 to 7,800 acres	>340 million ft² >7,800 acres	*ft² ÷ 34,000* *acres ÷ 0.78*
	Pile*	≤1,300 ft² ≤0.029 acres	>1,300 to 130,000 ft² >0.029 to 2.9 acres	>130,000 ft² >2.9 acres	*ft² ÷ 13* *acres ÷ 0.00029*
	Land treatment	≤27,000 ft² ≤0.62 acres	>27,000 to 2.7 million ft² >0.62 to 62 acres	>2.7 million ft² >62 acres	*ft² ÷ 270* *acres ÷ 0.0062*

1 ton = 2,000 lbs = 1 yd³ = 4 drums = 200 gallons

* Use area of land surface under pile, not surface area of pile.

PA Table 1b: WC Scores for Multiple Source Sites

WQ Total	*WC Score*
>0 to 100	18
>100 to 10,000	32
>10,000	100

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GROUND WATER PATHWAY CRITERIA LIST

7

Site Name: Consolidated Freightways
Date:

This chart provides guidelines to assist you in hypothesizing the presence of a suspected release and identifying primary targets. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize a suspected release or to identify primary targets. This chart will record your professional judgment in evaluating these factors.

The "Suspected Release" section of the chart guides you through evaluation of some site, source, and pathway conditions to help hypothesize whether a release from the site is likely. If a release is suspected, use the "Primary Targets" section to guide you through evaluation of some conditions that will help identify targets likely to be exposed to hazardous substances. You may use this section of the chart more than once, depending on the number of targets you feel may be considered "primary." In the "Primary Targets" section on this sheet, record the responses for the well that you feel has the highest probability of being exposed to hazardous substances.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question. If you check the "Suspected Release" box as "yes", make sure that you assign a Likelihood of Release value of 550 for the pathway.

GROUND WATER PATHWAY

SUSPECTED RELEASE				PRIMARY TARGETS			
Yes	No	Unknown		Yes	No	Unknown	
☒	☐	☐	Are sources poorly contained?	☐	☐	☐	Is any drinking-water well nearby?
☐	☒	☐	Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)?	☐	☐	☐	Is any nearby drinking-water well closed?
☐	☒	☐	Is waste quantity particularly large?	☐	☐	☐	Has foul-tasting or foul-smelling water been reported by any nearby drinking-water users?
☐	☒	☐	Is precipitation heavy and infiltration rate high?	☐	☐	☐	Do any nearby wells have a large drawdown or high production rate?
☐	☒	☐	Is the site located in an area of karst terrain?	☐	☐	☐	Are drinking-water wells located between the site and other wells that are suspected to be exposed to hazardous substances?
☐	☒	☐	Is the subsurface highly permeable or conductive?	☐	☐	☐	Does any circumstantial evidence of ground water or drinking water contamination exist?
☐	☒	☐	Is drinking water drawn from a shallow aquifer?	☐	☐	☐	Does any drinking-water well warrant sampling?
☐	☒	☐	Are suspected contaminants highly mobile in ground water?	☐	☐		Other criteria? _____
☐	☒	☐	Does any circumstantial evidence of ground water or drinking water contamination exist?	☐	☐		**PRIMARY TARGET(S) IDENTIFIED?**
☐	☐		Other criteria? _____				
☐	☒		**SUSPECTED RELEASE?**				

Summarize the rationale for suspected release (attach an additional page if necessary):

N/A

Summarize the rationale for Primary Targets (attach an additional page if necessary):

N/A

GROUND WATER PATHWAY

Pathway Characteristics

Answer the questions at the top of the page. Refer to the Ground Water Pathway Criteria List (page 7) to hypothesize whether you suspect that hazardous substances associated with the site have been released to ground water (GW). Record the depth to the aquifer (in feet): the difference between the deepest depth of waste deposited and the shallowest depth of the top of the aquifer at or as near as possible to the site. Note whether the site is in karst terrain (characterized by abrupt ridges, sink holes, caverns, springs, disappearing streams). State the distance (in feet) from any source to the nearest well used for drinking water.

Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Ground Water Pathway Criteria List (page 7). Remember to use only Column A for this pathway if you score a suspected release to ground water, and do not evaluate factor 2.

2. **No Suspected Release:** If you do not suspect a release, determine the GW LR score based on depth to aquifer or whether the site is in an area of karst terrain. If you do not suspect a release to ground water, remember to use only Column B to score this pathway.

Targets (T)

Evaluates the threat to populations who obtain their drinking water from GW supplies. To apportion populations served by blended drinking-water supply systems, determine the percentage of population served by each well within the 4-mile target distance limit based on its production.

3. **Primary Target Population:** Populations served by any drinking-water wells that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Ground Water Pathway Criteria List (page 7) to make this determination. In the space provided, enter the population served by any wells you suspect have been exposed to hazardous substances from the site. If only the number of residences is known, use the average county residents per household (rounded to the next integer) to determine population served. Multiply the population by 10 to determine the Primary Target Population score. Note that if you do not suspect a release, there is no Primary Target Population.

4. **Secondary Target Population:** Populations served by any drinking-water wells within four miles of the site that you do not suspect have been exposed to hazardous substances should be evaluated on PA Table 2a or 2b (used for wells drawing from karst aquifers) (page 9). Circle the assigned value for the population in each distance ring and enter it in the column on the far right side of the table. Sum the far right column and enter the total as the Secondary Target Population factor score.

5. **Nearest Well** represents the threat posed to the well that is most likely to be exposed to hazardous substances. If you have identified a Primary Target Population, enter 50. Otherwise, obtain the Nearest Well value from PA Table 2a or 2b for the closest distance category with a drinking-water well population.

6. **Wellhead Protection Area (WHPA):** WHPAs are special areas designated by States for protection under Section 1428 of the Safe Drinking Water Act. Local/State and EPA Regional water officials can provide information regarding the location of WHPAs.

7. **Resources:** Score automatically assigned. Do not override; do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release). Note that if there are no drinking-water wells within the target distance limit, the total targets score for either Column A or Column B will be 5 (automatically assigned for resources).

Waste Characteristics (WC)

8. **Waste Characteristics** score is assigned from page 4. However, if any Primary Target has been identified for GW, assign the higher of the score calculated on page 4 or a score of 32.

Ground Water Pathway Score: Multiply the scores for LR, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

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Site Name: Consolidated Freightways 8

Date:

GROUND WATER PATHWAY SCORESHEET

Pathway Characteristics		
Do you suspect a release (see Ground Water Pathway Criteria List, page 7)?	Yes ___	No X
Is the site located in karst terrain?	Yes ___	No X
Depth to aquifer:	<70 ft	
Distance to the nearest drinking-water well:	N/A ft	

LIKELIHOOD OF RELEASE	A Suspected Release	B No Suspected Release	References
1. SUSPECTED RELEASE: If you suspect a release to ground water (see page 7), assign a score of 550, and use only column A for this pathway.	(550)		
2. NO SUSPECTED RELEASE: If you do not suspect a release to ground water, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340. Use only column B for this pathway.		(500 or 340) 500	6
LR =		500	

TARGETS			
3. PRIMARY TARGET POPULATION: Determine the number of people served by drinking water from wells that you suspect have been exposed to hazardous substances from the site (see Ground Water Pathway Criteria List, page 7). ___ people x 10 =			
4. SECONDARY TARGET POPULATION: Determine the number of people served by drinking water from wells that you do NOT suspect have been exposed to hazardous substances from the site, and assign the total population score from PA Table 2. Are any wells part of a blended system? Yes ___ No ___ If yes, attach a page to show apportionment calculations.		0	4
5. NEAREST WELL: If you have identified any Primary Targets for ground water, assign a score of 50; otherwise, assign the highest Nearest Well score from PA Table 2. If no drinking-water wells exist within 4 miles, assign a score of zero.	(50, 20, 18, 8, 6, 3, 2, or 0)	(20, 18, 8, 6, 3, 2, or 0) 0	4
6. WELLHEAD PROTECTION AREA (WHPA): Assign a score of 20 if any portion of a designated WHPA is within ¼ mile of the site; assign 5 if from ¼ to 4 miles.	(20, 5, or 0)	(20, 5, or 0) 0	4
7. RESOURCES: A score of 5 is assigned.	(5) 5	(5) 5	
T =		5	

WASTE CHARACTERISTICS			
8. A. If you have identified any Primary Targets for ground water, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.	(100 or 32)		
B. If you have NOT identified any Primary Targets for ground water, assign the waste characteristics score calculated on page 4.	(100, 32, or 18)	(100, 32, or 18) 18	
WC =		18	

GROUND WATER PATHWAY SCORE: $\frac{LR \times T \times WC}{82,500}$ (subject to a maximum of 100) = 0.55

Site Name: Consolidated Freightways
Date:

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PA TABLE 2: VALUES FOR SECONDARY GROUND WATER TARGET POPULATIONS

PA Table 2a: Non-Karst Aquifers

Distance from Site	Population	Nearest Well (choose highest)	Population Served by Wells Within Distance Category: 1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	Population Value
0 to ¼ mile	0	20	1	2	5	16	52	163	521	1,633	5,214	16,325	
> ¼ to ½ mile	0	18	1	1	3	10	32	101	323	1,012	3,233	10,121	
> ½ to 1 mile	0	9	1	1	2	5	17	52	167	522	1,668	5,224	
> 1 to 2 miles	0	5	1	1	1	3	9	29	94	294	939	2,938	
> 2 to 3 miles	0	3	1	1	1	2	7	21	68	212	678	2,122	
> 3 to 4 miles	0	2	1	1	1	1	4	13	42	131	417	1,306	
Nearest Well =		0										Score =	0

PA Table 2b: Karst Aquifers

Distance from Site	Population	Nearest Well (use 20 for karst)	Population Served by Wells Within Distance Category: 1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	Population Value
0 to ¼ mile		20	1	2	5	16	52	163	521	1,633	5,214	16,325	
> ¼ to ½ mile		20	1	1	3	10	32	101	323	1,012	3,233	10,121	
> ½ to 1 mile		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 1 to 2 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 2 to 3 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 3 to 4 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
Nearest Well =												Score =	

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SURFACE WATER PATHWAY CRITERIA LIST

11

Site Name: Consolidated Freightways

Date:

This chart provides guidelines to assist you in hypothesizing the presence of a suspected release and identifying primary targets. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize a suspected release or to identify primary targets. This chart will record your professional judgment in evaluating these factors.

The "Suspected Release" section of the chart guides you through evaluation of some site, source, and pathway conditions to help hypothesize whether a release from the site is likely. If a release is suspected, use the "Primary Targets" section to guide you through evaluation of some conditions that will help identify targets likely to be exposed to hazardous substances. You may use this section of the chart more than once, depending on the number of targets you feel may be considered "primary." In the "Primary Targets" section on this sheet, record the responses for the target that you feel has the highest probability of being exposed to hazardous substances.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question. If you check the "Suspected Release" box as "yes", make sure that you assign a Likelihood of Release value of 550 for the pathway.

SURFACE WATER PATHWAY

SUSPECTED RELEASE

Yes	No	Unknown	
☒	☐	☐	Is surface water nearby?
☐	☒	☐	Is waste quantity particularly large?
☐	☒	☐	Is the drainage area large?
☐	☒	☐	Is precipitation heavy or infiltration rate low?
☒	☐	☐	Are sources poorly contained or prone to runoff or flooding?
☒	☐	☐	Is a runoff route well defined (e.g., ditch or channel leading to surface water)?
☐	☒	☐	Is vegetation stressed along the probable runoff path?
☒	☐	☐	Are suspected contaminants highly persistent in surface water?
☐	☒	☐	Are sediments/water unnaturally discolored?
☒	☐	☐	Is wildlife unnaturally absent?
☒	☐	☐	Has deposition of waste into surface water been observed?
☒	☐	☐	Is ground water discharge to surface water likely?
☒	☐	☐	Is there any circumstantial evidence of surface water contamination?
☐	☐		Other criteria? _____
☒	☐		**SUSPECTED RELEASE?**

PRIMARY TARGETS

Yes	No	Unknown	
☐	☐	☐	Is any target nearby? If yes:
			☐ Drinking-water intake
			☐ Fishery
			☐ Sensitive environment
☐	☐	☐	Has an intake, fishery, or recreational area been closed?
☐	☐	☐	Is there any circumstantial evidence of surface water contamination at or downstream of a target?
☐	☐	☐	Does any target warrant sampling? If yes:
			☐ Drinking-water intake
			☐ Fishery
			☐ Sensitive environment
☐	☐		Other criteria? _____
☐	☐		**PRIMARY INTAKE(S) IDENTIFIED?**
☐	☐		**PRIMARY FISHERY IDENTIFIED?**
☐	☐		**PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED?**

Summarize the rationale for suspected release (attach an additional page if necessary):

See Surface Water Route, #11

Summarize the rationale for Primary Targets (attach an additional page if necessary):

None

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SURFACE WATER PATHWAY

Pathway Characteristics

The surface water pathway includes three threats: Drinking Water Threat, Human Food Chain Threat, and Environmental Threat. Answer the questions at the top of the page. Refer to the Surface Water Pathway Criteria List (page 11) to hypothesize whether you suspect hazardous substances have been released to surface water. Enter the distance to surface water (the shortest overland drainage distance from a source to a surface water body). State the floodplain in which the site is located (e.g., 100-yr, 200-yr). If the site is located in more than one floodplain, use the most frequent flooding event. Identify surface water uses for the 15-mile surface water migration path.

Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Surface Water Pathway Criteria List (page 11). Remember to use only Column A for this pathway if you score a suspected release to surface water, and do not evaluate factor 2.

2. **No Suspected Release:** Determine score based on the shortest overland drainage distance from a source to a surface water body. If distance to surface water is greater than 2,500 feet, determine this score based on flood frequency. Remember to use only Column B to score this pathway if you do not suspect that hazardous substances have been released.

Drinking Water Threat Targets (T)

3. List all drinking-water intakes on downstream surface water bodies within the 15-mile target distance limit. Provide the intake name, the type of water body on which the intake is located, the flow of the water body, and the number of people served by the intake (apportion the population if part of a blended system).

4. **Primary Target Population:** Evaluate any populations served by drinking-water intakes that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. In the space provided, enter the population served by all intakes you suspect have been exposed to hazardous substances, and multiply by 10 to derive the Primary Target Population score. Remember, if you do not suspect a release, there is no Primary Target Population.

5. **Secondary Target Population:** On PA Table 3 (page 13), evaluate any populations served by drinking-water intakes that you do not suspect have been exposed to hazardous substances. Enter the population served by intakes for each flow category. Circle the assigned population value and enter it in the far right column. Sum the population values and enter the total as the Secondary Target Population score.

Gauging station data for most surface water bodies should be available from USGS or other sources. In the absence of gauging station data, see PA Table 4 (page 13) for a listing of surface water body types and associated flow categories. The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that the flow category "mixing zone of quiet flowing rivers" can be used for rivers with flows of at least 10 cfs, but only for intakes within 3 miles of the probable point of entry.

6. **Nearest Intake** score represents the threat posed to the drinking-water intake that is most likely to be exposed to hazardous substances. If you have identified a Primary Target Population, assign a score of 50. Otherwise assign the score determined from PA Table 3 (page 13) for the lowest-flowing water body on which there is an intake.

7. **Resources:** Score automatically assigned. Do not override; do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

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Site Name: Consolidated Freightways #2
Date:

SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Surface Water Pathway Criteria List, page 11)?	Yes X No ___
Distance to surface water:	adjacent ft
Flood Frequency:	>500 yrs
What is the downstream distance to the nearest drinking-water intake?	1.1 miles
nearest fishery? 1000 feet ~~miles~~	nearest sensitive environment? <0.1 miles

LIKELIHOOD OF RELEASE	A Suspected Release	B No Suspected Release	References
1. SUSPECTED RELEASE: If you suspect a release to surface water (see page 11), assign a score of 550, and use only column A for this pathway.	(550) 550		3,12,14,15, 26-33
2. NO SUSPECTED RELEASE: If you do not suspect a release to surface water, and the distance to surface water is 2,500 feet or less, assign a score of 500; otherwise, assign a score from the table below. Use only column B for this pathway.		(500, 400, 300 or 100)	
LR =	(550) 550	(500, 400, 300 or 100)	

Floodplain	Score
Site in annual or 10-yr floodplain	500
Site in 100-yr floodplain	400
Site in 500-yr floodplain	300
Site outside 500-yr floodplain	100

DRINKING WATER THREAT TARGETS

3. Determine the water body types, flows (if applicable), and number of people served by all drinking-water intakes within the 15-mile target distance limit. If there are no drinking-water intakes within the target distance limit, assign a total Targets score of 5 at the bottom of this page (Resources only) and proceed to page 14.

Intake Name	Water Body Type	Flow	People Served
City of Tonawanda	Niagara River	200,000 cfs	20,000
City of N. Tonawanda	Niagara River	200,000 cfs	20-30,000
City of Lockport	Niagara River	200,000 cfs	25,000

24,25

4. PRIMARY TARGET POPULATION: If you suspect any drinking-water intake listed above has been exposed to hazardous substances from the site (see Surface Water Pathway Criteria List, page 11), list the intake name(s) and calculate the factor score based on the number of people served.

_____, _____

0 people x 10 = 0 ___

5. SECONDARY TARGET POPULATION: Determine the Secondary Target Population score from PA Table 3 based on the populations using drinking-water from intakes that you do NOT suspect have been exposed to hazardous substances from the site.

Are any intakes part of a blended system? Yes ___ No X
If yes, attach a page to show apportionment calculations.

1 — 1,24,25

6. NEAREST INTAKE: If you have identified any Primary Targets for the drinking water threat (Factor 4), assign a score of 50; otherwise, assign the Nearest Intake score from PA Table 3. If no drinking-water intake exists within the 15-mile target distance limit, assign a score of zero.

(60, 20, 10, 2, 1, or 0) 0 — (20, 10, 2, 1, or 0) — 24,25

7. RESOURCES: A score of 5 is assigned.

(5) 5 — (5) 5

T = 6

Site Name: Consolidated Freightways
Date:

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PA TABLE 3: VALUES FOR SECONDARY SURFACE WATER TARGET POPULATIONS

Surface Water Body Flow Characteristics (see PA Table 4)	Population	Nearest Intake (choose highest)	Population Served by Intakes Within Flow Category: 1 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	Population Value
<10 cfs	_____	20	2	5	16	52	163	521	1,633	5,214	16,325	52,136	163,246	_____
10 to 100 cfs	_____	2	1	1	2	5	16	52	163	521	1,633	5,214	16,325	_____
>100 to 1,000 cfs	_____	1	0	0	1	1	2	5	16	52	163	521	1,633	_____
>1,000 to 10,000 cfs	_____	0	0	0	0	0	1	1	2	5	16	52	163	_____
>10,000 cfs or Great Lakes	75,000	(0)	0	0	0	0	0	0	1	(1)	2	5	16	1
3-mile Mixing Zone	_____	10	1	3	8	26	82	261	816	2,607	8,162	26,068	81,663	_____
Nearest Intake =		0											Score =	1

PA TABLE 4: SURFACE WATER TYPE / FLOW CHARACTERISTICS WITH DILUTION WEIGHTS FOR SECONDARY SURFACE WATER SENSITIVE ENVIRONMENTS

Type of Surface Water Body: Water Body Type	OR	Flow Characteristics	Dilution Weight
minimal stream		flow less than 10 cfs	1
small to moderate stream		flow 10 to 100 cfs	0.1
moderate to large stream		flow greater than 100 to 1,000 cfs	N/A
large stream to river		flow greater than 1,000 to 10,000 cfs	N/A
large river		flow greater than 10,000 cfs	N/A
3-mile mixing zone of quiet flowing streams or rivers		flow 10 cfs or greater	N/A
coastal tidal water (harbors, sounds, bays, etc.), ocean, or Great Lakes		N/A	N/A

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SURFACE WATER PATHWAY HUMAN FOOD CHAIN THREAT

Likelihood of Release (LR)

LR is the same for all threats in the Surface Water Pathway. Enter the LR score determined on page 12.

Human Food Chain Threat Targets (T)

8. The only human food chain targets are fisheries. A fishery is "any area of a surface water body from which food chain species are taken or could be taken for human consumption on a subsistence, sporting, or commercial basis." Food chain organisms include fish, shellfish, crustaceans, amphibians, and amphibious reptiles. Fisheries are delineated by changes in surface water body type (i.e., streams and rivers, lakes, coastal tidal waters, and oceans/Great Lakes) and whenever the flow characteristics of a stream or river change. In the space provided, identify all fisheries within the 15-mile target distance limit. Indicate the surface water body type and stream flow for each fishery. Gauging station data should be available for most surface water bodies from USGS or other sources. In the absence of gauging station data, see PA Table 4 (page 13) for a listing of surface water body types and associated flow categories. The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that, if there are no fisheries within the 15-mile target distance limit, the Human Food Chain Threat Targets score is zero; and you should proceed to the Environmental Threat evaluation.

9. **Primary Fisheries** are any fisheries within the 15-mile target distance limit that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. If you identify any Primary Fisheries, enter 300 as the Primary Fisheries factor score, and do not evaluate Secondary Fisheries. Note that if you do not suspect a release, there are no Primary Fisheries.

10. **Secondary Fisheries:** Evaluate fisheries that you do not suspect have been exposed to hazardous substances. Determine the lowest flow for which you have identified a Secondary Fishery. Use this flow to select the Secondary Fisheries score from the table. Enter the score into either Column A or Column B.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

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Site Name: Consolidated Freightways
Date:

SURFACE WATER PATHWAY (continued)
HUMAN FOOD CHAIN THREAT SCORESHEET

LIKELIHOOD OF RELEASE		A Suspected Release	B No Suspected Release	References
Enter the Surface Water Likelihood of Release score from page 12.	LR =	(550) 550	(500,400,300 or 100)	

HUMAN FOOD CHAIN THREAT TARGETS

8. Determine the water body types and flows (if applicable) for all fisheries within the 15-mile target distance limit. If there are no fisheries within the target distance limit, assign a Targets score of 0 at the bottom of this page and proceed to page 15.

Fishery Name	Water Body Type	Flow
Niagara River	Large river	200,000 cfs
		cfs
		cfs
		cfs
		cfs

9. PRIMARY FISHERIES: If you suspect any fishery listed above has been exposed to hazardous substances from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate Factor 10. List the Primary Fisheries:

_____, _____,

_____, _____.

(300 or 0) 0

10. SECONDARY FISHERIES: If you have not identified any Primary Fisheries, assign a Secondary Fisheries score from the table below using the LOWEST flow at any fishery within the 15-mile target distance limit.

Lowest Flow	Secondary Fisheries Score
< 10 cfs	210
10 to 100 cfs	30
> 100 cfs, coastal tidal waters, oceans, or Great Lakes	12

(210,30,12 or 0) 12

(210,30,12, or 0)

		A	B
	T =	(300,210,30,12 or 0) 12	(210,30,12 or 0)

SURFACE WATER PATHWAY ENVIRONMENTAL THREAT

Likelihood of Release (LR)

LR is the same for all threats in the Surface Water Pathway. Enter the LR score determined on page 12.

Environmental Threat Targets (T)

11. There are many different types of Environmental Targets. Refer to PA Table 5 (page 16) for a listing of sensitive environments that are evaluated for the Surface Water Pathway Environmental Threat. In the space provided, identify all sensitive environments located within the 15-mile target distance limit. Indicate the surface water body type and flow at each sensitive environment. Gauging station data for most surface water bodies should be available from USGS or other sources. In the absence of gauging station data, see PA Table 4 (page 13) for a listing of surface water body types and associated flow categories. The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that, if there are no sensitive environments within the 15-mile target distance limit, the Environmental Targets score is zero; and you should proceed to the Waste Characteristics evaluation.

12. **Primary Sensitive Environments** are surface water sensitive environments within the 15-mile target distance limit that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. If you identify any Primary Sensitive Environments, enter 300 as the Primary Sensitive Environments factor score, and do not evaluate Secondary Sensitive Environments. Note that if you do not suspect a release, there are no Primary Sensitive Environments.

13. **Secondary Sensitive Environments** are surface water sensitive environments that you do not suspect have been exposed to hazardous substances. If you have identified Secondary Sensitive Environments, evaluate them based on flow by the following process: if there are any Secondary Sensitive Environments on surface water bodies with flows of 100 cfs or less, list them in the table. Use PA Table 4 (page 13) to determine the appropriate dilution weight(s).

Use PA Tables 5 and 6 (page 16) to determine the appropriate value for sensitive environment type. When measuring length of wetlands that are located on both sides of a surface water body, sum the frontage areas. For sensitive environments that fall into more than one of the categories listed in PA Table 5, sum the values for each type to determine the environment value. For example, a wetland of 1.5 miles total length (value of 50) that is also a critical habitat for a Federally endangered species (value of 100) would receive an environment value of 150.

For each sensitive environment, multiply the dilution weight by the environment type/length of wetlands value and record the product in the far right column. Sum the values in the far right column and enter the total as the Secondary Sensitive Environments score. Do not evaluate any other Secondary Sensitive Environments. However, if **all** Secondary Sensitive Environments are on surface water bodies with flows of greater than 100 cfs, assign a Secondary Sensitive Environments score of 10.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

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Site Name: Consolidated Freightways 5
Date:

SURFACE WATER PATHWAY (continued)
ENVIRONMENTAL THREAT SCORESHEET

LIKELIHOOD OF RELEASE		A Suspected Release	B No Suspected Release	References
Enter the Surface Water Likelihood of Release score from page 12.	LR =	(550) 550	(500, 400, 300 or 100)	

ENVIRONMENTAL THREAT TARGETS

11. Determine the water body types and flows (if applicable) for all surface water sensitive environments within the 15-mile target distance limit (see PA Tables 4 and 5). If there are no sensitive environments within the 15-mile target distance limit, assign a Targets score of 0 at the bottom of this page, and proceed to page 17.

Environment Name	Water Body Type	Flow
Wetlands - Two Mile Creek	Small stream	10-100 cfs
Wetlands - Niagara River	Large river	200,000 cfs
State Threatened Species Habitat	Large river	200,000 cfs
Waterfowl Wintering Area	Large river	200,000 cfs
		cfs

13, 18-20

12. PRIMARY SENSITIVE ENVIRONMENTS: If you suspect any sensitive environment listed above has been exposed to hazardous substances from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate Factor 13. List the Primary Sensitive Environments:

_____, _____,
_____, _____.

(300 or 0) 0

13. SECONDARY SENSITIVE ENVIRONMENTS:

A. For Secondary Sensitive Environments on surface water bodies with flows of 100 cfs or less, assign scores as follows, and do not evaluate part B of this factor:

Flow	Dilution Weight (PA Table 4)	Environment Type and Value (PA Tables 5 and 6)	Total
10-100 cfs	0.1 x	(Wetlands - Two Mile Creek) 25 =	2.5
cfs	x	=	
cfs	x	=	
cfs	x	=	
cfs	x	=	

Sum = 2.5

B. If NO Secondary Sensitive Environments are located on surface water bodies with flows of 100 cfs or less, assign a score of 10.

(10 or 0) 0 (10 or 0)

13

T = 2.5

Site Name: Consolidated Freightways
Date:

PA TABLE 5: SURFACE WATER AND AIR SENSITIVE ENVIRONMENTS VALUES

Sensitive Environment	Assigned Value
Critical habitat for Federally designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument National Seashore Recreation Area National Lakeshore Recreation Area	100
Habitat known to be used by Federally designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay or estuary Migratory pathways and feeding areas critical for the maintenance of anadromous fish species in a river system Terrestrial areas utilized by large or dense aggregations of vertebrate animals (semi-aquatic foragers) for breeding National river reach designated as recreational	75
Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
State designated areas for the protection/maintenance of aquatic life under the Clean Water Act	5
Wetlands	See PA Table 6 (Surface Water Pathway) or PA Table 9 (Air Pathway)

PA TABLE 6: SURFACE WATER WETLANDS FRONTAGE VALUES

Total Length of Wetlands	Assigned Value
Less than 0.1 mile	0
→ 0.1 to 1 mile	25 *
Greater than 1 to 2 miles	50
Greater than 2 to 3 miles	75
Greater than 3 to 4 miles	100
Greater than 4 to 8 miles	150
Greater than 8 to 12 miles	250
Greater than 12 to 16 miles	350
Greater than 16 to 20 miles	450
Greater than 20 miles	500

Two Mile

* Length of Creek from mouth of unnamed stream to Niagara River = 1,000 feet
Total length of wetlands = 1,000 ft x 2 = 2,000 feet = 0.4 mile

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SURFACE WATER PATHWAY WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE

Waste Characteristics (WC)

14. **Waste Characteristics** score is assigned from page 4. However, if any Primary Target has been identified for any surface water threat, assign the higher of the score calculated on page 4 or a score of 32.

Surface Water Pathway Threat Scores

Fill in the matrix with the appropriate scores from the previous pages. To calculate the score for each threat: multiply the scores for LR, T and WC, divide the product by 82,500, and round the result to the nearest integer. The Drinking Water Threat and Human Food Chain Threat are subject to a maximum of 100. The Environmental Threat is subject to a maximum of 60. Enter the rounded threat scores into the right side of the table.

Surface Water Pathway Score

Sum the individual threat scores to determine the Surface Water Pathway Score. If the sum is greater than 100, assign 100.

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Site Name:
Date:

SURFACE WATER PATHWAY (concluded)
WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY

WASTE CHARACTERISTICS	A *Suspected Release*	B *No Suspected Release*
14. A. If you have identified ANY Primary Targets for surface water (pages 12, 14, or 15), assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.	(100 or 32)	
B. If you have NOT identified any Primary Targets for surface water, assign the waste characteristics score calculated on page 4.	(100,32, or 18) 18	(100,32, or 18)
WC =	18	

SURFACE WATER PATHWAY THREAT SCORES

Threat	*Likelihood of Release (LR) Score (from page 12)*	*Targets (T) Score*	*Pathway Waste Characteristics (WC) Score (determined above)*	*Threat Score LR x T x WC / 82,500*
Drinking Water	550	6	18	(subject to a maximum of 100) 0.72
Human Food Chain	550	12	18	(subject to a maximum of 100) 1.44
Environmental	550	2.5	18	(subject to a maximum of 60) 0.30

SURFACE WATER PATHWAY SCORE
(Drinking Water Threat + Human Food Chain Threat + Environmental Threat)

(subject to a maximum of 100) 2.46

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SOIL EXPOSURE PATHWAY CRITERIA LIST

Site Name: Consolidated Freightways

Date:

This chart provides guidelines to assist you in hypothesizing the presence of a resident population. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize resident populations. This chart will record your professional judgment in evaluating this factor.

Use the resident population section to guide you through evaluation of some site and source conditions that will help identify targets likely to be exposed to hazardous substances. You may use this section of the chart more than once, depending on the number of nearby people you feel may be considered part of a resident population. Record the responses for the resident population target that you feel has the highest probability of being exposed to hazardous substances.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question.

SOIL EXPOSURE PATHWAY				
SUSPECTED CONTAMINATION	***RESIDENT POPULATION***			
	Yes	No	Unknown	
Surficial contamination is assumed.	☐	☒	☐	Are there residences, schools, or day care facilities on or within 200 feet of areas of suspected contamination?
	☐	☒	☐	Are residences, schools, or day care facilities located on adjacent land previously owned or leased by the site owner/operator?
	☐	☒	☐	Is there an overland migration route that might spread hazardous substances near residences, schools, or day care facilities?
	☐	☒	☐	Are there any reports of adverse health effects from onsite or adjacent residents or students, exclusive of apparent drinking water or air contamination problems?
	☐	☒	☐	Does any offsite property warrant sampling?
	☐	☒		Other criteria? Property slopes away from nearby residence
	☐	☐		**RESIDENT POPULATION IDENTIFIED?**

Summarize the rationale for resident population (attach an additional page if necessary):

N/A

SOIL EXPOSURE PATHWAY

Pathway Characteristics

Answer the questions at the top of the page. Identify people who are most likely to be regularly exposed to contamination at the site because they work at the facility or reside or attend school or day care on or within 200 feet of an area of suspected contamination. If the site is active, estimate the number of full or part-time workers at this facility. Note that evaluation of targets is based on current site conditions.

Likelihood of Exposure (LE)

1. **Suspected Contamination:** The PA always assumes that surficial contamination exists. **Do not override this assumption.** Surficial contamination often exists even if wastes have been "removed" or are believed to be buried below the surface. A 550 is automatically assigned for this factor; only Column A can be scored for this pathway.

Resident Population Threat Targets (T)

2. **Resident Population** corresponds to "primary targets" for the migration pathways. Determine if there are people living or attending school or day care on or within 200 feet of areas of suspected contamination. Use professional judgment guided by the Soil Exposure Pathway Criteria List (page 18) to make this determination. Record the number of people identified as Resident Population. Multiply this population by 10 to determine the Resident Population factor score.

3. **Resident Individual:** If you have identified a Resident Population, assign a score of 50. Otherwise, assign a score of 0.

4. **Workers:** Estimate the number of full and part-time workers regularly present at this facility and other facilities where contamination is suspected. Assign a score for the workers factor from the table.

5. **Terrestrial Sensitive Environments:** In the table provided, list each Terrestrial Sensitive Environment located on areas of suspected contamination. Use PA Table 7 (page 20) to assign a value for each sensitive environment. Sum the values of all the terrestrial sensitive environments and assign the total as the factor score.

6. **Resources:** Score automatically assigned. **Do not override;** do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A.

Waste Characteristics (WC)

7. Enter the WC score determined on page 4. There is no exception for this pathway.

Soil Exposure Pathway Score: Calculate the **Resident Population Threat Score** by multiplying the scores for LE, T, and WC, and dividing the product by 82,500. Round the threat score to the nearest integer. If the result is greater than 100, assign 100. The **Nearby Population Threat Score is always 2** for the PA; do not override this score. Add these 2 points to the calculated **Resident Population Threat Score** to determine the **Soil Exposure Pathway Score**, subject to a maximum of 100.

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Site Name: Consolidated Freightways 19
Date:

SOIL EXPOSURE PATHWAY SCORESHEET

Pathway Characteristics		
Do any people live on or within 200 ft of areas of suspected contamination?	Yes ___	No X
Do any people attend school or day care on or within 200 ft of areas of suspected contamination?	Yes ___	No X
Is the facility active? Yes X No ___ If yes, estimate the number of workers: 60		

		A Suspected Contamination	B No Suspected Contamination	References
LIKELIHOOD OF EXPOSURE				
1. SUSPECTED CONTAMINATION: Surficial contamination is assumed. A score of 550 is assigned.	LE =	(550) 550		
RESIDENT POPULATION THREAT TARGETS				
2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or day care on or within 200 feet of areas of suspected contamination (see Soil Exposure Pathway Criteria List, page 18). 0 people x 10 =		0		
3. RESIDENT INDIVIDUAL: If you have identified any Resident Population (Factor 2), assign a score of 50; otherwise, assign a score of 0.		(50 or 0) 0		
4. WORKERS: Assign a score from the following table based on the total number of workers at the facility and nearby facilities with suspected contamination:		(15, 10, 5, or 0) 5		
5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Assign a value from PA Table 7 for each terrestrial sensitive environment that is located on an area of suspected contamination:	Sum =	0		
6. RESOURCES: A score of 5 is assigned.		(5) 5		
	T =	10		
WASTE CHARACTERISTICS				
7. Assign the waste characteristics score calculated on page 4.	WC =	(100, 32, or 18) 18		

Number of Workers	Score
0	0
1 to 100	5
101 to 1,000	10
>1,000	15

Terrestrial Sensitive Environment Type	Value

RESIDENT POPULATION THREAT SCORE: $\frac{LE \times T \times WC}{82,500}$ = (adjust to a maximum of 100) 1.2

NEARBY POPULATION THREAT SCORE:
Assign a score of 2 = 2

SOIL EXPOSURE PATHWAY SCORE:
Resident Population Threat + Nearby Population Threat = (adjust to a maximum of 100) 3.2

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Site Name: Consolidated Freightways 20
Date:

PA TABLE 7: SOIL EXPOSURE PATHWAY
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES

Terrestrial Sensitive Environment	*Assigned Value*
Terrestrial critical habitat for Federally designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
Terrestrial habitat known to be used by Federally designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federally designated endangered or threatened status	50
State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

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AIR PATHWAY CRITERIA LIST

Site Name: Consolidated Freightways
Date:

This chart provides guidelines to assist you in hypothesizing the presence of a suspected release. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize a suspected release. This chart will record your professional judgment in evaluating this factor.

The "Suspected Release" section of the chart guides you through evaluation of some conditions to help hypothesize whether a release from the site is likely. For the Air Pathway, if a release is suspected, "Primary Targets" are any residents, workers, students, or sensitive environments within ¼ mile of the site.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question. If you check the "Suspected Release" box as "yes", make sure that you assign a Likelihood of Release value of 550 for the pathway.

AIR PATHWAY

SUSPECTED RELEASE				PRIMARY TARGETS
Yes	No	Unknown		
☐	☒	☐	Have odors been reported?	*If you suspect a release to air, evaluate all populations and sensitive environments within ¼ mile (including those onsite) as Primary Targets.*
☐	☒	☐	Has a release of hazardous substances to the air been directly observed?	
☐	☒	☐	Are there any reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air?	
☐	☒	☐	Is there any circumstantial evidence of an air release?	
☐	☐		Other criteria? _____	
☐	☒		**SUSPECTED RELEASE?**	

Summarize the rationale for suspected release (attach an additional page if necessary):

N/A

Pathway Characteristics

Answer the questions at the top of the page. Refer to the Air Pathway Criteria List (page 21) to hypothesize whether you suspect hazardous substances have been released from the site to the air. Due to dispersion, releases to air are not as persistent as releases to water migration pathways and are much more difficult to detect. Develop hypotheses concerning the release of hazardous substances to air based on "real time" considerations. Record the distance (in feet) from any source to the nearest regularly occupied building.

Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Air Pathway Criteria List (page 21). Remember to use only Column A for this pathway if you score a Suspected Release, and proceed to the target evaluation section.

2. **No Suspected Release:** If you do not score a Suspected Release, enter 500. Remember to use only Column B to score this pathway if you do not suspect hazardous substances are being released.

Targets (T)

3. **Primary Target Population** are those people subject to exposure from a suspected air release of hazardous substances from the site. Use professional judgment, guided by the Air Pathway Criteria List (page 21), to make this determination. Note that if you do not suspect a release, there are no primary population targets. If you score a Suspected Release, record the residential, student, and worker population located on or within ¼-mile of the site. Multiply this number of people by 10; enter the factor score in Column A.

4. **Secondary Target Population** are those people in distance categories not suspected to be subject to exposure from airborne hazardous substances. Determine the number of residents, students, and workers, and enter the summed population in PA Table 8 (page 23) for each distance category. Circle the population value for the distance category and record the value in the far right column of the table. Sum these values and enter the total as the factor score.

5. **Nearest Individual** represents the threat posed to the person most likely to be exposed to hazardous substances released from the site. If you have identified any Primary Population, enter 50. Otherwise, assign the score from the "Nearest Individual" column of PA Table 8 (page 23), for the nearest distance ring in which you have identified a Secondary Population.

6. **Primary Sensitive Environments:** List the sensitive environments (on or within ¼ mile of the site) subject to exposure from a suspected air release of hazardous substances from the site. Assign values for sensitive environment type (from PA Table 5, page 16) and/or wetland acreage (from PA Table 9, page 23). Sum the values and enter the total as the factor score.

7. **Secondary Sensitive Environments:** On PA Table 10 (page 23), list the sensitive environments that are in distance categories within ½ mile not suspected to be subject to exposure from airborne hazardous substances. Assign a value for each environment (PA Tables 5 and 9). Record the value for each Secondary Sensitive Environment on PA Table 10 (page 23), and multiply by the distance weight for that distance category. Sum the products, and enter the total as the factor score.

8. **Resources:** Score automatically assigned. Do not override; do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

Waste Characteristics (WC)

9. **Waste Characteristics** score is assigned from page 4. However, if any Primary Target has been identified for the air pathway, assign the higher of the score calculated on page 4 or a score of 32.

Air Pathway Score: Multiply the scores for LR, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

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Site Name: Consolidated Freightways 22
Date:

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AIR PATHWAY SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Air Pathway Criteria List, page 21)?	Yes ___ No X
Distance to the nearest individual:	1,000 ft

	A Suspected Release	B No Suspected Release	References
LIKELIHOOD OF RELEASE			
1. SUSPECTED RELEASE: If you suspect a release to air (see page 21), assign a score of 550, and use only column A for this pathway.	[550]		
2. NO SUSPECTED RELEASE: If you do not suspect a release to air, assign a score of 500, and use only column B for this pathway.		[500] 500	15
LR =		500	
TARGETS			
3. PRIMARY TARGET POPULATION: Determine the number of people subject to exposure from a release of hazardous substances through the air (see Air Pathway Criteria List, page 21). ___ people x 10 =			
4. SECONDARY TARGET POPULATION: Determine the number of people within the 4-mile target distance limit, and assign the total population score from PA Table 8.		50	2
5. NEAREST INDIVIDUAL: If you have identified any Primary Targets for the air pathway, assign a score of 50; otherwise, assign the highest Nearest Individual score from PA Table 8.	[50, 20, 7.2.1, or 0]	[20, 7.2.1, or 0] 20	2
6. PRIMARY SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (PA Table 5) and wetland acreage values (PA Table 9) for environments subject to exposure from air hazardous substances (see Air Pathway Criteria List, page 21).			
Sum =			
7. SECONDARY SENSITIVE ENVIRONMENTS: Use PA Table 10 to determine the score for secondary sensitive environments.		0.625	13
8. RESOURCES: A score of 5 is assigned.	[5] 5	[5] 5	
T =		75.625	
WASTE CHARACTERISTICS			
9. A. If you have identified any Primary Targets for the air pathway, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.	[100 or 32]		
B. If you have NOT identified any Primary Targets for the air pathway, assign the waste characteristics score calculated on page 4.	[100, 32, or 18]	[100, 32, or 18] 18	
WC =		18	

AIR PATHWAY SCORE:	$\frac{LR \times T \times WC}{82{,}500}$	[subject to a minimum of 100] 8.25

Site Name: Consolidated Freightways
Date:

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PA TABLE 8: VALUES FOR SECONDARY AIR TARGET POPULATIONS

Distance from Site	Population	Nearest Individual (choose highest)	Population Within Distance Category: 1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	Population Value
Onsite	60	(20)	1	2	(5)	16	52	163	521	1,633	5,214	16,325	52,136	163,246	5
>0 to ¼ mile	11	20	1	(1)	1	4	13	41	130	408	1,303	4,081	13,034	40,811	1
> ¼ to ½ mile	1,234	2	0	0	1	1	3	(9)	28	88	282	882	2,815	8,815	9
> ½ to 1 mile	3,559	1	0	0	0	1	1	3	(8)	26	83	261	834	2,612	8
>1 to 2 miles	15,676	0	0	0	0	0	1	1	3	(8)	27	83	266	833	8
>2 to 3 miles	35,498	0	0	0	0	0	1	1	1	4	(12)	38	120	376	12
>3 to 4 miles	72,210	0	0	0	0	0	0	1	1	2	(7)	23	73	229	7
Nearest Individual =		20												Score =	50

PA TABLE 9: AIR PATHWAY VALUES FOR WETLAND AREA

Wetland Area	Assigned Value
Less than 1 acre	0
→ 1 to 50 acres	25
Greater than 50 to 100 acres	75
Greater than 100 to 150 acres	125
Greater than 150 to 200 acres	175
Greater than 200 to 300 acres	250
Greater than 300 to 400 acres	350
Greater than 400 to 500 acres	450
Greater than 500 acres	500

PA TABLE 10: DISTANCE WEIGHTS AND CALCULATIONS FOR AIR PATHWAY SECONDARY SENSITIVE ENVIRONMENTS

Distance	Distance Weight	Sensitive Environment Type and Value (from PA Table 5 or 9)	Product
Onsite	0.10	x	
		x	
0-1/4 mi	0.025	x 25 (Wetlands - Two Mile Creek)	0.625
		x	
		x	
1/4-1/2mi	0.0054	x	
		x	
		x	
		x	
		x	
Total Environments Score =			0.625

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SITE SCORE CALCULATION

In the column labeled S, record the Ground Water Pathway score, the Surface Water Pathway score, the Soil Exposure Pathway score, and the Air Pathway score. Square each pathway score and record the result in the S^2 column. Sum the squared pathway scores. Divide the sum by 4, and take the square root of the result to obtain the **Site Score.**

Recommendation

Provide a recommendation for site disposition in accordance with EPA guidelines.

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Site Name: Consolidated Freightways 24
Date:

SITE SCORE CALCULATION

	S	S^2
GROUND WATER PATHWAY SCORE (S_{gw}):	0.55	0.30
SURFACE WATER PATHWAY SCORE (S_{sw}):	2.46	6.05
SOIL EXPOSURE PATHWAY SCORE (S_{se}):	3.20	10.24
AIR PATHWAY SCORE (S_a):	8.25	68.06
SITE SCORE:	$\sqrt{\frac{S_{gw}^2+S_{sw}^2+S_{se}^2+S_a^2}{4}}$ =	$\sqrt{\frac{84.65}{4}} = 4.60$

RECOMMENDATION

No Further Remedial Action Planned

SUMMARY

	YES	NO
1. Is there a high possibility of a threat to nearby drinking water wells by migration of hazardous substances in ground water?	☐	☒
A. If yes, identify the wells recommended for sampling during the SI.		
B. If yes, how many people are served by these threatened wells?		
2. Are any of the following suspected to have been exposed to hazardous substances through surface water migration from the site?		
A. Drinking water intake	☐	☒
B. Fishery	☐	☒
C. Sensitive environment: wetland, critical habitat, others	☐	☒
D. If yes, identify the targets recommended for sampling during the SI. N/A		
3. Do people reside or attend school or day care on or within 200 ft of any area of suspected contamination?	☐	☒
4. Are there public health concerns at this site that are not addressed by PA scoring considerations? If yes, explain: N/A	☐	☒