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Municipal Brownfields - B
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Spills - SP
ERP - E
VCP - V
BCP - C

B 00080-9

DRAFT

Remedial Alternatives Report

for the

Site Investigation / Remedial Alternatives Report

for the property at 2560 Hamburg Turnpike
(Amadori Project Site SBL# 141.20-1-2.1)
Lackawanna, New York

Prepared for:

The City of Lackawanna

Prepared by:

URS Greiner Consultants, Inc.
282 Delaware Avenue
Buffalo, New York 14202

December 1998

G27658

DRAFT

SITE INVESTIGATION AND REMEDIAL ALTERNATIVES REPORT
REMEDIAL ALTERNATIVES REPORT

AMADORI PROPERTY
SBL#141.20-1-2.1
2560 HAMBURG TURNPIKE
LACKAWANNA, NEW YORK

DECEMBER 1998

PREPARED FOR

THE CITY OF LACKAWANNA
LACKAWANNA ECONOMIC DEVELOPMENT ZONE

PREPARED BY

URS GREINER CONSULTANTS, INC.
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EXECUTIVE SUMMARY

To investigate the environmental conditions at the Amadori property in the City of Lackawanna, New York, the City retained the services of URS Greiner Consultants, Inc. (URSG) to conduct a site investigation (SI) and Remedial Alternatives Report (RAR). The SI report (which included information on presence, nature and extent, fate and transport pathways, and potential receptors of site contamination), was completed and a report was submitted in September 1998 to the City of Lackawanna and New York State Department of Environmental Conservation (NYSDEC). NYSDEC has approved the SI Report, which was utilized to prepare this RAR. This RAR identifies and evaluates three potentially applicable remedial alternatives, and recommends one to implement before redeveloping the site.

The property is located at 2560 Hamburg Turnpike and is approximately 8.4 acres in size. Numerous debris and/or material storage piles or berms are present at several locations throughout the property. Surrounding land use is light industrial with residential properties located farther north and south of the site. Except for sampling location AP-SS-2, the level of polycyclic aromatic hydrocarbons (PAHs) in the site surface soils were not greatly elevated above local background levels and can be considered typical of an urban/industrial setting. In addition, elevated chromium concentrations were found in an isolated portion of site surface soils (around sampling location AP-SS-7). PAHs and metals in subsurface soils were at concentrations exceeding State soil criteria and at levels generally consistent across the property. Groundwater was not a medium of concern in the RAR.

Based on the assumption that the site will be limited to industrial/commercial uses, the contamination identified at the site did not appear to represent a significant detriment to redevelopment. Three alternatives were analyzed using the evaluation criteria defined in 6 NYCRR 375: soil removal and offsite disposal; partial surface soil removal and offsite disposal; and institutional controls. Based on the analysis, partial surface soil removal and offsite disposal is recommended.

The following items will need to be addressed prior to, or as part of, site redevelopment:

- Deed restrictions limiting future use to industrial/commercial purposes.
- Development of guidelines/restrictions for potential future construction activities which may disturb the contaminated soil/fill materials.
- A layer of clean fill or asphalt will be placed at certain areas of the site, to provide additional safeguards to the City, and/or potential developers. Additionally, the soil in the vicinity of sampling locations AP-SS-2 and AP-SS-7 will be excavated and disposed off site.

1.0 INTRODUCTION

The City of Lackawanna, New York (the City) owns the property referred to as the Amadori project site located at 2560 Hamburg Turnpike in Lackawanna (Figure 1-1). Under a 1996 New York State Department of Environmental Conservation (NYSDEC) Clean Water/Clean Air Bond Act grant, the City retained the services of URS Greiner Consultants, Inc. (URSG) to prepare a Site Investigation/Remedial Alternatives Report (SI/RAR) for the property. The SI Report was completed and submitted to the City of Lackawanna in September 1998. This Remedial Alternatives Report presents the remedial action objectives for the site which are then used to develop the remedial alternatives. This report includes a description and evaluation of each remedial alternative and a comparative analysis of the alternatives. Based on this analysis, an alternative is recommended to the City of Lackawanna.

1.1 Site Background

1.1.1 Site Description

The property is a relatively flat vacant parcel, approximately 8.4 acres in size (Figure 1-2). A number of debris and/or storage piles are scattered at various locations within the property area. These piles contain soil, concrete, wood, various sized plastic and steel piping, prefabricated concrete catch basins, tires, railroad ties, and other debris. A large debris pile exists on the southern-central portion of the site. The northwestern end of the property is dominated by the remnants of a fenced-in equipment storage/laydown area and contains the majority of the material piles remaining on the site. The eastern end of the fenced area contains two small metal tanks on skids (empty and labeled water tanks). The northeastern area of the property is scattered with numerous large dimension concrete sewer conduits and catch basins. A few crushed and empty 55-gallon drums are also found in this area.

The eastern and eastern-central portion of the property is characterized by open meadow containing little to no surface materials. Based on a Phase I Environmental Site Assessment (ESA), this area was the previous location of a ballfield used by the City during the 1960s and 1970s

(Panamerican Environmental 1998). Along the northern and southern sides of the site are two parallel stands of mature trees that appear to have been associated with former residential row housing. Remnants of the house concrete foundations are visible at various locations across the property.

1.1.2 Site History

Based on information contained in the Phase I ESA, the Lackawanna Steel Company (predecessor to the Bethlehem Steel Company) built company houses on the property around 1902. This residential area was called Smokes Creek Village or Old Village. The 1927 Sanborn map showed the Buffalo Brake Beam facility, as well as four rows of parallel housing units oriented east to west occupied the property. These housing units continued to the west of A Street and a perpendicular row existed east of the property across B Street on what is now property occupied by a Erie County Sewer Authority sewage treatment plant. First and Second Streets extended between these row housing units and to Hamburg Turnpike. The row houses are not depicted on the 1950 Sanborn map and it has been reported that they were demolished in the 1930s.

Information, maps, and photographs located at the City of Lackawanna Steel Plant Museum and long-time area residents revealed that coal and wood were used to heat the row houses until the 1950s, when furnaces were converted to natural gas. Historic period maps also illustrated two swampy areas north-northwest of the property on either side of Ridge Road.

After the housing units were removed, the property remained relatively vacant until the late 1950s and the property was used by local residents for gardens. City records indicate that the eastern and southeastern area of the property was graded, seeded, and was actively used by the City in 1973 as a recreation area that included a mini-bike trail and ballfield (called the "Old Village Ballfield"). The exact date of first use by the City for these purposes could not be ascertained.

In 1968, the Amadori Construction Co., Inc. (Amadori), began leasing the property from the Bethlehem Steel Company (BSC) and constructed the Amadori building. In 1973, Amadori purchased the property from BSC and sold it to Mark Roberts Construction. The property,

including the Amadori building site, was used to store, repair, and maintain construction equipment. In 1975, an area measuring 196 by 396 feet was fenced on the property. An undated aerial photograph associated with the 1980 Nussbaumer & Clark map showed that construction equipment storage and debris piles were present primarily within the fenced area on the northeast part of the site, to the east of the fenced area along the border with Buffalo Brake Beam, and to the north of the ballfield.

1.2 Report Organization

This report is divided into three sections. Section 1 provides background information and the results of the SI at the Amadori site. The next section (Section 2) presents the remedial action objectives for the site, the development of remediation goals, and the general response actions, which are assembled into remedial alternatives. Section 3 details information about each individual alternative and provides an assessment and a comparative analysis of the alternatives. This report organization is consistent with the format suggested by 6 NYCRR 375.

2.0 IDENTIFICATION AND DEVELOPMENT OF ALTERNATIVES

2.1 Introduction

This section presents the methodology and rationale used to develop remedial action alternatives for the Amadori project site.

2.2 Remedial Action Objectives

The remedial action objectives of this project are to evaluate and remediate site environmental contamination so that the property does not pose any human health risk and, therefore, can be marketed for development or sold by the City of Lackawanna. The property is currently vacant. These objectives also include identifying and developing remedial alternatives. In order to evaluate the practicality and feasibility of meeting this objective, it has been assumed that the site will be used for commercial/industrial purposes. Appropriate remedial action alternatives were developed and evaluated, and a remedy for the site was selected.

As explained in Section 2.2.2, both surface and subsurface contamination is considered for the development of the remedial alternatives. However, during the October 1998 meeting between NYSDEC, URSG, and the City of Lackawanna, the NYSDEC suggested that the areas of concern for the Amadori project are those immediately surrounding sampling locations AP-SS-2 and AP-SS-7, where the maximum PAHs and chromium concentrations were detected, respectively.

2.2.1 Selection of Cleanup Goals

The NYSDEC's *Determination of Soil Cleanup Objectives and Cleanup Levels* (TAGM 4046) provides a basis and procedure to determine soil cleanup levels (NYSDEC 1994). TAGM 4046 contains individual criteria for the chemicals detected at the site, as shown in Table 2-1. Also, TAGM 4046 limits the concentration of total semivolatile organic compounds (SVOCs) to 500 parts per million (ppm) or less. In addition, the NYSDEC has provided individual criteria for

cadmium (10 ppm), chromium (50 ppm), and lead (500 ppm), that are different than those included in TAGM 4046.

Furthermore, during the October 22, 1998 meeting between the City of Lackawanna, URSG and the NYSDEC, the NYSDEC indicated that detected concentrations of chemicals at background samples should be used as cleanup goals, if these concentrations are greater than the TAGM 4046 criteria. During the SI, two surface soil samples were collected from two background locations north of the site (Figure 2-1). These samples contained various PAHs and metals, several of which exceeded the TAGM 4046 criteria; however, they were within typical values for urban industrial areas. The concentrations from the two background samples were averaged and compared to TAGM 4046 criteria. For each chemical detected at the Amadori project site that has a TAGM 4046 value, or a NYSDEC provided value, the cleanup goal was considered to be the greater of the respective TAGM 4046 value, the average background concentration, or the value provided by NYSDEC. Table 2-1 shows the cleanup goals for the site. All of these levels have been established as cleanup goals for the site, considering that reuse of the property will be restricted to commercial/industrial purposes.

2.2.2 Contaminants of Interest

During the SI sampling, contaminants were detected in surface and subsurface soils that exceeded the TAGM 4046 cleanup criteria. PAHs and metals were detected in all locations, including background, and at levels above the regulatory criteria. Total SVOCs were detected at each surface soil sample at levels below the respective TAGM 4046 criterion. Additionally, most of the contaminants detected in onsite surface soils were at levels similar to or approximately twice the background concentrations. Only PAHs at AP-SS-2, beryllium at AP-SS-1, and chromium at AP-SS-7 were detected at levels much higher than their respective background concentration. Generally, subsurface soil contamination was higher than that of surface soils.

Groundwater sampling during the SI revealed limited contamination of the groundwater at the northeastern part of the Amadori property (likely originating from an upgradient offsite source). However, the groundwater is not considered a medium of interest in this report and is not

further discussed for two reasons. First, there are no receptors using site groundwater as a potable water source (the surrounding area is serviced by the municipal water supply). Second, groundwater was encountered at depth greater than 8 feet and, therefore, will not likely be encountered by construction workers during site development.

2.3 General Response Actions

General response actions may be applied at a site to meet the remedial action objectives and may include: treatment, containment, excavation, extraction, disposal, institutional controls, no action, or a combination of responses. The following general response actions were identified as appropriate for the soils at the site:

- Excavation (partial or complete)
- Disposal
- Institutional controls

Treatment of soil, either on site or off site, was not included as a general response action due to the high cost of treatment. Contamination consisting of PAHs and metals, as at the Amadori site, can be treated by soil washing or solidification/stabilization. However, mobilization and operation of such a treatment system would be costly considering: 1) the small size of the site; 2) the volume of contaminated soils; and 3) the limited value of the property. Excavation and disposal of contaminated soils is considered to be less expensive than treatment of soil.

2.4 Development of Alternatives

The general response actions identified above have been assembled into remedial action alternatives that address the environmental concerns at the site. As discussed in Section 2.2, it is assumed that the site will be used for commercial/industrial purposes.

The primary exposure routes associated with PAHs and metals in the onsite soils are dermal contact, incidental ingestion, and inhalation. Consequently, in developing the remedial action

alternatives, the primary goal was to prevent contact, ingestion, or inhalation of the contaminated soils. Three alternatives were developed which include:

Alternative 1 - Excavation and Disposal

Alternative 2 - Partial Excavation and Disposal

Alternative 3 - Institutional Controls

These alternatives are discussed and evaluated in detail in Section 3.0.

3.0 DETAILED ANALYSIS OF ALTERNATIVES

3.1 Introduction

The detailed analysis of the remedial action alternatives developed for the site involved presenting and analyzing relevant information necessary to select a remedy for the site. The proposed alternatives were analyzed in this report using the following seven evaluation criteria as defined in 6 NYCRR 375:

1. Overall protection of human health and the environment
2. Compliance with remedial action objectives
3. Short-term effectiveness
4. Long-term effectiveness and permanence
5. Reduction of toxicity, mobility, and volume
6. Feasibility (i.e., implementability, cost)
7. Community acceptance

The criterion of community acceptance will be evaluated by the NYSDEC following issuance of the proposed remedial action plan.

3.2 Individual Analysis of Alternatives

The components of each alternative are further defined in the following paragraphs with regard to the extent of the contaminated media to be addressed; the technologies to be used; and any performance requirements associated with those technologies. Cost estimates were prepared and are shown in Tables 3-1 to 3-3.

It should be noted that the removal of debris piles that exist at the site are not included in the cost analysis of the alternatives. Debris pile removal is assumed to be the responsibility of the purchaser of the site.

3.2.1 Alternative 1 - Excavation and Disposal

3.2.1.1 Description

Under this alternative, contaminated fill above native soil would be excavated (average depth of fill is 4 feet), and the excavated fill would be disposed of off site. Site excavation would be performed using traditional earthmoving equipment, such as backhoes and bulldozers. Excavated material would be transported using lined dump trucks or trailers to the nearest permitted solid waste landfill approved to accept nonhazardous contaminated soil. The excavated soil would be covered during transportation. The excavated areas would be backfilled to original grade with clean fill.

The estimated total volume of soil to be excavated under this alterative is 47,500 cubic yards. The same volume of clean soil also would be required for backfilling. Deed restrictions on future site use would not be necessary for this alternative, because all contaminated soils will be removed (contamination is assumed to extend in the fill only).

3.2.1.2 Assessment

This alternative complies with remedial goals and eliminates human health hazards. Implementation of this alternative would cause some short-term impacts (e.g., dust generation, noise disturbance, increased vehicular traffic) on the surrounding community and onsite construction workers. These impacts can be easily controlled through standard construction practices on health and safety. No long-term impacts on human health are anticipated from this alternative. This alternative would remove contamination from the site soils and, therefore, would reduce the toxicity, mobility, and volume of the site contamination. The contaminants would not be destroyed, however they would be moved away from the site. This alternative can be easily implemented by removing contaminated soils from the site and backfilling the excavation with clean fill. Costs for implementing this alternative are presented in Table 3-1.

3.2.2 Alternative 2 - Partial Excavation and Disposal

3.2.2.1 Description

Under this alternative, fill at the site surrounding the sampling locations AP-SS-2 and AP-SS-7 would be excavated to an approximate depth of 1 foot, and the excavated soil would be disposed of off site. Soils in the upper 1-foot interval are assumed to pose the most risk to human receptors, because they are easily accessible when landscaping, gardening, small repair, or other activities occur. Soil excavation would be performed using traditional earthmoving equipment, such as backhoes and bulldozers. Excavated material would be transported using lined dump trucks or trailers to the nearest permitted solid waste landfill approved to accept nonhazardous contaminated soil. The excavated soil would be covered during transportation. The excavated areas would be backfilled to original grade with clean fill.

The estimated total volume of soil to be excavated under this alternative is 500 cubic yards. The same volume of clean soil also would be required for backfilling. Deed restrictions on future site use and onsite excavations would be necessary to prevent contact with contaminated soil not removed during remediation.

3.2.2.2 Assessment

This alternative does not comply with remedial goals. However, it is important to note that the highest surface contamination will be removed from the site. The contamination in surface soils that will be left in place will not differ significantly from the contamination in area background soils. Potential human exposure is small in other contaminated areas since vegetation covers most of the Amadori project site. Moreover, developing the property for commercial/industrial use will protect human health further by permanently covering much of the site with impermeable structures (e.g., building floors, driveways, parking lots).

Implementation of this alternative would cause minimal short-term impacts (e.g., dust generation, noise disturbance, increased vehicular traffic) on the surrounding community and onsite construction workers. These impacts can be easily controlled through standard construction practices on health and safety. No long-term impacts on human health are anticipated from this

alternative. This alternative would partially reduce the toxicity, mobility, and volume of the site contamination. Deed restrictions limiting and specifying requirements for future site work would be necessary. The establishment of deed restrictions will provide increased protection against potential effects on human health. Costs for implementing this alternative are presented in Table 3-2.

3.2.3 Alternative 3 - Institutional Controls

3.2.3.1 Description

Under this alternative, institutional controls would be implemented. These controls would consist of deed restrictions to limit development of the site to commercial/industrial uses, and to control future excavation and construction activities at the site.

3.2.3.2 Assessment

This alternative does not comply with the remedial goals. Also, it does not provide reduction in the toxicity, mobility, or volume of the contamination, since site contamination is left in place. However, considering that the site is currently mostly covered with grasses and weeds, the health risks associated with primary exposure routes of incidental ingestion, inhalation, and dermal contact are small.

In its existing condition, the site will not cause any short- or long-term impacts on human health or the environment. If construction occurs, minimal short-term impacts (e.g., dust generation, noise disturbance, increased vehicular traffic) are expected on the surrounding community and on site construction workers. These impacts can be easily controlled through standard construction practices on health and safety. In the case of site development, there will not be any long-term impacts on human health. The establishment of deed restrictions will provide adequate protection against potential effects on human health. Development of the property will provide further protection to human health, since much of the site area permanently will be covered with impermeable structures (e.g., building floors, driveways, parking lots). Costs for implementing this alternative are presented in Table 3-3.

3.3 Comparative Analysis and Recommendations

The chemicals of concern at the site are PAHs and chromium which generally are adsorbed onto soil grains and exhibit low mobility. Any remedial action should be designed to minimize the primary human exposure routes of ingestion, inhalation, and dermal contact.

Based on the assumption that the future use of the site will be limited to industrial/commercial purposes, the following remedial action alternatives should be implemented:

At a minimum, the institutional controls as described in Alternative 3 should be implemented. If the City or potential developers require additional safeguards, then surface soil from the two areas of concern (i.e., around AP-SS-2 and AP-SS-7) could be removed and a layer of clean soil, as outlined in Alternative 2, could be placed over these areas. Excavation and offsite disposal of the excavated fill layer of soil, as described in Alternative 1, also is a possibility, but is expensive.

Based on the comparative analysis of the three alternatives (presented in Table 3-4), Alternative 2 - Partial Excavation and Disposal is recommended. This alternative complies with most of the 6 NYCRR 375 criteria and is not cost prohibitive. Alternative 1 - Excavation and Disposal would be the best overall alternative, however its cost is significant (much higher than the property value). Alternative 3 - Institutional Controls is the minimum remedial action that provides some protection to human health.

REFERENCES

New York State Department of Environmental Conservation (NYSDEC). 1997. *Environmental Restorations Projects (Brownfields).* Technical and Administrative Guidance Memorandum DER-1: 4058 Revised. Albany, NY: Bureau of Program Management Division of Environmental Remediation. December.

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URS Greiner Consultants, Inc. (URSG). 1998. *Site Investigation for Site Investigation/Remedial Alternative Report, Amadori Project Site.* September. Buffalo, New York.

SITE LOCATION MAP

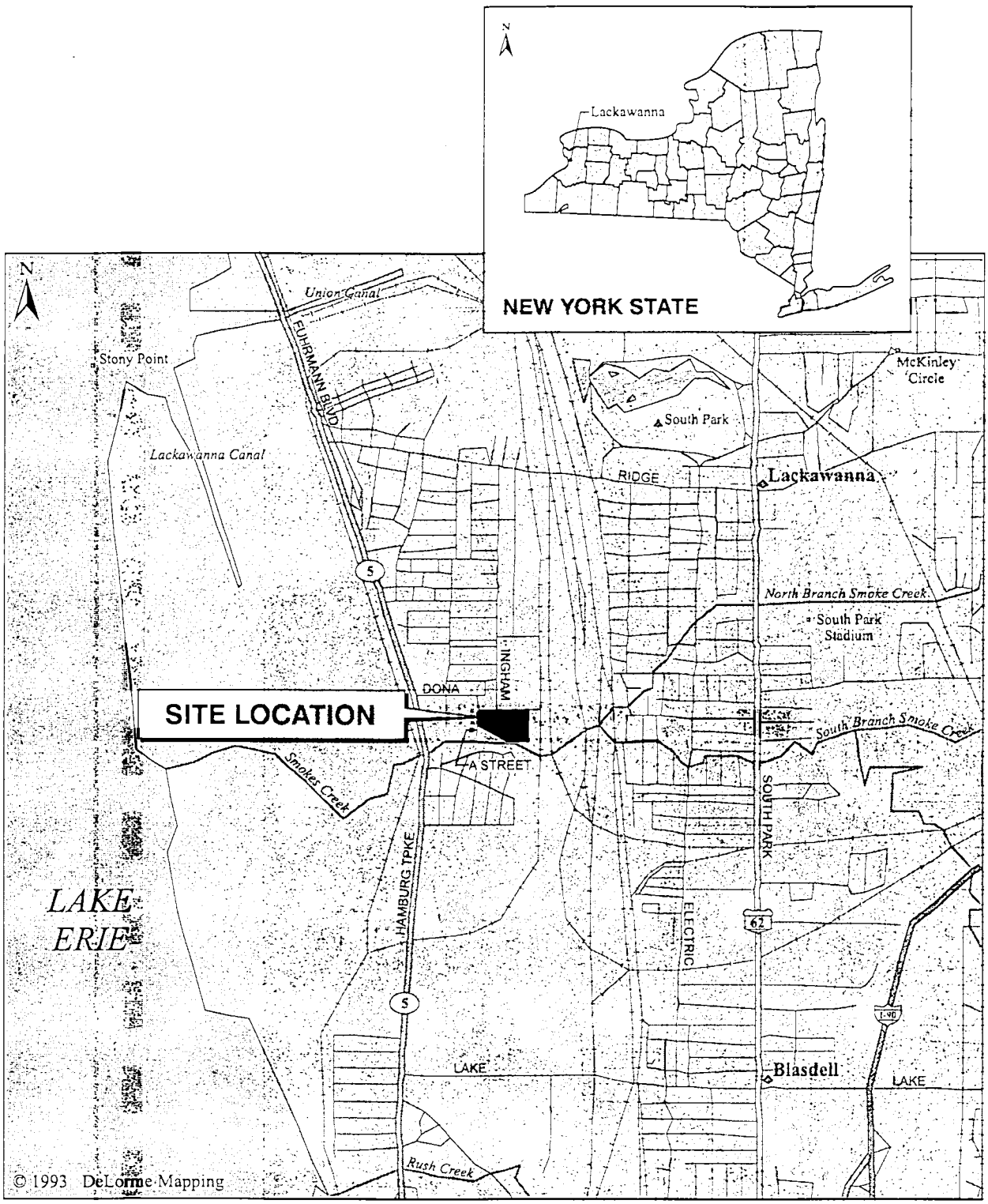

Figure 1-1

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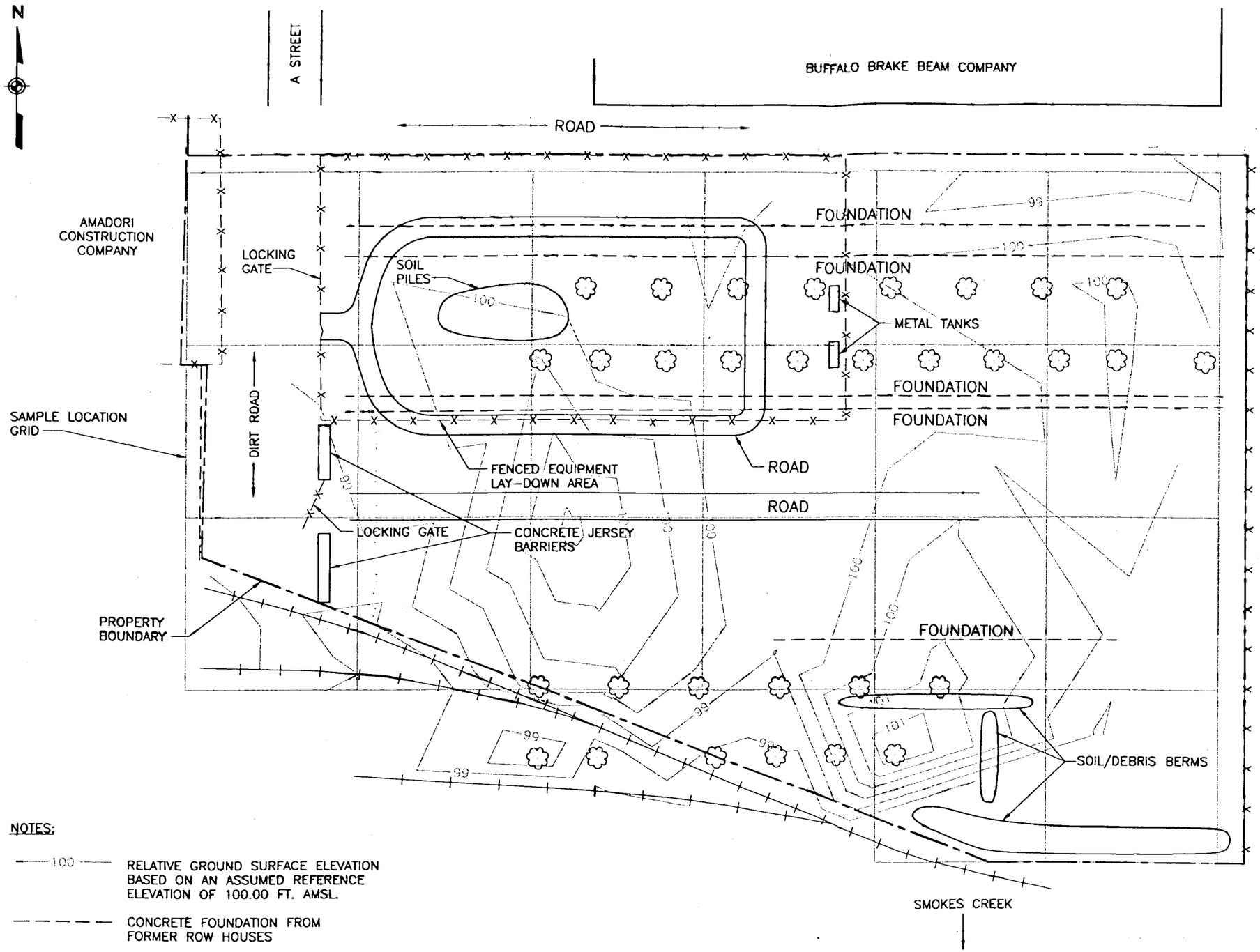

NOTES:

- 100 — RELATIVE GROUND SURFACE ELEVATION BASED ON AN ASSUMED REFERENCE ELEVATION OF 100.00 FT. AMSL.
- CONCRETE FOUNDATION FROM FORMER ROW HOUSES
- RAILROAD LINE
- ROW OF COTTONWOOD TREES
- PROPERTY LINE

80' 0 80'

SCALE: 1"= 80'

SITE PLAN
AMADORI PROPERTY, LACKAWANNA, N.Y.

URS Greiner Consultants, Inc.

FIGURE 1-2

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N

A STREET

BUFFALO BRAKE BEAM COMPANY

ROAD

AMADORI CONSTRUCTION COMPANY

LOCKING GATE

SOIL PILES

SAMPLE LOCATION GRID

DIRT ROAD

FENCED EQUIPMENT LAY-DOWN AREA

PROPERTY BOUNDARY

FOUNDATION

SOIL/DEBRIS BERMS

SMOKES CREEK

B1 B2 AMW-1 AMW-2 AMW-3 AMW-4

SS-1 SS-2 SS-3 SS-4 SS-5 SS-6 SS-7

TT-1 TT-2 TT-3 TT-4 TT-5 TT-6 TT-7 TT-8 TT-9 TT-10 TT-11 TT-12 TT-13 TT-14 TT-15 TT-16 TT-17 TT-18 TT-19 TT-20 TT-21 TT-22 TT-23 TT-24 TT-25 TT-26

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 32.5 33 34 35 36 37 38 38.5 39 39.5 40

COUNTY OF ERIE R/O
(SEWAGE TREATMENT PLANT)

BETHLEHEM STEEL CORP.

SOUTH BUFFALO RAILWAY CO.

NOTES:

22 — GRID NODE LOCATION OF DISCRETE SURFACE SOIL SAMPLE GRAB

SS-1 — COMPOSITE SURFACE SOIL SAMPLE

AMW-1 — MONITORING WELL ID

B1 — BORING FOR ATTEMPTED WELL INSTALLATION

TT-1 — TEST TRENCH/SUSURFACE SOIL SAMPLE

80' 0 80'

SCALE: 1"= 80'

SAMPLE LOCATION PLAN
AMADORI PROPERTY, LACKAWANNA, N.Y.

URS Greiner Consultants, Inc.

FIGURE 2-1

CC-5587B

TABLE 2-1
AMADORI PROJECT SITE
CLEANUP GOALS

Location I.D.				AP-SS-BG-1	AP-SS-BG-2	Average Background Concentration	Cleanup Goal	Basis
Sample I.D.				AP-SS-BG-1	AP-SS-BG-2			
Matrix				Soil	Soil			
Date Sampled				22-Jun-98	22-Jun-98			
Parameter	Units	TAGM Soil Cleanup Objective	NYSDEC Criteria	Background Concentration	Background Concentration			
Semivolatiles								
Naphthalene	UG/KG	13000		78	130	104	13000	TAGM
2-Methylnaphthalene	UG/KG	36400		100	130	115	36400	TAGM
Acenaphthylene	UG/KG	41000		120	140	130	41000	TAGM
Acenaphthene	UG/KG	50000		68	280	174	50000	TAGM
Dibenzofuran	UG/KG	6200		62	170	116	6200	TAGM
Fluorene	UG/KG	50000		74	280	177	50000	TAGM
Phenanthrene	UG/KG	50000		960	2700	1830	50000	TAGM
Anthracene	UG/KG	50000		210	690	450	50000	TAGM
Carbazole	UG/KG			150	430	290		
Fluoranthene	UG/KG	50000		1700	3400	2550	50000	TAGM
Pyrene	UG/KG	50000		1400	2700	2050	50000	TAGM
Benzo(a)anthracene	UG/KG	224		740	1200	970	970	Background
Chrysene	UG/KG	400		930	1400	1165	1165	Background
Benzo(b)fluoranthene	UG/KG	1100		960	1500	1230	1230	Background
Benzo(k)fluoranthene	UG/KG	1100		1000	1500	1250	1250	Background
Benzo(a)pyrene	UG/KG	61		850	1300	1075	1075	Background
Indeno(1,2,3-cd)pyrene	UG/KG	3200		300	450	375	3200	TAGM
Dibenz(a,h)anthracene	UG/KG	14		130	180	155	155	Background
Benzo(g,h,i)perylene	UG/KG	50000		270	420	345	50000	TAGM
Total Semivolatiles	UG/KG	500000		10102	19000	14551	500000	TAGM
Metals								
Aluminum	MG/KG				8360	8360		
Antimony	MG/KG			1.5		1.5		
Arsenic	MG/KG	7.5		12.1	12.3	12.2	12.2	Background
Barium	MG/KG	300		61.7	62.2	61.95	300	TAGM
Beryllium	MG/KG	0.16		0.43	0.46	0.445	0.445	Background
Cadmium	MG/KG	1	10	6.2	5.7	5.95	10	NYSDEC
Calcium	MG/KG			27400	10500	18950		
Chromium	MG/KG	10	50	57.6	35.7	46.65	50	NYSDEC
Cobalt	MG/KG	30		7	7	7	30	TAGM
Copper	MG/KG	25		41.7	35.8	38.75	38.75	Background
Iron	MG/KG	2000		30800	34000	32400	32400	Background
Lead	MG/KG		500	181	163	172	500	NYSDEC
Magnesium	MG/KG			5770	2390	4080		
Manganese	MG/KG			1650	963	1306.5		
Mercury	MG/KG	0.1			0.07	0.07	0.1	TAGM
Nickel	MG/KG	13		17.9	16.4	17.15	17.15	Background
Potassium	MG/KG			1010	885	947.5		
Selenium	MG/KG	2		3	4.1	3.55	3.55	Background
Silver	MG/KG			0.86	0.37	0.615		
Vanadium	MG/KG	150		27.5	19.5	23.5	150	TAGM
Zinc	MG/KG	20		441	373	407	407	Background

TAGM Soil Cleanup Objectives - New York State Department of Environmental Conservation. Division technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, January 24, 1994.

NYSDEC criteria provided to URSG at the October 22, 1998 meeting between NYSDEC, URSG and the City of Lackawana.

TABLE 3 - 1
AMADORI PROJECT SITE
COST ESTIMATE
ALTERNATIVE 1 - EXCAVATION AND REMOVAL

Item	Units	Unit Cost	Source	Quantity	Total Cost
Site Preparation, Clearing, Grubbing	ACRE	$2,925	1	2	$5,850
Soil Excavation + Load	CY	$2.30	1	47,500	$109,250
Transportation to Disposal Facility	CY	$10	1	47,500	$475,000
Offsite Disposal + Testing	TON	$9	2	61,750	$555,750
Backfill	CY	$1	1	47,500	$47,500
Transportation of Backfill	CY	$5	1	47,500	$237,500
Grading/Compaction	CY	$6.20	1	41,600	$257,920
Topsoil Purchase + Placement	CY	$20	2	5,900	$118,000
Seeding, Mulching and Fertilizer	ACRE	$1,949	1	8	$16,372
SUBTOTAL					$1,823,000
Contingencies		$1,823,000		15%	$273,450
Engineering		$1,823,000		15%	$273,450
Overhead and Profit		$1,823,000		10%	$182,300
SUBTOTAL					$729,200
TOTAL COST					$2,552,000

SOURCES:

1 - Means Site Work and Landscape Data, 1998

2 - URSG Estimate

TABLE 3 - 2
AMADORI PROJECT SITE
COST ESTIMATE
ALTERNATIVE 2 - PARTIAL EXCAVATION AND REMOVAL

Item	Units	Unit Cost	Source	Quantity	Total Cost
Site Preparation, Clearing, Grubbing	ACRE	$2,925	1	0	$0
Soil Excavation + Load	CY	$2.30	1	500	$1,150
Transportation to Disposal Facility	CY	$10	1	500	$5,000
Offsite Disposal + Testing	TON	$9	2	650	$5,850
Backfill	CY	$1	1	500	$500
Transportation of Backfill	CY	$5	1	500	$2,500
Grading/Compaction	CY	$6.20	1	400	$2,480
Topsoil Purchase + Placement	CY	$20	2	100	$2,000
Seeding, Mulching and Fertilizer	ACRE	$1,949	1	0.29	$573
SUBTOTAL					$20,000
Contingencies		$20,000		15%	$3,000
Engineering		$20,000		15%	$3,000
Overhead and Profit		$20,000		10%	$2,000
Legal and Administrative Fees for Deed Restrictions	LS	$2,500	2	100%	$2,500
SUBTOTAL					$10,500
TOTAL COST					$31,000

SOURCES:

1 - Means Site Work and Landscape Data, 1998

2 - URSG Estimate

TABLE 3 - 3
AMADORI PROJECT SITE
COST ESTIMATE
ALTERNATIVE 3 - INSTITUTIONAL CONTROLS

Item	Units	Unit Cost	Source	Quantity	Total Cost
Legal and Administrative Fees	LS	$2,500	2	1	$2,500
SUBTOTAL					$2,500
TOTAL COST					$2,500

SOURCES:

1 - Means Site Work and Landscape Data, 1998

2 - URSG Estimate

TABLE 3-4
AMADORI PROJECT SITE
COMPARATIVE ANALYSIS OF ALTERNATIVES

Evaluation Criteria	Alternative 1 Excavation & Disposal	Alternative 2 Partial Excavation & Disposal	Alternative 3 Institutional Controls
Overall Protection of Human Health and the Environment	Protective of human health and the environment.	Potential for human exposure is small. Development of property will provide further protection by permanently covering much of the site with impermeable structures (e.g., buildings, roads, parking lots).	Potential for human exposure is relatively small
Compliance with Remedial Action Objectives	Achieves remedial action objectives	Achieves remedial action objectives	Does not comply with remedial objectives
Short-Term Effectiveness	Possible short-term impacts (e.g., dust generation, noise disturbance, increased vehicular traffic)	Possible short-term impacts (e.g., dust generation, noise disturbance, increased vehicular traffic)	No impact. Minimal impacts if construction occurs
Long-Term Effectiveness and Permanence	Reduction of potential risk from soil	Reduction of potential risk from soil	Contamination reduced by natural processes
Reduction of Toxicity, Mobility, and Volume	Contamination removed offsite. Soil at the site will not have any toxicity or mobility.	Contamination partially removed offsite. Soil at the site will have reduced toxicity, mobility, and volume of contamination.	No reduction of toxicity, mobility, or volume of contamination
Feasibility	Can be implemented. Materials and services available. Cost: $2,552,000	Can be implemented. Materials and services available. Cost: $31,000	Easily implementable Cost: $2,500