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Report

Remedial Alternatives Report Roblin Steel

May 2001

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REMEDIAL ALTERNATIVES REPORT

ROBLIN STEEL

Prepared for

CITY OF NORTH TONAWANDA, NEW YORK

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May 2001

Project No. 80049FA

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CHAPTER 1

INTRODUCTION

1.1 GENERAL

In 1997, through tax delinquency, the City of North Tonawanda obtained the former Roblin Steel facility (see Figure 1, the site location map). The facility is abandoned, most fixtures of any value have been salvaged, and vandalism and miscellaneous refuse are apparent. The City has received a "brownfields" redevelopment grant through the New York State Clean Water/Clean Air Bond Act to facilitate the rehabilitation of the site so that it may be beneficially used by a new tenant, resulting in new jobs and an enhanced property tax position for the City. However, as part of the redevelopment of the site, soil and groundwater impacts identified during previous studies need to be addressed.

This report serves as the Remedial Alternatives Report for the Roblin Steel site. The purpose of the report is to use information derived during the site investigation to identify contaminants and areas of contaminated media at the site. Once these areas have been identified, the goal of the report is to identify appropriate forms of remediation for the site so it can be returned to beneficial use without posing unacceptable risk to new occupants, neighbors, or the environment in the vicinity of the site.

The remainder of this chapter summarizes background information about the site that was presented in the May 1999 Site Investigation Report (revised May 2000) and the February 1995 Preliminary Site Assessment Report. Chapter 2 identifies remedial action objectives for the site and develops remedial alternatives for management of the site-related impacts. Chapter 3 summarizes additional soil sampling that was performed to better define areas of impact and to complete the subsurface characterization of the site. Chapter 4 contains a detailed analysis of the remedial alternatives that have been developed for the site.

1.2 BACKGROUND INFORMATION

A. **Site History.** Manufacturing operations are reported to have begun at the site in 1918, when the property was owned by the Buffalo Bolt Company. Roblin Seaway Industries, Inc. (a precursor to Roblin Industries, Inc.) purchased the manufacturing plant and property in 1961. From 1977 to 1987, Confer Plastics leased two long, narrow buildings on the west side of the site. In 1985, Roblin Industries sold a 4.9-acre portion of the site and the building on that portion of the site to Armstrong Pumps, Inc. In 1987, Roblin Industries declared bankruptcy, and all activities ceased at the site. In 1989, the property owned by Roblin Industries was divided. As a result of foreclosure for back taxes, the City of North Tonawanda assumed ownership of 11.5 acres of the former Roblin Steel site in 1992. At that time, the remaining 11.8 acres of the Roblin site was owned by Banac Enterprises. In 1995, this portion of the site was being used as an automobile salvage operation. The City of North Tonawanda now owns the 11.8-acre parcel previously owned by Banac Enterprises, also acquired through foreclosure actions.

During the time that Roblin Industries owned the site (1961-1987), operations taking place in the buildings included hot rolling of steel rods and bars, sulfuric acid pickling of steel coils, lime and oil coating of steel coils, annealing of steel coils, wire drawing and melting, and casting of nickel. Wastes were regularly staged near the center of the southern portion of the site prior to being sent off site for disposal. Wastes generated at the site included sludge from the phosphate tank, iron oxide scale, lime, spent pickle liquor, and waste oil.

Several waste removal operations have taken place since operations ceased at the site. In 1990, 82 of 160 drums identified at the site were overpacked and characterized. Seven of the drums were identified as containing hazardous waste. Six of these drums were disposed off site in 1992, and the seventh drum was found to be empty. Also in 1992, a transformer was cleaned out and PCB-impacted soil from the area surrounding the transformer pad was excavated and disposed off site. The transformer was flushed with a mixture of diesel and hexane, and the flushing liquid was drummed with 18 of the 41 drums sent off site for disposal/incineration. The surface of the concrete transformer pad was milled off and the PCB-impacted concrete was also drummed and shipped off site for disposal. In 1995, a preliminary site assessment (PSA) was conducted at the site to determine whether there were environmental impacts of concern.

B. **Site Description.** The Roblin Steel site is an inactive manufacturing (steel processing) facility in the City of North Tonawanda, Niagara County, NY. The site is bounded by East Avenue on the north, Oliver Street on the east, Eighth Avenue on the south, and the Conrail-Erie Lackawanna railroad tracks on the west. One building, located on a 4.9-acre parcel adjacent to the northwest part of the site, has been occupied by Armstrong Pumps since 1985 and is an active facility.

The City of North Tonawanda is served by municipal water. There is no evidence of any private wells, potable or nonpotable, on the site. Industrial areas are adjacent to the site on the north and west, and residential areas are located to the east and south. A school and park are located within 1,600 feet of the facility to the east. The Niagara River is located approximately 1,000 feet west of the site. The adjacent residential properties are well maintained and small in size, with minimal yard areas. There is no evidence of private wells installed on any of these properties.

Most of the site consists of empty buildings in various states of disrepair and overgrown undeveloped property. Confer Plastics previously occupied two buildings on the western portion of the site, both of which have been burned. The location of one of these buildings is identified only by the presence of piles of bricks, while the other building still has portions of walls standing. A concrete reservoir from a former cooling pond is located in the approximate center of the site, south of another burned brick building. Waste piles, some from the previous operations at the site (possibly slag and scale) and some containing building rubble/materials, are present on the western and southern sides of the site. Drums of various materials are present outside near the southeast corner of the former mill building and inside the large brick building located in the center of the site. Transformer cases are present adjacent to the southeast side of the former mill building. Piles of tires are located adjacent to the south side of the cooling pond. Most of the area not covered by buildings or without heavy vegetative cover contains areas of black, stained soil. Although the site is fenced, access can be obtained through gaps in the perimeter fence and through gates that are not secure. Evidence of trespassers on the site was noted during site visits for sampling and well installation.

The former wire mill/rolling mill building was demolished in 2000 so that the steel in the structure could be salvaged. An asbestos survey was completed prior to demolition. Associated demolition debris was disposed of off site. The floor in the western side of the building consists of stained, contaminated wood blocks, some of which have heaved up from the subfloor. Trenches in the building are full of sediment/sludge. The floor of the eastern side of the building consists of dirt. Concrete-lined trenches are present in this portion of the building. Concrete-lined pickling tanks are also present in the northwest portion of the mill building. Two underground storage tanks (USTs) have been identified east of the building. At least one fiberglass UST was found west of the building at the site; however, the presence of the tanks could not be verified visually at the time this report was written.

C. **Nature and Extent of Contamination.** During the site investigation, soil and groundwater samples from a variety of locations were collected and analyzed for contaminants previously identified at the site. The following paragraphs summarize the nature and extent of contamination identified by the analytical results from the sampling activities. Areas of Concern are identified on Figure 2.

1. **Groundwater.** The only groundwater impacts identified during the site investigation included chlorinated volatile organic compounds (VOCs) detected in samples from Monitoring Well MW-3S in the southeast corner of the site. Compounds detected in the sample from MW-3S included 1,2-dichloroethene (1,2-DCE) at 62 ppb, trichloroethene (TCE) at 56 ppb, and tetrachloroethene (PCE) at 40 ppb. Samples from Monitoring Wells MW-11S and MW-12S were not found to contain VOCs, indicating the extent of the chlorinated VOC impacts is limited to the MW-3S area. MW-18S was installed in a subsequent phase of work, downgradient from MW-3S. There was minimal impact (13 ppb total VOCs) detected in that well, indicating a very localized occurrence of VOCs at MW-3S. Although elevated concentrations of some metals were found in some groundwater samples, most of these metals detected (iron, manganese, and magnesium) are found naturally dissolved in groundwater.

Wells MW-16S and MW-17S were installed to investigate potential impacts near reported USTs. Groundwater samples collected from these wells did not have any VOCs or STARS semi-volatile organic compounds (SVOC) compounds detected during analytical quantification.

2. **Interior Surface Conditions**. Although the 1995 PSA had identified polycyclic aromatic hydrocarbons (PAH)-contaminated soil beneath the wood block floor in the former mill building, during the field activities, it was noted that the wood block floor was underlain by a concrete slab or subfloor. The PAH-impacted material was more accurately determined to be residue which had seeped through cracks in the wood block floor and accumulated over time. PAH impacts in this residue were confirmed during the site investigation. In general, concentrations of individual PAH compounds were above recommended soil cleanup guidelines in all interior residue samples. The highest concentrations were found in samples collected near the north end of the wire mill building and in one sample from inside the large brick building.

3. **Soils Conditions.** In general, one or more PAHs were found at elevated levels in all soil samples collected from the site. PCBs were detected in one sample from the southeast side of the wire mill building, adjacent to MW-3. However, the concentration is at the cleanup goal. PCBs were detected above cleanup goals in two of the three samples collected from the area between the mill building and the large brick building. Although this portion of the site had undergone a PCB cleanup in the past, no confirmatory samples were collected following the remedial actions. It appears that further cleanup activities may be warranted. Finally, elevated concentrations of metals were also detected in soil samples from various locations around the site. The metals that were detected at concentrations above cleanup goals include antimony, beryllium, cadmium, chromium, mercury, and lead.

Soil samples were collected from MW-16S and MW-17S, which were installed to evaluate the areas where USTs reportedly exist. Soil samples collected during installation of the wells were found to contain STARS contaminants. The samples from both well locations were found to contain several PAHs at concentrations exceeding cleanup guidelines, and the sample from MW-17S was found to contain petroleum VOCs at concentrations exceeding cleanup guidelines. A tank was visible at the location of MW-17S; however, no evidence of a tank was noted when MW-16S was installed.

4. **Waste Piles and Drums.** Besides the contaminated soil and groundwater areas identified above, there are a number of waste piles and/or waste materials in various locations around the site. Many of these wastes contain contaminants that could pose a threat to the environment if spilled or handled improperly. Several piles of material described as containing mill scale or slag are present in the southern portion and along the western side of the site adjacent to the railroad tracks. A pile of white material, presumably lime, was present inside the former mill building. Several cardboard drums labeled "corrosive" were present adjacent to the pile. Two large piles of tires are present adjacent to the southern side of the cooling pond. Piles of building rubble, including some that are just bricks, are present in many areas of the site. Finally, numerous drums are present in various locations around the site. Adjacent to the southeast corner of the mill building are drums containing lubricants and antifreeze, probably associated with the former automobile salvage operations that took place in the building. Overpacked drums and normal drums from the historical interim remedial measures are present inside the large brick building in

the center of the site. The contents of most of the drums are not known. Debris located in the rolling mill/wire mill building was removed at the time of the building's demolition.

D. **Contaminant Fate and Transport.** Although a number of contaminants were found in surface and subsurface soils around the site, none of the contaminants were identified in the groundwater (with the exception of MW-3S), indicating impacts are likely to be confined to the surface or upper few feet of soil across the site. The groundwater in the vicinity of MW-3S apparently flows toward Oliver Street and infiltrates a combined sewer that runs along the street instead of toward the Niagara River.

E. **Fish and Wildlife Impacts.** A Step 1 fish and wildlife impact analysis was completed for the Roblin Steel site. It concluded that there is very little diversity of vegetation at the site due to the developed nature of the area. In addition, the dense development of the site and surrounding areas provides limited habitat for wildlife species. The primary value of the natural resources at the site lies in redeveloping the site for commercial and/or recreational opportunities.

F. **Human Heath Risk Assessment.** The risk assessment indicated there would likely be unacceptable risks associated with site-related contaminants. Most of the potential health risks are due to the possibility of direct contact with the contaminated soil and residue under the wood block floor inside the buildings. Because the site is located in an area served by public water, restrictions can be emplaced to prevent the installation of private wells in the area of the chlorinated VOC impacts.

1.3 AREAS OF CONCERN

Based on the conclusions of the SI, seven Areas of Concern have been identified. The identification and development of alternatives presented in Chapter 2 will address each of the Areas of Concern listed below:

AOC-1	Miscellaneous Drums and Waste Piles
AOC-2	Building Ruins
AOC-3	Wood Block Floor with Impacted Soil/Residue
AOC-4	Impacted Soil
AOC-5	Underground Storage Tanks
AOC-6	Impacted Groundwater
AOC-7	Cooling (Quench) Pond

CHAPTER 2

IDENTIFICATION AND DEVELOPMENT OF ALTERNATIVES

2.1 INTRODUCTION

Remedial action objectives are developed by specifying contaminants and media of interest, exposure pathways, and remediation goals. The information required for this part of the remedial alternative (RA) evaluation includes a determination of the nature and extent of the contamination and the potential for the contamination to adversely affect a potential receptor. This information was presented in the Site Investigation (SI) Report and summarized in Chapter 1 of this report. This determination is then used to help identify general response action technologies that are appropriate for the site characteristics. The general response action technologies are then evaluated with respect to effectiveness, reliability, and cost. The technologies that survive this initial screening are combined into alternative remedial actions for the site as a whole, or for specific areas of the site. The developed alternatives must comply with the scope of remediation, which includes contaminant cleanup goals, areal extent of required remediation, and performance and design standards. The cleanup goals are derived from standards, criteria, and guidance (SCGs), applicable or relevant and appropriate requirements (ARARs), or site-specific risk factors. This procedure follows 6 NYCRR 375-1.10 remedy selection requirements.

The overall remedial action objective for the Roblin Steel site, as for any inactive hazardous waste site, is to provide for protection of human health and the environment by minimizing potential contact with, and the migration potential of, site-related contaminants. This, in turn, minimizes the only identified exposure pathway.

Remedial actions must also conform to SCGs that are generally applicable, consistently applied and promulgated, or that are relevant and appropriate for the site. Included as SCGs for the site are statutory requirements which establish cleanup levels for protection of public health and the environment. Alternatively, a public health evaluation (or baseline risk assessment) can be used to establish risk-based cleanup goals.

It is the City's intention to redevelop the property in a manner that will bring the greatest economic benefit to the City. The City hopes to attract a commercial or industrial user to the site. To facilitate this goal, the City currently envisions demolishing the existing structures on the property. Depending on end use, however, this may not be necessary. In addition to complying with SCGs, the evaluation of alternatives will also be conducted with a regard for the City's goals for the property.

Once the remedial action objectives are refined for the site, alternatives are assembled that will satisfy the objectives. The assembled alternatives should provide a range of options and sufficient information to provide comparison. Response actions should, in turn, include a range of technologies that: (1) provide permanent solutions to the contaminant source so that long-term management is not required; (2) provide treatment which results in reduction in contaminant volume, toxicity, or mobility; (3) provide containment of the contaminant source; and (4) involve no action. The no action alternative is often used only as a basis of comparison. In the following evaluations, the no action alternative is retained for all Areas of Concern to serve as a basis of comparison. However, in all but one Area of Concern, the no action alternative is eliminated from further consideration but is retained for comparison purposes. In one of the seven Areas of Concern, the no action alternative is retained as a potential course of action. To represent this in this report, the no action alternative is retained on the "Results of Preliminary Screening" tables for all of the Areas of Concern.

If contaminated groundwater has been identified at the site, the need for groundwater control actions should be assessed. This assessment should, if possible, address both cleanup levels and the time frame within which the cleanup objectives might be achieved. Depending on site conditions, alternatives should be developed which achieve chemical-specific regulatory or risk-based levels within varying time frames using different methodologies. Besides containment and active treatment options, other management options, such as institutional controls, may be possible for impacted groundwater. Furthermore, institutional controls, which ensure adequate protection against exposure, may be appropriate for the site.

The risk assessment which was completed as part of the SI Report has identified that the existing soil concentrations pose a public health risk; therefore, remedial actions are warranted, especially with respect to surface soils and the residue under the wood block floors inside the buildings. The Roblin Steel site is further complicated by the presence of numerous waste piles and objects which also pose a potential risk to site users if left in the current state.

The remainder of this chapter presents the development of remedial action alternatives for the Roblin Steel site. Because of the size of the site and the number of discrete areas requiring some form of management, alternatives have been identified separately for each area of the site.

2.2 AREA OF CONCERN 1 - MISCELLANEOUS DRUMS AND WASTE PILES

A. **Description of Area of Concern.** During the site investigation activities, it was noted that there were a number of waste piles and/or waste materials in various locations around the site, as described below:

1. Several large piles of tires are present immediately to the south and southeast of the cooling pond.

2. A group of drums containing unknown liquids was present near the southeast corner of the former rolling mill building and the fence along Oliver Street. These drums were most likely related to the 1995 automobile salvage operation. Some of these drums were removed in May 2000 as part of the rolling mill demolition project and some remain on site. Additional drums are present inside the eastern side of the large brick building. The building roof has collapsed onto some of the drums, prohibiting access to determine if the contents are labeled. These drums are reportedly associated with the 1990 and 1995 removal actions that took place at the site. They may also possibly date to previous operations. According to conversations with New York State Department of Environmental Conservation (NYSDEC) representatives and a review of NYSDEC files that confirmed the conversations, drums containing hazardous materials have been removed from the site. Based on existing information, the only remaining drums contain ancillary materials such as general refuse and personal protective equipment (PPE). These drums will be managed as solid waste. The exact number and contents of all the drums is unknown.

3. Several piles of waste material are present in the southern portion of the site and along the western side of the site adjacent to the railroad tracks. This material was identified during the preliminary site assessment as being mill scale and/or slag.

4. There are several piles in various locations around the site that appear to contain debris consisting of miscellaneous building material.

5. A pile of white material and bags of lime were noted inside the former wire mill building.

These waste materials potentially contain contaminants that could pose a threat to the environment if handled improperly. There is also potential for contaminants to leach into underlying soil and groundwater over time due to stormwater infiltration. Although the waste materials differ, it is likely that similar response actions will be required for management of the material in order for site development to occur. Therefore, the various waste materials and debris have been grouped together as one area of concern.

B. **Development of Remedial Objectives.** As stated in Section 2.1, the remedial action objective for the Roblin Steel site is to provide for protection of human health and the environment by minimizing potential contact with, and the migration potential of, site-related contaminants. Remedial action objectives for the separate areas of waste include:

1. Prevent direct contact with waste piles and drum contents.

2. Prevent spills and/or leaks of drummed material.

3. Prevent or minimize the possible leaching of contaminants from the material in waste piles.

C. **Identification of Response Actions and Technology Options.** During this portion of the RA Report, technology options for satisfying response actions are identified for initial screening. Response actions include no action, institutional measures, containment measures, disposal options, and destruction or treatment options. Table 2-1 presents a summary of this initial screening of options for Area of Concern 1.

1. The no action response for Area of Concern 1 includes leaving the areas of waste material in place. Because the contents of many of the drums are unknown, and because many of the identified waste areas represent safety hazards if left in place, the no action response is not likely to be an acceptable action for the site. However, it has been retained for consideration for comparison purposes only.

2. Institutional controls for management of Area of Concern 1 include establishment of a long-term waste storage area at the site that would restrict access by unauthorized persons. Although relatively easy to implement, this option will not be effective in reducing the volume of waste at the site.

3. Disposal is the third response action for managing the areas of waste at the Roblin Steel site. The contents of the various drums and waste piles would need to be characterized to determine whether the material can be disposed off site, in a Part 360 landfill (non-hazardous or solid waste), or if the material needs to be sent to a RCRA permitted facility (hazardous waste). Any drums that are not labeled appropriately, as well as any drums that do not appear to be in good condition, will need to be overpacked. Once characterization is completed, the bulk and drummed material can be shipped in trucks to the appropriate permitted disposal facilities. It is possible that some of the material may need to be pretreated prior to disposal because of land ban restrictions. Disposal in permitted facilities is effective for long-term management of the waste materials and is easily implemented. Costs for disposal will depend on the results of the waste characterization.

4. A disposal/treatment option for the liquid, drummed, non-hazardous waste material at the Roblin Steel site is transportation to the City of North Tonawanda publicly owned treatment works (POTW), which uses activated carbon for treatment of wastewater. If the contents of the drums were added to the POTW influent in controlled rates, it is likely that the treatment plant could easily provide treatment for liquids containing organic compounds without impacting the discharge permit limits. Similar to the option for off-site disposal, this method is easily implemented and would be effective for most organic chemicals of concern. However, an analysis of the influent loadings would need to be done to determine whether the POTW could provide treatment for liquid wastes containing significant quantities of metals. Similarly, this option would not be appropriate for any liquids that are characterized as hazardous waste or for the waste materials that consist of solids, such as the building debris, the lime pile, and the waste piles (scale and slag).

5. Containment options for managing the waste materials at the Roblin Steel site include solidification or stabilization of the solid material, such as the lime and waste scale and/or slag piles, and creation of an on-site waste disposal cell. Solidification/stabilization uses reagents which, when mixed with contaminated soil or waste, results in the contaminants

being physically bound within a stabilized mass (solidification) or results in chemical reactions induced between the reagents and the contaminants, and subsequent mobility and leachability of the contaminants (stabilization).

Once stabilized, the material must be disposed either on or off site. Disposal on site is possible and the material could be used for pavement. This option is only reliable for contaminated material containing inorganic contaminants and semi-volatile organic contaminants. The other containment option includes creation of a lined and capped land disposal cell that would contain the waste materials on site. Because this option is potentially more costly and would require long-term management and monitoring, it has been rejected in favor of solidification/stabilization. Another containment option includes covering the waste with a layer of low permeability soil. This option would not be effective for the liquid waste in drums, the building residue, the lime, and the tires, but may be appropriate for the waste piles (slag and scale).

D. **Initial Screening of Technology Options.** The initial screening of response action options focuses on whether the options are effective and reliable, as well as the cost of the option. Those options that are obviously ineffective, unreliable, and/or too costly are rejected from further consideration, with the exception of the no further action alternative, which is retained throughout the entire screening process to form a baseline of comparison.

Although the no action alternative response is obviously ineffective for management of all the waste materials included in Area of Concern 1, it is required for comparison to all other options. Containment via creation of an on-site waste disposal cell has been rejected because it would likely not be effective for the drummed material. In addition, it would require long-term maintenance and monitoring, which would drive the costs higher than the other options. One alternative to disposal of the waste liquids in drums is treatment at the City of North Tonawanda POTW. This option has been retained for further consideration and would likely be very cost effective. Although institutional controls are possible, it is unlikely that access restrictions alone would be reliable and effective long term, particularly if the site changes hands. Therefore, the response actions and process options that have been retained following this initial screening include no action (for comparison only), disposal off site, treatment of waste liquids at the local POTW, and treatment of waste scale and slag by solidification/stabilization methods.

E. **Remedial Action Alternatives.** As discussed above, three response actions have been retained for further consideration for management of Area of Concern 1. The first alternative is no action. This alternative would allow everything to remain as it is on site. Because this alternative would not be effective at managing the waste materials if the site were redeveloped, and because some of the waste materials present are safety hazards and could impact the environment if left in place, this alternative will not be implemented. However, to be consistent with regulatory requirements, this alternative has been retained in the evaluation to serve as a baseline of comparison.

Alternative 2 includes characterization of all waste materials present on the site, followed by off-site disposal at permitted facilities. Following waste characterization, it is likely that several different disposal facilities would need to be identified, as some of the material may be suitable for disposal at a Part 360 landfill, some of the material may require disposal at a RCRA permitted landfill, and some material may need to go to a Part 360 C&D landfill. In addition, if any drums are found to contain non-hazardous liquid wastes, it is possible that the contents could be disposed/treated at the POTW. The City has begun negotiations for disposal of the tire piles. Because of the disposition of most of the waste material, excavation is not likely to be required, and the material will only need to be loaded into trucks and transported to the disposal facilities. It is likely, however, that the drums will need to be overpacked in order to meet Department of Transportation labeling requirements.

The third alternative retained for consideration is a combination of Alternative 2 above, and on-site solidification/stabilization. It is possible that the piles of scale and slag from the former steel manufacturing operations may be used as a portion of the aggregate should paving be required at the site. A leaching test could be utilized to determine the appropriate percentage of waste material that could be added to the aggregate without resulting in the leaching of metals from the solidified mass. The waste piles could be consolidated until areas requiring pavement are identified. At that time, the waste material could be used to reduce the amount of aggregate required for paving. In addition to this alternative, other types of waste material not suitable for use as aggregate would most likely still require off-site disposal. Included in this category are the building debris, the tires, and possibly the lime. Table 2-2 summarizes the alternatives for Area of Concern 1.

2.3 AREA OF CONCERN 2 - BUILDING RUINS

A. **Description of Area of Concern.** There are or were seven separate vacant buildings in various conditions on the Roblin site. At least three of the buildings have been burned and consist of piles of brick or portions of walls left standing. The largest buildings, the rolling mill and adjacent wire mill buildings, were demolished in May 2000. An asbestos survey was completed prior to demolition. Environmental conditions in those buildings (drums, tanks, waste piles, and asbestos) were managed by the demolition contractor.

The wire mill/rolling mill building was a metal and wood building standing with the roof intact. Trenches in the building are full of sediment/sludge. The floor of the eastern side of the building consists of dirt. Concrete-lined trenches are present in this portion of the building. There are some concrete tanks located within the wire mill building that will also need to be removed. The concrete tanks were used for sulfuric acid pickling of steel coils and are empty. Following the demolition of the buildings, the slab floors, trenches, and foundation of the buildings remained and require management.

There is one smaller building on the northeast section of the site that remains intact. It is an electric controls building located just east of the rolling mill building.

For the purposes of this report, all of the remaining building structures, including those that have fallen into rubble and those that are merely remaining foundations, are included as one area of concern.

B. **Development of Remedial Objectives.** The remedial action objective for the Roblin Steel site is to provide for protection of human health and the environment. Although there are not necessarily site-related contaminants in the building ruins, there is the potential for the buildings to continue falling down, injuring someone on the site.

The following materials are not considered site contaminants associated with the building ruins: the drums, waste piles, and the wood block floor with impacted and soil/residue. The asbestos-containing building materials are included in this area of concern.

General response actions for satisfying the remedial action objectives for this area of concern include:

1. Prevent further deterioration of the buildings.
2. Prevent threat to life and health from building ruins.
3. Prevent migration of asbestos-containing building materials from the site.

C. **Identification of Response Actions and Technology Options.** During this portion of the report, options for use on the building ruins Area of Concern 2 are identified for initial screening. The options include no action, stabilization of the buildings, and removal of the buildings. Table 2-3 presents a summary of the initial screening of the options.

1. The no action response for Area of Concern 2 includes leaving the building ruins as they stand. Because there is a threat to human life and health by leaving some of the buildings as they are, and because it is not consistent with the City's intentions for the property, the no action response has been rejected from consideration for the five buildings that are already falling down. The two most intact buildings are currently being demolished. Although not to be implemented, the no action alternative is retained for comparison purposes.

2. The next response action would be to stabilize the buildings to prevent them from falling down and creating a threat to human life and health. For many of the buildings, this would include knocking down the existing walls that are left standing without support or a roof. Although this may be an option, it would not facilitate the development of the site for structures. Due to the goal of the redevelopment of the site, this option has been rejected from consideration for the five buildings that are falling down.

3. The final option for the buildings is to remove them from the site. This would include removing the asbestos-containing building materials, properly disposing at a landfill, tearing down the buildings, recycling any building materials (such as brick and metal), and disposing of the remainder of the rubble as construction and demolition debris. This is the preferred option to provide the maximum flexibility for the redevelopment of the site.

D. **Initial Screening and Selection of Technology Options.** Due to the age and previous uses of the buildings, an asbestos inventory will need to be completed and any asbestos-containing building materials removed prior to dismantling the buildings. For the brick buildings, the remedial options are to clean and sell the used bricks to be used as they are or crushed and used as an aggregate. For the metal buildings, the metal could be cleaned and salvaged, depending on its market value. The remainder of the building materials, including the concrete tanks and concrete slabs, would be removed and sent to a construction and demolition landfill. However, there would be an option to leave the concrete slabs in place, depending on the proposed plans for the redevelopment of the site.

For buildings with areas of concern located in the interior, there is a safety concern to remove them prior to completing this option. There may be some demolition required prior to performing the other options.

For the three outbuildings that may remain intact, a building survey should be completed to determine if there are asbestos-containing building materials or other safety hazards that need to be removed. The future use or demolition of these outbuildings will be decided based on the redevelopment plans for the site.

E. **Remedial Action Alternatives.** Three response actions have been retained for further consideration. These include no further action, stabilizing the buildings to eliminate physical hazards, or demolishing the buildings. The no further action alternative is retained throughout the screening process to provide a baseline of comparison. In all likelihood, the future use of the site will not include the restoration of the more intact buildings. Demolition will be the probable alternative unless reuse of the rolling mill/wire building is foreseen. Remedial alternatives are summarized on Table 2-4.

2.4 AREA OF CONCERN 3 – WOOD BLOCK FLOOR WITH IMPACTED SOIL/RESIDUE

A. **Description of Area of Concern.** There are wood block floors in the wire mill/rolling mill building and the large brick building to the south of Armstrong Pumps. The majority of the blocks are approximately 3 to 4 inches thick and 4 to 6 inches on a side and do not appear to be uniform in size. In general, the wood block floors have buckled in several places. The wood blocks appear to be black, and there appears to be black sand between the concrete floor and the blocks. In some areas, the residue appears to contain a liquid substance. The thickness of the soil/residue varies in all locations. In all three buildings, there appears to be a concrete floor slab below the wood block floors. The thickness of the floor slab is unknown.

Samples of the soil/residue were obtained and tested for PAH compounds. Many of the samples exceeded the cleanup standards.

For the purposes of this report, all of the wood block floors with soil/residue are included as one area of concern.

B. **Development of Remedial Action Objectives.** The remedial action objective for the Roblin Steel site is to provide for protection of human health and the environment. General response actions for satisfying the remedial action objectives for this area of concern include:

1. Prevent direct contact with the impacted soil/residue.
2. Prevent migration of the impacted soil/residue to other areas by displacement.
3. Prevent reuse of the wooden blocks that are contaminated.

C. **Identification of Response Actions and Technology Options.** During this portion of the report, options for Area of Concern 3 are identified for initial screening. The options include no action, encapsulation of the wood block floors with impacted soil/residue, and removal of the wood block floors with impacted soil/residue. Table 2-5 presents a summary of the initial screening of the options.

1. The no action response for Area of Concern 3 includes leaving the wood block floors with impacted soil/residue in place. Because the risk assessment identified potential risks to human health by leaving these in place, the no action response will not be implemented. It will, however, be retained for comparison purposes only.

2. The next response action would be to encapsulate the wood block floors with impacted soil/residue. The three buildings where these floors exist have been scheduled for demolition; therefore, the floors would need to be removed prior to demolition to prevent contamination of the debris from the floors. Although this may be an option, it would not facilitate the development of the site for structures. Due to the goal of the redevelopment of the site, this option has been rejected from consideration.

3. The final option for the wood block floors with impacted soil/residue is to remove them from the site. This would include removing the materials and disposing at a landfill.

This is the preferred option to provide the maximum flexibility for the redevelopment of the site.

D. **Initial Screening and Selection of Technology Options.** Due to the condition and previous uses of the buildings, dismantling of some of the buildings prior to removing the wood blocks may be necessary for safety considerations. The wood block floors with impacted soil/residue could be removed and loaded onto trucks to be transported for disposal. The wood block floors with impacted soil/residue could be incinerated or sent to a landfill that accepts materials with this contamination.

E. **Remedial Action Alternative.** Three alternatives remain for managing the wooden block floors and the associated residue: no further action, encapsulation, or removal and disposal. The no further action alternative is retained throughout the screening process to provide a baseline of comparison. The removal of the blocks and residue is the more likely alternative in consideration of the future use plans of the site. Alternatives are summarized on Table 2-6.

2.5 AREA OF CONCERN 4 – IMPACTED SOIL

A. **Description of Area of Concern.** During the site investigation activities, several areas of contaminated soil were identified. In general, the soil was found to contain metals, PAHs, and, in some areas, PCBs (Arochlor 1260). Since most of the soil samples were collected from the surface, it is not clear whether the contaminants identified in the surface soils are present at depths below 1 foot. Based on limited soil boring information, it appears that there is approximately 2 feet of fill material across most of the site. Table 2-7 summarizes the PAH and PCB compounds of concern in surface soil samples collected from various locations at the Roblin Steel site. Table 2-8 summarizes metal concentrations in surface soil samples.

The risk assessment completed as part of the SI Report concluded that there were risks to human health associated with contact and accidental ingestion of contaminants in the surface soil. Therefore, implementation of remedial actions for management of the impacted surface soil is appropriate.

Prior to completing the detailed analysis of remedial alternatives for soil, additional characterization was performed. Additional sampling was conducted to better define the areal extent and depth of previously identified areas of impact. This work is described in Chapter 3.

B. **Development of Remedial Objectives.** As stated in Section 2.1, the remedial action objective for the Roblin Steel site is to provide for protection of human health and the environment by minimizing potential contact with, and the migration potential of, site-related contaminants. Remedial action objectives have been further refined for Area of Concern 4, the areas of impacted soil, as follows:

1. Prevent direct contact with the surface soil.

2. Prevent or minimize the possible leaching of contaminants from the soil into the groundwater.

C. **Identification of Response Actions and Technology Options.** During this portion of the RA Report, technology options for satisfying response actions are identified for initial screening. Response actions include no action, institutional measures, containment measures, disposal options, and treatment options. Table 2-9 presents a summary of the initial screening of options for Area of Concern 4.

1. The no action response for Area of Concern 4 includes leaving the impacted surface soil in place. The information included in the risk assessment portion of the SI Report did not indicate the potential for adverse risks to site workers if the site were redeveloped. However, many of the contaminants have been identified as potential carcinogens with no established reference doses. If the site was redeveloped and site access improved, it is likely that more people would have access to the impacted soil. This alternative will not meet the remedial objectives of the project and will not be implemented. It is retained in the evaluation for comparison purposes only.

2. Institutional controls for management of Area of Concern 4 include implementing access restrictions for the site. The perimeter fence would need to be upgraded and locking gates would need to be installed at all access points. Some form of security would be required in order to prevent unauthorized use in addition to the fencing. This option would be comparatively easy to implement and of moderate cost; however, it would not be effective in achieving remedial goals over time nor effective in achieving remedial goals. Also, it is inconsistent with the City's objective of redevelopment.

3. Containment options include capping the soil in place, either with a layer of clean soil (minimum 1-foot thick) or with asphalt pavement. If a soil cap is used, it is also possible to excavate and consolidate much of the impacted soil and form bermed areas that could be attractively landscaped once capped with soil. Any soil with PCB concentrations greater than TAGM 4046 cleanup goals would need to be excavated and disposed off site. Both of these options are easily implemented and relatively moderate in cost.

The soil cover would be effective in preventing contact with the contaminants in the soil, but would not be wholly effective in preventing leaching of contaminants out of the soil. It is possible that selection of appropriate plantings could result in minimum leaching of contaminants because the root zones would take up water that did not run off the berms. In contrast, a cap of impervious pavement would likely be effective in both preventing direct contact and minimizing leaching of contaminants. It is also possible that the soil would be suitable for solidification/stabilization (described under Area of Concern 1). This would need to be verified by appropriate testing to determine whether all of the organic contaminants were immobilized. If so, this excavated and solidified/stabilized soil could then be used as pavement over soil left in place in other portions of the site.

4. Treatment options for soils with a mixture of PCBs, PAHs, and metals are limited. One option that may reduce concentrations of the Roblin site contaminants of concern is soil washing. Soil washing is a water-based process used on excavated soils. It works by dissolving contaminants in the wash solution, and to a certain extent, removing uncontaminated portions of soil and leaving behind a smaller volume of fine particles to which contaminants are adsorbed. According to the USEPA remediation technology matrix, soil washing is applicable for treatment of soils with PAHs and metals, but has not been demonstrated to provide effective treatment for PCB-contaminated soil. However, because of the mixture of PAHs and metals, different wash reagents may be required. Therefore, the process may need to be implemented in a sequential fashion to remove all the contaminants of concern. Since only three soil samples from a small area of the site were found to exceed cleanup goals for PCBs, it may still be advantageous to evaluate this process for use on the majority of the impacted soils at the site. Average costs for soil washing are reported by the USEPA to be $170/ton for once-through treatment.

5. Disposal is the last option evaluated for Area of Concern 4. Options include excavation of the contaminated soil and disposing either off site in a permitted facility or

on site in a specially constructed land disposal cell. For both options, the soil would need to be excavated, staged in a secure area, and sampled for waste characterization. In practice, the limits of excavation (depth of excavation and lateral extent) would depend on the planned use of the site following redevelopment, except for PCB-impacted soil, which will be excavated to achieve cleanup goals as specified in NYSDEC TAGM 4046. The excavated soil would then need to be characterized. Once characterization is completed, soil can be shipped bulk in trucks to appropriate permitted disposal facilities. It may be advantageous to segregate excavated soil from various parts of the site, as it is possible that some of the material can be disposed in a Part 360 landfill, and other portions of the waste material may need to go to a hazardous waste landfill. This option is effective for long-term management of the waste materials and is easily implemented.

Costs for disposal will depend on the results of the waste characterization. A land disposal cell could be constructed on site, but this would require a liner, leachate collection, and a multi-layer cap. This would not be as readily implemented at the site and would require long-term restrictions on the use of that portion of the site. In addition, the long-term maintenance and monitoring plan that would be required makes this option more expensive than other options for this area of concern.

D. **Initial Screening of Technology Options.** The initial screening of response action options focuses on effectiveness and reliability, as well as the cost of the option. Those options that are obviously ineffective, unreliable, or too costly are rejected from further consideration. Although the no action response option is obviously ineffective for preventing contact with the contaminants in the soil and would not prevent or minimize leaching into the groundwater, it is required for comparison to all other options. The option that includes creating a waste disposal cell on the site has been rejected because it would be more difficult to implement than the other disposal options (excavated followed by off-site disposal). In addition, long-term maintenance would probably be more costly for this option than the other off-site disposal. On-site treatment via soil washing has been rejected since sequential washing steps would likely be required for the mixture of contaminants present in the soil at the site. This would drive the treatment costs up prohibitively. Finally, institutional controls (access restrictions alone) are possible; however, they would potentially be ineffective over time, especially if the site changes hands. Therefore, the only options to be retained following this initial screening include no action (for comparison basis only), off-site disposal, and on-site capping (either using asphalt, with or without some of the soil used as aggregate, or with clean soil).

E. **Remedial Action Alternatives.** As discussed above, four options have been retained for further consideration for management of Area of Concern 4. The first alternative is no action. This alternative would allow everything to remain as it is on site. Alternative 2 includes capping the impacted soil with a clean soil cap to prevent direct contact with contaminants. In practice, this would likely include excavation of the impacted soil and consolidation in bermed areas at strategic locations on the site, except for soil with concentrations of PCBs exceeding 10 ppm. Such soil would be excavated and disposed off site. These bermed areas would then be covered with a minimum of 12 inches of clean soil and landscaped. Alternative 3 includes capping the areas of impacted soil with a layer of asphalt or cement pavement. This alternative would prevent contact with the contaminated soil, and also reduce stormwater infiltration through the soil, thereby minimizing leaching of contaminants during storm events. If the areas of contamination are found to be widespread, this could result in extensive paving over areas that would be better left unpaved. Instead, it may be possible to excavate the soil in these areas and use it as aggregate for the pavement or as a base for areas that require fill material to bring the surface to proper grade. This would be similar to the solidification/stabilization option described under Area of Concern 1. Finally, Alternative 4 for this area of concern includes excavation of the contaminated soil, undertaking waste characterization, staging of the soil on site until waste characterization is complete, and transporting to appropriate permitted disposal facilities. In practice, the extent of excavation will depend on the planned reuse of the property. This option may be undertaken in conjunction with Alternatives 2 and 3, where soil left in place is covered with pavement or clean soil. Table 2-10 summarizes the four alternatives developed for Area of Concern 4.

2.6 AREA OF CONCERN 5 – UNDERGROUND STORAGE TANKS

A. **Description of Area of Concern.** To date, three USTs have been located at the site. Two steel tanks have been identified east of the former rolling mill. One fiberglass tank has been identified west of the rolling mill building. Additional fiberglass tanks may be present with the one already identified. Another tank is alleged to exist in the northwest corner of the site. Tank characterization and removal efforts are currently being contracted. For the purposes of this report, all USTs, regardless of location or contents, have been grouped together as one area of concern.

B. **Development of Remedial Objectives.** As stated in Section 2.1, the remedial action objective for the Roblin Steel site is to provide for protection of human health and the environment by minimizing potential contact with, and the migration potential of, site-related contaminants. Remedial action objectives have been further refined for the three USTs (Area of Concern 5) as follows:

1. Prevent direct contact with contents.
2. Prevent spills and/or leaks of UST contents.
3. Prevent or minimize the migration of contaminants from the USTs.

C. **Identification of Response Actions and Technology Options.** During this portion of the RA Report, technology options for satisfying response actions are identified for initial screening. Response actions include no action, containment measures, and closure. Table 2-11 presents a summary of the initial screening of options for the three USTs.

1. The no action response for Area of Concern 5 includes leaving the USTs in place. Because the contents and the integrity of the tanks is unknown, and because unlined USTs can pose a threat to the environment if left in place, the no action response will not be implemented. It is retained for comparison purposes only.

2. Containment measures for management of Area of Concern 5 include closing the tanks in place. This involves removing the tank contents, cleaning the tank interior, and filling the tank with concrete or flowable fill to prevent future use of the tank. Once the tanks have been located, this option is relatively easy to implement.

3. The last option for managing the USTs at the Roblin Steel site includes removing the tank contents and removing the tank itself. This is the preferred method for closing a UST. Similar to closing the tank in place, this option is easy to implement once the tank has been located, and is considered the preferred option for closing a UST.

D. **Initial Screening and Selection of Technology Options.** Because the number and condition of the reported underground storage tanks is unknown, the first requirement is that the City undertake investigative activities to locate the three USTs. A backhoe can be used to verify the presence of reported subsurface structures in the suspected areas. Following identification of the tanks, the preferred method from a regulatory point of view is to remove the tank contents and the tank itself. If a tank is found in a location that limits access by excavating equipment, the tank can be closed in place. The City of North Tonawanda is currently negotiating contracts with tank removal contractors to do the exploration work and then remove the tanks from the site. No further screening or evaluation of alternatives for this area of concern should be required.

E. **Remedial Action Alternatives.** Two remedial alternatives remain: closing the tanks in place and removing the tanks and the associated impacted material. Alternatives are summarized on Table 2-12. The City is already undertaking a program to remove the tanks.

2.7 AREA OF CONCERN 6 – IMPACTED GROUNDWATER

A. **Description of Area of Concern.** During the site investigation activities, groundwater in the southeast corner of the site was found to be impacted with low concentrations of chlorinated VOCs. Groundwater in this portion of the site presumably flows toward the combined sewer line that runs down the west side of Oliver Street at approximately the same elevation as the groundwater. Groundwater in a monitoring well in the vicinity of one of the USTs was also found to contain a sheen indicative of potential petroleum contamination, although no VOCs were detected in the groundwater samples collected from these wells. Table 2-13 summarizes the compounds of concern in samples collected from monitoring wells at the Roblin Steel site.

B. **Development of Remedial Objectives.** As stated in Section 2.1, the remedial action objective for the Roblin Steel site is to provide for protection of human health and the environment by minimizing potential contact with, and the migration potential of, site-related contaminants. Remedial action objectives have been further refined for Area of Concern 6, the area of impacted groundwater, as follows:

1. Prevent exposure to contaminants in groundwater.

2. Minimize the migration of dissolved contaminants through groundwater.

3. Provide for attainment of groundwater standards, to the extent possible, at the property boundary.

C. **Identification of Response Actions and Technology Options.** During this portion of the RA Report, technology options for satisfying response actions are identified for initial screening. Response actions include no action, institutional measures, and collection and/or treatment options. Table 2-14 presents a summary of the initial screening of technology options for Area of Concern 6.

1. The no action response includes letting groundwater impacts go unattended. This is the most easily implemented option for management of the groundwater impacts. Historically, concentrations of VOCs exceeding standards have only been detected in samples from Monitoring Well GW-3. The most recent sampling round detected only three VOCs at a total concentration less than 160 ppb. Samples from other wells were not found to contain any of the same compounds, indicating that the groundwater source is not widespread. There is some indication that the groundwater is presumably flowing toward a combined sewer that runs down the west side of Oliver Street at approximately the same elevation as the groundwater. (If so, it is possible that the groundwater is being collected by the sewer and ultimately treated in the City's POTW.) Because neighboring properties are connected to municipal water, there are presently no groundwater users in the area of the impacted groundwater. Therefore, no action is also likely to be effective in achieving remedial objectives for the site.

The no action response has been retained for comparison purposes, and is a likely remedial alternative for this site.

2. Institutional controls can be used to prevent future exposure to the impacted groundwater. Although there are no identified groundwater users in the vicinity of the impacted groundwater, it is possible that a well could be installed in the future. To prevent this from happening, the City could enact deed restrictions that would prohibit the installation of potable wells in this portion of the site. Alternatively, if wells were installed, the City could undertake a monitoring program and agree to provide point-of-use treatment units if monitoring indicates exceedances of standards.

3. Groundwater collection and treatment can be done either on or off site. Recovery wells can be installed in the area of impacted groundwater. Groundwater can then be pumped to a treatment unit installed on site (either activated carbon or air stripping could be used to remove contaminants of concern) and then discharged to the ground or the City's combined sewers. An alternative is to store the groundwater in a tank and periodically transport the contents of the tank to the City's wastewater treatment plant, which uses activated carbon for treatment. A tank could be installed at the POTW to

provide controlled introduction of the groundwater to the treatment plant influent. Both options are relatively easy to implement, as equipment is readily available for collecting, storing, and treating groundwater with low concentrations of VOCs. Since on-site treatment and discharge would need to be combined with a monthly monitoring program to verify that acceptable treatment is being achieved, and because an on-site treatment system would need ongoing maintenance, off-site treatment is likely to be more cost effective.

4. In situ treatment can also be implemented for the contaminants of concern in Area of Concern 6. In situ treatment for chlorinated VOCs would likely consist of air sparging. Such a system is commonly used at sites with VOC-contaminated groundwater. However, the permeability of the aquifer limits the effectiveness of such a system, as air sparging is more effective in sand with high permeability or hydraulic conductivity. The SI Report indicated that the overburden in the vicinity of the impacted groundwater (GW-3) consists of a mixture of silt and till. The effectiveness of air sparging for treating impacted groundwater in this type of geology is not well demonstrated.

D. **Initial Screening of Technology Options.** The initial screening of response action options evaluates effectiveness, reliability, and the cost of the option. Those options that are obviously ineffective, unreliable, or too costly are rejected from further consideration. For the limited area of impacted groundwater, the no action option may be both effective and appropriate for achieving remedial action objectives. Besides being required for comparison to all other options, the combined sewer located on Oliver Street appears to be serving as a groundwater collection system that is already providing collection of impacted groundwater with treatment at the City's wastewater treatment plant. Institutional controls in the form of deed restrictions would also take advantage of continued groundwater interception by the Oliver Street combined sewer. Groundwater collection can also be undertaken by installation of an on-site recovery well(s) in the area of concern. On-site groundwater treatment has been rejected in favor of off-site treatment at the City's wastewater treatment plant, as the off-site treatment option would be much less costly to implement. In situ treatment has also been rejected from further consideration at this time due to the presence of low permeability unsaturated and saturated soils in the area of the impacted groundwater. Air sparging systems are known to be more effective in sandy soils with higher permeabilities.

E. **Remedial Action Alternatives.** As discussed above, three options have been retained for further consideration for management of Area of Concern 6, the impacted groundwater at the

Roblin Steel site. These are summarized on Table 2-15. The first alternative is no action, which would not include any actions be undertaken for the impacted groundwater. This alternative is required to provide a baseline of comparison. It is also easy to implement, low cost, and may be quite effective. The second alternative includes enacting deed restrictions that would prohibit the installation of potable wells in the area of impacted groundwater. This option also includes continued presumed interception of the groundwater by the Oliver Street combined sewer. The third alternative includes installation of groundwater recovery wells in the area of impacted groundwater and off-site treatment. The groundwater would be stored on site and periodically transported to the City's wastewater treatment plant for introduction at the head end of the plant. Since the POTW uses activated carbon for wastewater treatment, the contaminants of concern would be readily treated.

2.8 AREA OF CONCERN 7 – COOLING (QUENCH) POND

A. **Description of Area of Concern.** A concrete-lined cooling pond used during the historic manufacturing operations at the site is located south of the approximate middle of the site. A fence restricts access to the pond. The cooling pond contains water, tires, and possible drums. Based on information from groundwater monitoring reported in the SI Report, it does not appear that the cooling pond has had any adverse impact on site groundwater. However, since the pond presents a potential long-term safety hazard, it should be decommissioned before the site is redeveloped.

B. **Development of Remedial Actions for the Cooling Pond.** As part of the cooling pond decommissioning, it should first be sampled for waste characterization and then drained. The water can be removed from the pond using a vacuum truck, which will transport the water to the City's wastewater treatment plant for disposal. Any lines leading into the pond can then be traced, most likely through the use of smoke tests. The lines and the tank would then need to either be removed or filled in place. If the tank is removed, the area would need to be backfilled.

C. **Identification of Response Actions and Technology Options.** During this portion of the RA Report, technology options for satisfying response actions are identified for initial screening. Response actions include no action, institutional measures, or collection and treatment options. Table 2-16 presents a summary of technology options for Area of Concern 7.

1. The no action response does not protect people in the vicinity of the site from the physical or potential chemical risks associated with the concrete basin. Therefore, it is not considered a viable alternative and will be retained only for comparison purposes.

2. Institutional controls may already be considered to be in place as the pond is fenced.

3. Pumping the liquid from the pond, characterizing it, and treating or disposing of it off site is the third alternative.

D. **Initial Screening of Technology Options.** The no action alternative has already been eliminated as not being protective of human health. The institutional control already in place, the fence, is not a sufficient long-term solution and is therefore also eliminated from further consideration. Off-site disposal or treatment of the liquid in the pond and demolishing or filling the structure will serve to eliminate both the physical and chemical risks associated with the cooling pond.

E. **Remedial Action Alternatives.** As stated above and as summarized on Table 2-17, disposal of the liquids in the pond and filling or demolishing the concrete structure is the only retained alternative.

2.9 SUMMARY

Table 2-18 provides a summary of the conclusions of Chapter 2. The seven Areas of Concern are identified, as well as the alternatives retained for further consideration. Based on the need to protect human health and the environment, applicable SCGs, and the future intended use of the site, preferred alternatives have been tentatively identified. Upon City and NYSDEC review of the screening process to date and its conclusions, a detailed analysis of the remaining alternatives or a further limited list of alternatives will be completed, leading to the final selection of remedial actions at the site.

CHAPTER 3

ADDITIONAL SOIL SAMPLING AND ANALYSIS

3.1 INTRODUCTION

As discussed in Chapter 2 regarding Area of Concern 4, Impacted Soil, additional characterization of the areal extent and depth of the impacted soil was required prior to the completion of the detailed analysis of alternatives (Chapter 4). The additional soil sampling and analysis plan (sampling plan) was outlined in Stearns & Wheler's May 24, 2000 correspondence (Appendix H) to the NYSDEC. The soil samples were collected on June 15, 2000 using hydraulic push technology and appropriate sample collection and handling protocols. Figure 3-1 identifies the soil sample locations and the limits of the four areas of impacted soil that were separated for better characterization.

3.2 EXTENT OF PAH IMPACTS

A. **Area 3.** Based on previous analytical results, the area near surface soil sample site SS-45 was targeted for additional sampling and analysis for PAH concentration. Three shallow soil samples were collected at a depth of 0 to 0.5 feet: 6-00-8A, 6-00-9A, and 6-00-13A. The vertical extent of PAH concentration, if any, was investigated by obtaining soil samples at a depth of approximately 2.0 to 2.5 feet at the same locations (soil samples 6-00-8B, 6-00-9B, and 6-00-13B). The probe hole borings encountered fill consisting of dark, moist, granular silty sand at the surface to a depth of 3.0 feet overlying silty clay (native material) to the completion depth of 4 feet. The sample analytical results are summarized in Table 3-1.

Total PAH concentrations for the surface soil samples (6-00-8A, 6-00-9A, and 6-00-13A) ranged from 13.621 ppm (6-00-8A) to 34.360 ppm (6-00-9A). Total PAH concentrations for the subsurface soil samples (6-00-8B, 6-00-9B, and 6-00-13B) ranged from 5.393 ppm (6-00-8B) to 14.650 (6-00-13B). Although, in most cases, concentrations of individual PAH compounds (benzo(a)anthracene, chrysene, benzo(a)pyrene, for example) were detected, none of the reported total PAH concentrations exceeded 50 ppm. A cleanup goal of 50 ppm total PAHs has been accepted at other sites by the NYSDEC as a recommended cleanup objective for total PAH compounds. In general, total PAH concentrations were higher in the surface soil than in the subsurface soil.

B. **Area 4.** Based on previous analytical results, the areas near surface soil sample sites SS-52 and SS-54 were targeted for additional sampling and analysis for PAH concentration. Three shallow soil samples were collected near SS-52 at a depth of 0 to 0.5 feet: 6-00-2A, 6-00-5A, and 6-00-22A. The vertical extent of PAH concentration, if any, was investigated by obtaining soil samples at depths of 2.5 to 3.0 feet at the same locations (soil samples 6-00-2B and 6-00-5B). Probe hole borings 6-00-5 and 6-00-22 encountered dark, moist, granular, silty sand (fill). Probe hole boring 6-00-2 encountered moist silty sand with a black moist silt layer with wood chips at a depth of 1 to 1.5 feet.

Three surface soil samples were collected near SS-54 at a depth of 0 to 0.5 feet: 6-00-1A, 6-00-3A, and 6-00-4A. The vertical extent of PAH concentration, if any, was investigated by obtaining soil samples at depths of 2.5 to 3.0 feet at the same locations (soil samples 6-00-1B, 6-00-3B, and 6-00-4B). The probe hole borings near SS-54 encountered dark, moist, granular, silty sand (fill) at the surface to a depth of 3.5 feet overlying silty clay (native material) to the completion depth of 4 feet. The analytical results are summarized in Table 3-1.

Total PAH concentrations for the surface soil samples taken near SS-52 (6-00-2A, 6-00-5A, and 6-00-22A) ranged from 12.184 ppm (6-00-5A) to 2293 ppm (6-00-2A). The total PAH concentration in two of the soil samples -- 6-00-2A (2293 ppm) and 6-00-22A (255 ppm) -- are above 50 ppm for total PAHs. Total PAH concentrations for the subsurface soil samples (6-00-2B and 6-00-5B) ranged from 0.050 ppm (6-00-2B) to 0.284 ppm (6-00-5B). For both samples, the concentrations of individual PAH compounds were below the individual PAH cleanup goals established in TAGM 4046.

Total PAH concentrations for the surface soil samples taken near SS-54 (6-00-1A, 6-00-3A and 6-00-4A) ranged from 7.500 ppm (6-00-4A) to 34.100 ppm (6-00-3A). Although all total PAH concentrations were below 50 ppm, concentrations of several individual PAH compounds exceeded cleanup goals. Total PAH concentrations for the subsurface soil samples (6-00-1B, 6-00-3B, and 6-00-4B) ranged from 0.016 ppm (6-00-1B) to 0.780 ppm (6-00-4B). All PAH concentrations in these samples were below individual PAH cleanup goals.

3.3 EXTENT OF PCB IMPACTS

A. **Area 3.** The previous site investigation reported two soil samples (SS-32 and SS-34) with PCB concentrations above the 1 ppm cleanup goal for PCBs in surface soil. Six additional surface soil samples (6-00-38A, 6-00-39A, 6-00-40A, 6-00-41A, 6-00-42A, and 6-00-43A) were collected near SS-32 and SS-34 from a depth of 0 to 0.5 feet. The analytical results are summarized in Table 3-2. The total PCB concentrations ranged from 0.77 ppm (6-00-40A) to 400 ppm (6-00-42A). Five of the six soil samples collected exceed the recommended soil cleanup objective of 1 ppm for total aroclors.

3.4 EXTENT OF SOIL IMPACTS ASSOCIATED WITH METALS

The results of soil sample analysis during the previous SI activities indicated that the areal and vertical extent of the metals arsenic, cadmium, chromium, and lead in the soil needed additional investigation. Also, the previous analytical results indicated that for some soil samples, the cadmium, chromium, and lead concentrations were indicative of soil concentrations that could fail TCLP testing.

A. **Area 1.** Based on previous analytical results, the areas near surface soil sample sites SS-19, SS-20/21, SS-24 and SS-25 were targeted for additional sampling and analysis for arsenic, cadmium, chromium, and lead concentration. The probe borings encountered dark, moist, granular, silty sand (fill) at the surface to a depth of approximately 3.0 feet overlying silty clay (native material) to the completion depth of 4 feet. Nine shallow soil/surface soil samples (6-00-23A, 6-00-25A, 6-00-26A, 6-00-27A, 6-00-30A, 6-00-31A, 6-00-32A, 6-00-34A, and 6-00-35A) were collected at a depth of 0 to 0.5 feet. The vertical extent of metals concentration was investigated by obtaining five soil samples (6-00-25B, 6-00-27B, 6-00-31B, 6-00-34B, and 6-00-35B) in the lower fill material and four samples (6-00-23B, 6-00-26B, 6-00-30B, and 6-00-32B) in the upper portion of the native material underlying the site. Additionally, four surface soil samples (6-00-24A, 6-00-28A, 6-00-29A, and 6-00-33A) were collected and analyzed for total concentration of arsenic, cadmium, chromium, and lead and for TCLP concentration of arsenic, cadmium, chromium and lead. The analytical results are summarized in Table 3-3.

As indicated in Table 3-3, the concentration of arsenic in surface soil samples from Area 1 ranged from 5.8 ppm (sample 6-00-35A) to 31.8 ppm (sample 6-00-28A). The TAGM cleanup guideline for arsenic is 7.5 ppm or site background. Although concentrations of arsenic in 10 of the 13 samples exceed 7.5 ppm, only 3 samples were found with concentrations exceeding 20 ppm. Concentrations in excess of 20 ppm, and especially in excess of 30 ppm, are of concern because arsenic is associated with both chronic toxicity and carcinogenic results. Concentrations of cadmium exceeded cleanup goals in 9 of the 13 surface soil samples, and concentrations of chromium exceeded cleanup goals in all surface soil samples. Concentrations of lead in surface soil samples ranged from a low of 34.2 ppm to a high of 1750 ppm. Background concentrations of lead in excess of 400 ppm are common in surface soil in urban areas. However, the concentrations of lead in sample 6-00-28A exceed the typical range for urban soil.

In general, the concentration of metals in the subsurface fill and native soil samples was less than in the corresponding surface soil sample, with concentrations of the metals also being less than the TAGM cleanup objectives for soil. The exceptions were the fill sample 6-00-35B, in which concentrations of arsenic, cadmium, and lead were all higher in the subsurface fill sample than in the surface soil sample; and samples 6-00-26B and 6-00-30B, in which concentrations of chromium exceeded cleanup goals in the native soil sample.

The results from the TCLP testing of the surface soil samples indicated that all concentrations of the target metals were below regulatory standards.

B. **Area 2.** Based on previous analytical results, the areas near surface soil sample sites SS-39/40 were targeted for additional sampling and analysis for arsenic, cadmium, chromium, and lead concentration. Similar to what was found on the other portions of the site, the probe hole borings encountered dark, moist, granular, silty sand (fill) at the surface to a depth of approximately 3.0 feet overlying silty clay (native material) to the completion depth of 4 feet. Two shallow (surface) soil samples (6-00-19A and 6-00-20A) were collected at a depth of 0 to 0.5 feet. The vertical extent of metals concentration was investigated by obtaining one soil sample in the lower fill material (6-00-20B) and one soil sample (6-00-19B) in the upper portion of the native material underlying the site. Additionally, two surface soil samples (6-00-17A and 6-00-18A) were collected and analyzed for total concentration of arsenic, cadmium, chromium, and lead and for TCLP concentration of arsenic, cadmium, chromium, and lead. The analytical results are summarized in Table 3-3.

The concentrations of arsenic, cadmium, and chromium in all Area 2 surface soil samples exceeded the recommended soil cleanup objectives for each of the metals. The concentration of arsenic in one sample (6-00-17A) is close to the cleanup objective; however, the concentration of arsenic in the three other samples is above 27 ppm, with two samples containing arsenic in excess of 30 ppm. Lead concentrations in surface soil ranged from 83.6 to 3710 ppm. Concentrations of lead in samples 6-00-19A and 6-00-20A are above what would typically be considered background. Concentrations of metals in the lower fill sample (6-00-20B) exceeded the recommended soil cleanup objectives for both arsenic and chromium. Similar to two native soil samples from Area 1, the concentration of chromium in the native material soil sample exceeded the recommended soil cleanup objectives. None of the samples analyzed using TCLP exceeded regulatory levels for the four specific metal concentrations.

C. **Area 3.** Based on previous analytical results, the areas near surface soil sample sites SS-36, SS-43 and SS-44/46 were targeted for additional sampling and analysis for arsenic, cadmium, chromium, and lead concentration. The probe hole borings encountered dark, moist, granular, silty sand (fill) at the surface to a depth of approximately 3.0 feet overlying silty clay (native material) to the completion depth of 4 feet. Eight shallow soil samples (6-00-10A, 6-00-11A, 6-00-12A, 6-00-14A, 6-00-15A, 6-00-16A, 6-00-36A, and 6-00-37A) were collected at a depth of 0 to 0.5 feet. The vertical extent of metals concentration was investigated by obtaining three soil samples in the lower fill material (6-00-11B, 6-00-12B, 6-00-36B) and five soil samples (6-00-10B, 6-00-14B, 6-00-15B, 6-00-16B and 6-00-37B) in the upper portion of the native material underlying the site. Additionally, two surface soil samples (6-00-44A and 6-00-45A) were collected and analyzed for total concentration of arsenic, cadmium, chromium, and lead as well as TCLP concentration of arsenic, cadmium, chromium, and lead. The analytical results are summarized in Table 3-3.

Although the concentration of arsenic in all but one of the Area 3 surface soil samples exceeded the TAGM cleanup goal of 7.5 ppm, the concentrations were generally lower than in samples from Areas 1 and 2. The concentration of arsenic in only two samples was found to exceed 20 ppm (samples 6-00-36A and 6-00-37A). The concentration of cadmium in all 10 surface soil samples was found to exceed the TAGM cleanup objective. Especially significant were the concentrations of cadmium in samples 6-00-12A (104 ppm) and 6-00-37A (1420 ppm). The concentration of chromium in 8 of the 10 samples was found to exceed TAGM cleanup goals. Concentrations of lead in the surface soil samples were generally in the background range for urban soils, with the exception of sample 6-00-12A (1460 ppm). Concentrations of arsenic in subsurface fill samples were found to exceed the concentration in the corresponding surface soil sample (6-00-11B and 6-00-12B). Fill sample 6-00-12B was also associated with high concentrations of chromium and lead. Concentrations of the four metals in native soil samples 6-00-10B and 6-00-16B were all below levels of concern. Concentrations of chromium in native soil samples 6-00-14B and 6-00-15B were above the TAGM cleanup goals; however, the concentrations were below those found in the corresponding surface soil sample. The concentration of cadmium in native soil sample 6-00-37B was 571 ppm, indicating a possible hot spot area in this location. The concentrations of the four metals in the leachate from the TCLP testing of the four surface soil samples were below regulatory limits.

D. **Area 4.** Based on previous analytical results, the areas near surface soil sample sites SS-51 were targeted for additional sampling and analysis for arsenic, cadmium, chromium, and lead concentration. The probe hole borings encountered dark, moist, granular, silty sand (fill) at the surface to a depth of 3.0 feet overlying silty clay (native material) to the completion depth of 4 feet. Two shallow soil samples (6-00-6A and 6-00-7A) were collected at a depth of 0 to 0.5 feet. The vertical extent of metals concentration was investigated by obtaining one soil sample in the lower fill material (6-00-7B) and one soil sample (6-00-6B) in the upper portion of the native material underlying the site. Additionally, two surface soil samples (6-00-21A) were collected and analyzed for total concentration of arsenic, cadmium, chromium, and lead as well as TCLP concentration of arsenic, cadmium, chromium, and lead. The analytical results are summarized in Table 3-3.

The concentration of arsenic in surface soil sample 6-00-21A was 42.9 ppm, significantly above the cleanup goal. Although concentrations of arsenic in the other two surface soil samples in Area 4 were found to exceed the TAGM cleanup goals, the concentrations were at relatively low concentrations (9.3 and 13.5 ppm) and are not considered of concern. Lead concentrations in the three surface soil samples in Area 4 are also within the range of what would typically be considered background. Cadmium concentrations in only one sample (6-00-21A) were higher than TAGM cleanup goals, while chromium concentrations in all three surface soil samples were detected at concentrations above cleanup goals. The concentrations of the four metals in the TCLP sample from 6-00-21A were below regulatory limits.

CHAPTER 4

DETAILED ANALYSIS OF ALTERNATIVES

4.1 INTRODUCTION

Each alternative for each Area of Concern that has passed through the development and initial screening phase is now compared to enable selection of a preferred remedial alternative for the impacted soils at the site. This assessment is made using the criteria specified by the NYSDEC, which are:

1. Overall protectiveness of public health and the environment.
2. Compliance with Standards, Criteria and Guidance (SCG).
3. Short-term effectiveness.
4. Long-term effectiveness.
5. Reduction of toxicity, mobility, and volume.
6. Feasibility.
7. Community acceptance (state and local).

This report compares the different remedial alternatives using the six initial criteria. The final criteria will be evaluated by NYSDEC following the public comment period. It should be noted that as part of the feasibility evaluation, cost estimates are provided. The costs presented are based on conceptual ideas and a first phase estimate of quantities involved. The costs are presented so that individual alternatives can be compared. In no way are these estimates intended to be used as an estimate of the ultimate cleanup goals for the site. Following remedial design, a cost estimate based on actual waste quantities will be made which will be an assessment of the entire project cost.

4.2 ANALYSIS OF ALTERNATIVES

After the initial screening of remedial alternatives, preferred alternatives were tentatively identified and are summarized in Table 2-18. NYSDEC reviewed the initial screening results, and on March 22, 2000, indicated general agreement with the development of possible remediation alternatives and concurred that the screening procedures were adequately followed.

The following is a detailed analysis of the remaining alternatives for each of the seven Areas of Concern.

A. **Area of Concern 1 – Miscellaneous Drums and Waste Piles.** A number of waste piles and/or waste materials (drums) remain in various locations around the site. Three response actions to this Area of Concern were retained during the initial screening: no action, off-site disposal, and a combination of off-site disposal and on-site solidification/stabilization.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow everything to remain as it is on the site. Because the condition of such materials may change over time, this alternative is associated with implementation of a long-term site inspection program.

b. **Overall Protection of Human Health and the Environment.** This alternative does not provide for appropriate management of the wastes in the Area of Concern. The contents of many of the drums are unknown and many of the identified waste areas represent safety hazards if left in place. Therefore, this alternative does not protect overall human health and the environment.

c. **Compliance with SCG.** The known safety hazards associated with the waste piles do not comply with SCG. The drum contents, if released to the environment, may not meet SCG. In addition, solid waste disposal regulations are not met if the material remains in place.

d. **Short-term Effectiveness.** This alternative does not provide for management of the Area of Concern. The environmental impacts may be significant if the drums were to leak. However, the no action remedy could be implemented immediately.

e. **Long-term Effectiveness and Permanence.** The no action alternative would not be effective in the long term due to the likelihood that the drums would eventually release their contents to the environment. The waste piles would remain a safety hazard. This alternative does not provide a permanent remediation of the Area of Concern.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative would provide no reduction of the toxicity, mobility or volume of the waste materials or conditions represented by the presence of the miscellaneous drums and/or mill scale piles.

g. **Feasibility.** The no action alternative is ill suited to site conditions. The site currently is accessible to the public. The presence of waste piles and drums would not be conducive to the planned redevelopment of the site. The no action alternative may be easily implemented, requires no specialized services or materials, and would not incur short-term costs. The long-term liability associated with this alternative is unacceptable. Capital costs associated with this alternative are negligible. However, long-term site inspections will be required.

2. **Alternative 2, Off-Site Disposal.**

a. **Description.** Alternative 2 includes characterization of all waste materials present on the site, followed by off-site disposal at permitted facilities.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The complete removal and proper disposal of all drums and waste piles would eliminate a potential source for adverse effects on human health and the environment from Area of Concern 1. There may be minimal residual public health and environmental impacts from any minor waste material remaining on site after the remedial action.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if characterization and proper disposal of the drums, their contents, and the waste piles were completed in accordance with federal and state regulations. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-term Effectiveness.** Alternative 2 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during removal operations. Potential environmental impacts stemming from the off-site disposal of drums and waste piles include the unlikely event of a spill during characterization or removal of the drums. It is anticipated that this alternative could be implemented within a short time frame.

e. **Long-term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would provide permanent management of the potential hazardous substances in Area of Concern 1. Minor residual contaminants may be present in the areas formerly occupied by drums and/or waste piles. Appropriate precautions and procedures would be required to be implemented during the characterization and removal phases of off-site disposal to assure adequate and reliable control and to minimize on-site residual impacts from the drums and/or waste piles.

f. **Reduction of Toxicity, Mobility, or Volume.** Off-site disposal of the drums and waste piles would effectively reduce the toxicity, volume, and mobility of potential hazardous substances on the site.

g. **Feasibility.** Currently, the drums and waste piles are easily accessible for characterization and removal. As stated previously in this report, it is likely that several different disposal facilities may need to be identified. Some materials may be suitable for disposal at a Part 360 landfill, whereas some of the material may require disposal at a RCRA permitted landfill. Some building materials may be able to be disposed in a Part 360 C&D landfill. Finally, some drum contents may be able to be disposed at the POTW. The waste and drums are located above ground; therefore, the material will only need to be loaded into trucks and transported to the disposal facilities. Some buildings may need to be stabilized in order to access the drums. The drums may need to be overpacked in order to meet Department of Transportation labeling requirements. Specialized services and materials are not required to implement this alternative. The cost of off-site disposal of all drums and waste pile material will depend on the results of the waste characterization analyses. For the purposes of this report, we have assumed all drums, drum contents, and waste piles are not hazardous wastes. A cost estimate was developed for disposal of the materials. Quantities are only estimated based on approximate waste pile footprints. The cost for this alternative was estimated at over $1 million. Details are presented in Appendix A.

3. **Alternative 3, Off-Site Disposal and On-Site Solidification/Stabilization.**

a. **Description.** Alternative 3 is a combination of Alternative 2 and on-site solidification/stabilization. Some of the waste materials may be reused on site as aggregate for paving. Because the quantity of waste in the slag piles is not accurately known, it is likely that only a portion of the material can be reused as aggregate. The remainder of the waste materials and the drums would likely require off-site disposal. It should be noted that this alternative would need to be coordinated with future site development plans.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The waste materials that would be used as an aggregate would be non-hazardous materials that could be reused at the site rather than being disposed at a landfill. The remaining materials would also be disposed at an appropriate landfill. These actions would remove a potential source for adverse effects on human health and the environment from Area of Concern 1.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if characterization and proper disposal of the drums, their contents, and the waste piles were completed in accordance with federal and state regulations. In addition, the use of waste materials as aggregate would be closely monitored to assure compliance with SCG. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-term Effectiveness.** Alternative 3 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during removal operations and on-site storage of waste material suitable for aggregate use. Potential environmental impacts stemming from the off-site disposal of drums and waste piles include the unlikely event of a spill during characterization or removal of the drums and/or waste piles. It is anticipated that the off-site disposal alternative could be implemented quickly. The on-site solidification/stabilization of some of the waste material may require a longer period of time extending to the redevelopment of the property.

e. **Long-term Effectiveness and Permanence.** The remedial actions implemented under Alternative 3 would provide permanent remediation of the drums and waste piles in terms of on-site impacts. Appropriate precautions and procedures would be required to be implemented during the characterization and removal phases of off-site disposal to assure adequate and reliable control and to minimize on-site residual impacts from the drums and/or waste piles.

f. **Reduction of Toxicity, Mobility, or Volume.** Off-site disposal of the drums and waste piles and on-site stabilization/solidification of some waste materials would effectively reduce the toxicity, volume, and mobility of potential hazardous substances by either completely removing the potential contaminant source or rendering it immobile. Testing may be required to verify that material to be kept on site is acceptable for use as a pavement aggregate.

g. **Feasibility.** Currently, the drums and waste piles are easily accessible for characterization and removal. As stated previously in this report, it is likely that several different disposal facilities would need to be identified; as some of the material may be suitable for disposal at a Part 360 landfill, some of the material may require disposal at a RCRA permitted landfill, and some material may need to go to a Part 360 C&D landfill. The waste material and drums are located above ground; therefore, the material will only need to be loaded into trucks and transported to the disposal facilities. Some buildings may need to be stabilized in order to access the drums. The drums may need to be overpacked in order to meet Department of Transportation labeling requirements. The required services and materials are readily available to implement this alternative. The use of waste material as aggregate may reduce some of the costs associated with off-site disposal of all drums and waste pile material, depending on the results of the waste characterization analyses. For the use of waste material as aggregate, a leaching test could be used to determine the percentage of waste material that could be added without resulting in the leaching of metals from the solidified mass. The waste material to be used as aggregate would remain on site until needed. Costs associated with implementation of this alternative are comparable to Alternative 2 (Appendix A).

B. **Area of Concern 2 – Building Ruins**. Of the seven vacant buildings at the site, at least three have been burned and consist of piles of brick with portions of walls left standing. The largest buildings, the rolling mill and adjacent wire mill buildings, were demolished in May 2000. As noted in Chapter 2, the slab floors, trenches, and foundations of the rolling mill and adjacent wire mill buildings remain and require management. The remaining building structures have fallen into rubble or are merely foundations. A portion of the roof of the large building in which drums are stored has fallen down. The status of the remaining portions of the large building is unknown. Three response actions to this Area of Concern were retained during the initial screening: no further action, stabilizing the buildings to eliminate physical hazards, and demolishing the buildings.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow everything to remain as it is on the site. Long-term monitoring would be required.

b. **Overall Protection of Human Health and the Environment.** Because there is a threat to human life and health by leaving some of the buildings as they stand, this alternative does little to protect overall human health and the environment. The partially standing buildings represent a safety hazard. Due to the age and previous uses of the buildings, asbestos-containing building materials may be present. The no further action alternative would not protect human health and the environment from a possible release of asbestos from any potential asbestos-containing building materials or potentially hazardous materials from drums being compromised, resulting in a spill.

c. **Compliance with SCG.** The known safety hazards associated with building ruins do not comply with SCG. As the buildings deteriorate further, any potential asbestos-containing building materials may release asbestos to the environment at concentrations that may not comply with SCG. Further deterioration could compromise drums, resulting in a release at concentrations that may not comply with SCG.

d. **Short-term Effectiveness.** This alternative does not provide for remediation of the Area of Concern. The no further action remedy could be implemented immediately.

e. **Long-Term Effectiveness and Permanence.** The no action alternative would not be effective in the long term due to the likelihood that the building ruins would remain a safety hazard and the potential for release of asbestos to the environment.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative would provide no reduction of the toxicity, mobility, or volume of potential hazardous substances (such as asbestos-containing building materials).

g. **Feasibility.** The no action alternative is ill suited to site conditions. The site currently is accessible to the public. The presence of building ruins would not be conducive to the planned redevelopment of the site. The no action alternative may be easily implemented, requires no specialized services or materials, and would not incur short-term costs, but the long-term costs in terms of liability may be unacceptable.

2. **Alternative 2, Stabilization of the Buildings.**

a. **Description.** Alternative 2 would provide for the stabilization of the buildings to eliminate physical hazards. For many of the buildings, this would include knocking down the existing walls that are left standing without support or a roof.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The stabilization of existing on-site buildings would eliminate a potential source for adverse effects on human health and the environment from Area of Concern 2 by preventing the release of potential asbestos-containing materials.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if the stabilization process transformed the buildings so that the site is brought into compliance with applicable building codes and environmental regulations. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-Term Effectiveness.** Alternative 2 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during stabilization operations. Potential environmental impacts may include release of asbestos from any asbestos-containing building materials during the stabilization process. It is anticipated that this alternative could not be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would be effective for the life of the remedial action. It would not provide permanent remediation of the on-site safety hazards or potential environmental impacts. Eventually, the building ruins will have to be removed and any potential asbestos-containing building materials (ACM) properly disposed. Appropriate precautions and procedures would be required to be implemented during the stabilization of the building ruins to assure adequate and reliable control and to minimize on-site residual impacts from the ruins.

f. **Reduction of Toxicity, Mobility, or Volume.** Stabilization of the building ruins would effectively reduce the toxicity, volume, and mobility of on-site contaminant sources temporarily.

g. **Feasibility.** This alternative would prevent the building ruins from falling down and creating a threat to human life and health. The stabilization of the building ruins is easily implemented and all services and materials required are readily available. However, it would not facilitate the planned redevelopment of the site. Capital costs for this alternative are estimated at approximately $1 million. Actual costs would depend on accurate estimates of waste and the C&D tipping fees at the time of the project. Costs for disposal of ACM have not been included at this time (Appendix B).

3. **Alternative 3, Removal.**

a. **Description.** Alternative 3 provides for removal of all building ruins from the site. This would include removing any ACM, properly disposing the materials at a permitted landfill, tearing down the buildings, recycling any building materials (such as brick and metal), and disposing of the remainder of the rubble as construction and demolition debris.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The removal of existing building ruins would eliminate a potential source for adverse effects on human health and the environment from Area of Concern 2.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if the removal, transport, and disposal of the building ruin materials were completed in compliance with all applicable SCG. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-Term Effectiveness.** Alternative 3 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during removal operations. Potential environmental impacts stemming from the removal of the building ruins include the unlikely event of a release of asbestos-containing materials during characterization or removal of the building ruins. It is anticipated that the removal alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial actions implemented under Alternative 3 would provide permanent remediation of the building ruins. Appropriate precautions and procedures would be required to be implemented during the characterization and removal phases to assure adequate and reliable control and to minimize on-site residual impacts from the building ruins.

f. **Reduction of Toxicity, Mobility, or Volume.** Removal of the building ruins would effectively reduce the toxicity, volume, and mobility potential hazardous substances from the building ruins.

g. **Feasibility.** Currently, the building ruins are easily accessible for characterization and removal. An asbestos inventory will need to be completed and any asbestos-containing materials removed prior to dismantling the buildings. Some of the building ruins only need to be collected and loaded into trucks for transport to the appropriate disposal facility. Some of the building ruins may need to be knocked down prior to being loaded into trucks for transport to the appropriate disposal facility. As stated previously in this report, it is likely that several different disposal facilities would need to be identified, as some of the material may be suitable for disposal at a Part 360 landfill and some at a Part 360 C&D landfill. The required services and materials are readily available to implement this alternative. The costs to implement Alternative 3 are potentially higher than the other alternatives, but allow for flexibility in redevelopment. Costs have been estimated at $1.5 million, excluding disposal of ACM. Appendix B presents assumptions associated with this alternative.

C. **Area of Concern 3 - Wood Block Floor with Impacted Soil/Residue**. The floor in both the wire mill/rolling mill building and the large brick building to the south of Armstrong Pumps is constructed of wood blocks overlying a concrete slab. Most of the blocks are approximately 3 to 4 inches thick and 4 to 6 inches on a side and appear to be relatively uniform in size. The wood blocks appear to be black, and there appears to be black residue between the concrete floor and the blocks. In some areas, the residue appears to contain a liquid substance. The thickness of the soil/residue varies in all locations. The thickness of the floor slab is unknown. The soil/residue material was sampled and analyzed and found to contain PAH compounds. Many of the samples exceeded the cleanup standards for PAH compounds. Three response actions to this Area of Concern were retained during the initial screening: no action, encapsulation, and removal with off-site disposal.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow the wood block floors with impacted soil/residue to remain in place; however, long-term monitoring would be required.

b. **Overall Protection of Human Health and the Environment.** Because the risk assessment identified potential risks to human health by leaving the wood blocks in place, the no further action alternative does not protect overall human health. Because many of the PAH compounds identified in the samples obtained from the soil/residue associated with the wood block floors are probable carcinogens, and because direct contact with the residue is possible in their current state, this alternative does not protect human health.

c. **Compliance with SCG.** The analytical results of samples obtained from the soil/residue material indicated that many of the samples exceeded the cleanup standards for PAH compounds. Therefore, this alternative does not comply with SCGs.

d. **Short-Term Effectiveness.** This alternative does not provide for any remedial action. This action would allow the potential for direct contact with the material to continue.

e. **Long-Term Effectiveness and Permanence.** The no action alternative would not be effective in the long term and does not provide a permanent solution due to the likelihood that there is a direct exposure pathway for human contact with the PAH compounds in the soil/residue.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative would provide no reduction of the toxicity, mobility, or volume of potential hazardous substances associated with the wood block floors and soil/residue.

g. **Feasibility.** The no action alternative is ill suited to site conditions. The site currently is accessible to the public, allowing for potential direct contact with the impacted wood block floors and soil/residue. One of the remedial action objectives developed in Chapter 2 for this Area of Concern was to prevent direct contact with the impacted soil/residue and to prevent reuse of the wooden blocks that are contaminated. The no action alternative may be easily implemented, requires no specialized services or materials, and would not incur short-term costs. The long-term costs in terms of liability are hard to quantify.

2. **Alternative 2, Encapsulation.**

a. **Description.** Under Alternative 2, the wood block floors with impacted soil/residue would be encapsulated and allowed to remain in place. The floor could be encapsulated by a 6-inch layer of concrete.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The encapsulation of the wood block floors would prevent direct contact by humans and would prevent any future migration of the PAH compounds to the environment for the lifetime of the encapsulation. If the integrity of the encapsulating material becomes compromised, this alternative may fail to protect human health and/or the environment.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if the encapsulating process were conducted using applicable health and safety guidelines. A health and safety plan would need to be developed and implemented during the on-site operations. A program of periodic monitoring of the encapsulating material condition and soil sampling and analysis should be implemented to assure the continued compliance with SCG.

d. **Short-Term Effectiveness.** Alternative 2 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during implementation. It is anticipated that this alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would provide management of the wood block floor and soil/residue for the lifetime of the encapsulation. Deed restrictions would need to be imposed in order to prevent site development that could compromise the integrity of the encapsulation.

e. **Reduction of Toxicity, Mobility or Volume.** On-site encapsulation of the wood block floor and impacted soil/residue would reduce the mobility of the material. This alternative does not provide reduction of the toxicity or volume of potential hazardous material. This alternative does not provide for treatment or destruction of the material.

f. **Feasibility.** This alternative is suitable to current site conditions. The site currently is unused. Encapsulating the wood block floors in the buildings would include either placing concrete around the wood block flooring or a membrane with a protective covering. Encapsulation is not suitable to the planned redevelopment of the site, as the encapsulated areas may interfere with new construction. The services and materials required for encapsulation are readily available. The cost of encapsulation is relatively higher than no action (see Appendix C) and does not allow for flexibility during redevelopment.

3. **Alternative 3, Off-Site Disposal.**

a. **Description.** Alternative 3 involves removal of the wood block floors and impacted soil/residue from the site and disposal in a permitted landfill or destruction in an incinerator.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The removal and proper disposal of the wood block floors and impacted soil/residue would remove a potential source for direct contact between humans and the residue from Area of Concern 3.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if characterization and proper disposal of the wood block floors and impacted soil/residue were completed in accordance with federal and state regulations. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-Term Effectiveness.** Alternative 3 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during removal operations. Potential environmental impacts stemming from the off-site disposal of the wood blocks and impacted soil/residue include the potential for dust and airborne contaminants to be transported by wind to off-site receptors. It is anticipated that the off-site disposal alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial actions implemented under Alternative 3 would provide permanent remediation of wood block floors and impacted soil/residue in terms of on-site impacts. Appropriate precautions and procedures would be required to be implemented during the characterization and removal phases of off-site disposal to allow adequate and reliable control and to minimize on-site residual impacts from the wood block floors and/or soil/residue.

f. **Reduction of Toxicity, Mobility, or Volume.** Off-site disposal of the wood block floors and impacted soil/residue would effectively reduce the mobility of potential hazardous substances associated with this Area of Concern. The toxicity and volume of the contaminants would be reduced at the site, but not at the disposal facility. Incineration would reduce toxicity, mobility, and volume of contaminants.

g. **Feasibility.** This alternative is well suited to current site conditions and the planned redevelopment of the site. Due to the conditions and previous uses of the buildings, dismantling of some of the buildings prior to removing the wood blocks may be necessary for safety considerations. The wood block floors with impacted soil/residue could be removed and loaded onto trucks for transport to the appropriate disposal facility. The required services and materials are readily available to implement this alternative. This alternative is associated with the lowest total cost, as no long-term monitoring is required. This alternative also allows for most flexibility in site redevelopment. All estimates assume material is non-hazardous (Appendix C).

D. **Area of Concern 4 – Impacted Soil.** Based on analytical results of samples obtained during the SI and the additional soil sampling event on June 15, 2000, which is summarized in Chapter 3, four areas of impacted soil have been identified (Figure 3). Total PAH compound concentrations exceeded 50 ppm in surface soil samples obtained from three of the four areas (Areas 1, 3, and 4). A total PAH concentration of less than 50 ppm has been accepted at other sites by the NYSDEC as a recommended cleanup objective for PAH compounds. The PCB impacts appear to be confined to surface soils in the area between SS-32 and SS-33 in Area 3. A small portion of the PCB-impacted soil may need to be managed separately as a hazardous waste, as the concentration exceeds 50 ppm.

The total metals concentrations were found to be at concentrations above recommended cleanup objectives in surface samples in all four areas. However, the TCLP metals analyses of selected surface soil samples in all areas indicate those soils would not exceed TCLP standards. The subsurface soil samples exceeded recommended cleanup objectives in isolated areas with some impacts extending to the upper portion of the native material.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow the impacted soil to remain in place. Periodic inspections would be required.

b. **Overall Protection of Human Health and the Environment.** It should be noted that the risk assessment did not identify potential risks to human health by leaving the impacted soil in place. Several of the contaminants found in surface soil are carcinogens. Therefore, the no action alternative, because it does not prevent direct contact with the impacted soil, is not protective of human health and the environment.

c. **Compliance with SCG.** The analytical results of samples obtained from the soils indicated that many of the samples exceeded the cleanup standards for PAH compounds, PCBs, and total metals. Allowing the impacted soils to remain as they are would provide a potential contaminant source to the soil and groundwater underlying the site.

d. **Short-Term Effectiveness.** The no action remedy could be implemented immediately; however, this option does not prevent direct contact with, or continued migration from, the areas of impact.

e. **Long-Term Effectiveness and Permanence.** The no action alternative would not be effective in the long term due to the likelihood that the contaminants in the impacted soils may eventually migrate further by leaching, dust movement, or transportation by a vehicle.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative would provide no reduction of the toxicity, mobility, or volume of the potential hazardous substances at the site.

g. **Feasibility.** The no action alternative is not suited to site conditions. The site currently is accessible to the public, allowing for potential direct contact with the impacted soils. The no action alternative may be easily implemented, requires no specialized services or materials, and would not incur short-term costs, but the long-term costs in terms of liability may be unacceptable. Long-term costs associated with inspections would be required.

2. **Alternative 2, Cap with Soil.**

a. **Description.** Under Alternative 2, the impacted soil would be capped with clean soil to prevent direct contact with impacted soils by humans. In practice, some portions of the site would likely be excavated of the impacted soil and consolidation in bermed areas at strategic locations at the site. These bermed areas would then be covered with a minimum of 12 inches of clean soil and then landscaped. Any PCB-impacted soil would be excavated to TAGM 4046 cleanup goals and disposed off site. Deed restrictions would be required to prevent excavation into bermed areas.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The clean soil would prevent direct contact by humans. However, this alternative may not completely prevent migration of the PAH compounds, PCBs, and total metals in the subsurface, and thus may fail to protect the environment.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCGs if the soil cap prevented further migration of the PAH compounds, PCBs, and total metals.

d. **Short-Term Effectiveness.** Alternative 2 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during the implementation of the remedial action. Construction activities could also result in the possible migration of PAH compounds, PCBs, and total metals from the impacted soils to the air during excavation and filling operations. It is anticipated that this alternative could be implemented within a short time.

e. **Long-Term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would prevent direct human contact with impacted soils. The residual risks include contaminant migration from the impacted soils to the subsurface/groundwater underlying the site. The integrity of the cap must be monitored periodically and a contingency plan developed to address failure of the landscaping and/or cap. A groundwater monitoring plan would need to be developed.

f. **Reduction of Toxicity, Mobility, or Volume.** Capping the impacted soils may provide for a reduction of mobility of contaminants; however, it would not provide a reduction in toxicity or volume of impacted soils.

g. **Feasibility.** This alternative is suitable to current site conditions (vacant). Depending on the future redevelopment of the site, this alternative may or may not be appropriate. In particular, the creation of bermed areas may not be feasible for the future site conditions, depending on the number and placement of new buildings. The services and materials that are required for the cap renovation of the perimeter fence and installation of gates are readily available. The cost of this alternative is approximately $370,000, as described in Appendix D. However, this estimate assumes only a 1-foot soil cap would be required and no permits would be required.

3. **Alternative 3, Cap with Asphalt or Concrete.**

a. **Description.** Alternative 3 includes capping the areas of impacted soil with a layer of asphalt or concrete pavement.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health and the environment if properly implemented and controlled. Capping with asphalt or cement would prevent direct human contact with the areas of impacted soils. The cap would also act to reduce stormwater infiltration through the soil, thereby minimizing leaching of contaminants during storm events.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCGs if the asphalt or cement cap prevented the migration of contaminants. A health and safety plan would need to be developed and implemented during the on-site operations. Additionally, a contingency plan would need to be developed to address failure of the capping material and/or groundwater monitoring plan developed to monitor contaminants migrating from the paved areas.

d. **Short-Term Effectiveness.** Alternative 3 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during site operations. Potential environmental impacts may include windborne migration of the contaminated soil during excavation/fill and/or paving operations. It is anticipated that this alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial actions implemented under Alternative 3 would provide long-term management of impacted soil for the lifetime of the asphalt or cement cap. However, the solution is not permanent. This alternative would require deed restrictions so that any future site development would not impact the cap. A health and safety plan would be required for any activities that would remove the cap from the impacted soils. Long-term maintenance and monitoring plans would be necessary.

f. **Reduction of Toxicity, Mobility, or Volume.** Capping of the impacted soil areas should provide for a reduction in mobility of potential hazardous substances in the soil. This alternative would not reduce the toxicity or volume of potential hazardous substances other than by natural attenuation.

g. **Feasibility.** This alternative is suitable to current site conditions, but not necessarily the planned redevelopment of the site depending on the number and placement of new buildings. The areas impacted by PCBs and PAH may be amenable to this alternative. Due to the widespread distribution of the total metals surface soil impacts, paving all impacted soil areas may not be practical. The required services and materials are readily available to implement this alternative. The cost of capping with asphalt or concrete is relatively high due to the cost of the materials for paving (see Appendix D). This alternative would allow for flexibility of redevelopment without "green" space.

4. **Alternative 4, Off-Site Disposal.**

a. **Description.** Alternative 4 involves excavation and disposal of impacted soils. For the purposes of this analysis, we have assumed that excavation will be limited to the upper 1 foot of impacted soils which, based on soil analytical results, is the zone with the greatest contaminant concentrations. The impacted soils would be disposed in a permitted landfill or incinerated. The remaining impacted soils would be covered by 1 to 2 feet of clean compacted soil. The actual extent of excavation will depend on the planned redevelopment use of the site. In addition, it is presumed that PCB-impacted soils will be excavated until confirmatory samples indicate cleanup goals based on NYSDEC TAGMs have been achieved.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The removal and proper disposal of the upper 1 foot of impacted soils would prevent direct contact with the impacted soil and prevent potential leaching into underlying clean soil. There may be minimal residual public health and environment from residual soil contamination. The installation of a clean soil cap should minimize the risks from further residual contamination.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if characterization and proper disposal of the impacted soils were completed in accordance with federal and state regulations. A health and safety plan would need to be developed and implemented during the proposed on-site operations.

d. **Short-Term Effectiveness.** Alternative 4 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during removal operations. Potential environmental impacts stemming from the off-site disposal of the impacted soils include the potential for dust migration to neighboring properties. It is anticipated that the off-site disposal alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial actions implemented under Alternative 4 would provide permanent remediation of the upper 1 foot of impacted soils in terms of on-site impacts. Residual contaminants will remain below the 1-foot zone. The installation of a clean soil cap should minimize the risks from direct contact with residual contamination.

f. **Reduction of Toxicity, Mobility, or Volume.** Off-site disposal of the upper 1 foot of impacted soils would effectively reduce the toxicity, volume, and mobility of potential hazardous substances. The mobility of remaining impacted soils would be decreased by the soil cap. The toxicity and volume of the remaining soil would not be changed; however, would not be as readily affected due to the soil cap.

g. **Feasibility.** This alternative is well suited to current site conditions and the planned redevelopment of the site. The upper 1 foot of impacted soils would be excavated and loaded onto trucks for transport to the appropriate disposal facility. A clean soil cap would then be placed over the excavated areas. The required services and materials are readily available to implement this alternative. The cost of off-site disposal is relatively high (Appendix D); however, it would allow for flexibility in the redevelopment, including "green" spaces.

E. **Area of Concern 5 – Underground Storage Tanks (USTs).** According to site records, there are at least three areas of USTs located at the site. The City currently is investigating the actual number, location, and condition of the USTs and will be undertaking the proper closure of all USTs located at the site.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow the USTs to remain in place.

b. **Overall Protection of Human Health and the Environment.** Due to the age of the USTs, they are anticipated to be unlined with no secondary protective measures in place. Additionally, the condition of the USTs may allow a release of their contents, if any, to the environment. Thus, there is a potential risk to human health and the environment by leaving USTs in place.

c. **Compliance with SCG.** The presence of unprotected USTs does not comply with current SCG or brownfields guidance. The USTs must be upgraded or removed/closed in place to comply with SCG.

d. **Short-term Effectiveness.** This alternative would not provide protection to the community during the remedial action. The environmental impacts may be significant if any of the UST contents migrated to the soils and/or groundwater underlying the site.

e. **Long-term Effectiveness and Permanence.** The no action alternative would not be effective in the long term due to the likelihood that the USTs, if left in place without upgrade or closure, would eventually release any contents to soils and/or groundwater underlying the site.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative would provide no reduction of the toxicity, mobility, or volume of the potential contaminants associated with the USTs.

g. **Feasibility.** The no action alternative is not suited to the planned redevelopment of the site, which may include excavation in association with new buildings in the UST areas. The long-term costs in terms of liability may be unacceptable.

2. **Alternative 2, In-Place Closure.**

a. **Description.** Under Alternative 2, USTs would be closed in place. This would involve removing the tank contents, cleaning the interior, and filling the tank with concrete or flowable fill to prevent future use of the tank. As part of the closure process, soil samples are required to be obtained below the UST to assure that the UST has not already released contaminants to the environment.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The in-place closure of the USTs would prevent direct contact by humans and would prevent any future migration of the any tank contents to the environment.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if the closure process were conducted using applicable state and federal regulations. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-Term Effectiveness.** Alternative 2 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during remediation. Potential environmental impacts may include spills stemming from improper procedures during closure. It is anticipated that this alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would provide permanent remediation of the USTs. Appropriate precautions and procedures would be required to be implemented to assure the USTs are closed properly. A contingency plan should be developed to provide emergency response and alternative remediation should UST confirmation sampling indicate the USTs have already released their contents to the subsurface in levels that exceed SCG.

f. **Reduction of Toxicity, Mobility, or Volume.** On-site closure of the USTs would reduce the toxicity, mobility, and volume of contaminants by removing the USTs' contents and preventing future use of the UST. The UST contents would be treated and/or destroyed off site as appropriate.

g. **Feasibility.** This alternative is suitable to current site conditions (vacant). The presence of closed in-place USTs may interfere with new construction. The services and materials required for closure in place are readily available. The cost of in-place closure is estimated at $40,000 as indicated in Appendix E.

3. **Alternative 3, Removal and Off-Site Disposal.**

a. **Description.** Alternative 3 involves removal of USTs from the site and proper disposal of the removed USTs, their contents, and any impacted soils. We have assumed that any liquids will be non-hazardous and disposed at the POTW, and any soil will be unimpacted and not require disposal.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The removal and proper disposal of USTs would eliminate a potential source for adverse effects on human health and the environment from Area of Concern 5. There may be residual public health and environment from residual soil contamination, if present, below the USTs.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if characterization and proper disposal of the USTs, their contents, and any impacted soils were completed in accordance with federal and state regulations. This alternative is also in compliance with brownfields guidance. A health and safety plan would need to be developed and implemented during the on-site operations.

d. **Short-Term Effectiveness.** Alternative 3 may allow for minimal adverse short-term impacts to the community due to increased truck traffic during removal operations. Potential environmental impacts stemming from the off-site disposal of the USTs, their contents, and any impacted soils include the unlikely event of a spill during characterization or removal. It is anticipated that the off-site disposal alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial actions implemented under Alternative 3 would provide permanent remediation of the USTs, their contents, and any impacted soils in terms of on-site impacts. Residual contaminants may be present in the areas formerly occupied by the USTs. Appropriate precautions and procedures would be required to be implemented during the characterization and removal phases of off-site disposal to minimize on-site residual impacts from the USTs.

f. **Reduction of Toxicity, Mobility, or Volume.** Off-site disposal of USTs would effectively reduce the toxicity, volume, and mobility of potential hazardous substances associated with the USTs.

g. **Feasibility.** This alternative is well suited to current site conditions and the planned redevelopment of the site. Some of the USTs may be located so that removal is not possible and will be closed in place. The required services and materials are readily available to implement this alternative. The cost of tank removal and off-site disposal is estimated at $13,000 (see Appendix E).

F. **Area of Concern 6 - Impacted Groundwater.** During the SI, groundwater in the southeastern corner of the site was found to be impacted with low concentrations of chlorinated VOCs. Groundwater in this area is flowing off site, presumably toward the combined sewer line along Oliver Street. Additionally, groundwater in a monitoring well in the vicinity of one of the

USTs was found to contain a sheen indicative of potential petroleum contamination. However, no petroleum contaminants were detected in the groundwater samples.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow the current on-site conditions to remain. Long-term monitoring would be required as part of this alternative.

b. **Overall Protection of Human Health and the Environment.** Based on the results of the SI, the area of impacted groundwater appears confined to the immediate vicinity of the southeastern corner of the site. The reported VOC concentration in that area is low. The groundwater from that area appears to be flowing towards Oliver Street and a combined sewer line. At the present time, all adjacent properties are served by municipal water. Further, the low concentrations of VOCs in Well 3S have not been detected in samples from wells hydraulically downgradient from MW-3S. Based on this analysis, this alternative may be protective of human health and the environment.

c. **Compliance with SCG**. The reported VOC concentration in the groundwater in the southeastern portion of the site exceeded the regulatory standards. However, it does not appear that contaminants are migrating off site.

d. **Short-Term Effectiveness.** Although this alternative does not provide for active remedial actions, the environmental impacts are likely to be insignificant given the low VOC concentration, the isolated area of impacted groundwater, and the lack of potential groundwater users immediately downgradient. The no action remedy could be implemented immediately.

e. **Long-Term Effectiveness and Permanence.** The no action alternative may be effective in the long term due to the low VOC concentration, the isolated area of impacted groundwater, and the lack of potential groundwater users immediately downgradient. Any long-term risks would be limited to the immediate area surrounding MW-3S. If a private well was installed, this remedy would not provide long-term protection.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative may provide for the reduction of the toxicity, mobility, or volume of the potential contaminants due to natural dilution and attenuation. Additionally, if the Oliver Street combined sewer is intercepting impacted groundwater and conveying it to the City's POTW, the toxicity, mobility, and volume of the potential hazardous substances associated with impacted groundwater may be further reduced.

g. **Feasibility.** The no action alternative is well suited to the planned redevelopment of the site. The no action alternative may be easily implemented, requires no specialized services or materials, and would not incur any capital costs. However, long-term monitoring may be required.

2. **Alternative 2, Institutional Controls.**

a. **Description.** Under Alternative 2, deed restrictions would be enacted which would prohibit the installation of potable wells in the area of impacted groundwater. Long-term groundwater monitoring may be required to assess the status of the groundwater in the vicinity of the impacted wells.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The deed restrictions would prevent future use of the impacted groundwater. This alternative is not actively protective of the environment. However, as stated previously, the groundwater plume appears to be confined to the site. Also, since the groundwater appears to flow towards a combined sewer, any impacted groundwater that flows off site may be intercepted and conveyed to the City's POTW, thus providing protection of the environment.

c. **Compliance with SCG.** Implementation of this alternative would not comply with SCGs because regulatory standards have not been achieved.

d. **Short-Term Effectiveness.** It is anticipated that this alternative could be implemented quickly. Short-term impacts are negligible.

e. **Long-Term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would not provide permanent remediation of the impacted groundwater. A contingency plan should be developed to provide emergency response and alternative remediation should future groundwater sampling indicate the degree of impacts to groundwater or the extent of impacted groundwater significantly increases.

f. **Reduction of Toxicity, Mobility, or Volume.** Providing institutional controls would not reduce the toxicity, mobility, and volume of hazardous substances associated with the impacted groundwater.

g. **Feasibility.** This alternative is suitable to current and anticipated future site conditions. The services and materials required for enacting deed restrictions are readily available. The cost of implementing this alternative is relatively low (see Appendix F). Additional monitoring may be necessary to reverse the actions of this alternative.

3. **Alternative 3, Removal and Off-Site Disposal.**

a. **Description.** Alternative 3 involves the installation of groundwater recovery wells in the area of impacted groundwater and off-site treatment. The groundwater would be stored on site and periodically transported to the City's POTW for treatment. This assumes the water would be classified as non-hazardous. If classified as hazardous, an on-site treatment system would be required.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health if properly implemented and controlled. The removal and proper treatment of impacted groundwater would remove a potential source for adverse effects on human health and the environment from Area of Concern 6.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG if the groundwater recovery, transportation to the POTW, and treatment at the

POTW complied with federal and state regulations. A health and safety plan would need to be developed and implemented to protect workers associated with the on-site operations.

d. **Short-Term Effectiveness.** Alternative 3 may allow for minimal adverse short-term impacts to the community due to increased truck traffic when the water is transported to the POTW. It is anticipated that this alternative could be implemented within a year.

e. **Long-Term Effectiveness and Permanence.** The remedial actions implemented under Alternative 3 would provide permanent remediation of the impacted groundwater in the southeastern corner of the site. Minor residual contaminants may remain. Appropriate precautions and procedures would be required to be implemented during the recovery, temporary on-site storage, and transportation phases to assure adequate and reliable control and to minimize on-site residual impacts from impacted groundwater.

f. **Reduction of Toxicity, Mobility, or Volume.** This alternative would reduce the toxicity, volume, and mobility of potential hazardous substances associated with the impacted groundwater at the site.

g. **Feasibility.** This alternative may be suitable for the planned redevelopment of the site, depending on the location of new structures. The required services and materials are readily available to implement this alternative;. however, the cost of off-site disposal is comparatively high (Appendix F) and may not be necessary given the low chance for exposure to the groundwater contaminants.

G. **Area of Concern 7 – Cooling (Quench) Pond.** A concrete-lined cooling pond used during the historic manufacturing operations at the site is located in the south-central portion of the site. Based on information gathered during the SI, the pond contains water and some tires. The pond also may contain some drums. A fence restricts access to the pond.

1. **Alternative 1, No Further Action.**

a. **Description.** The no action alternative is required in order to provide a baseline to which other alternatives may be compared. This alternative would allow the pond and its contents to remain as they are. Long-term inspections would be required.

b. **Overall Protection of Human Health and the Environment.** According to information gathered during the SI, the pond does not appear to have had any adverse impact on site groundwater or the environment. However, because the pond represents a potential long-term safety hazard, this alternative is not protective of human health.

c. **Compliance with SCG.** The pond does comply with SCG.

d. **Short-Term Effectiveness.** The no action remedy could be implemented immediately; however, the effectiveness of this remedy depends on the ability of the fence to deter trespassers. Because of safety issues and the waste material present in the pond, this alternative is not effective.

e. **Long-term Effectiveness and Permanence.** The no action alternative would not be effective in the long term or provide a permanent solution for this Area of Concern. The risk continues to be the safety hazard represented by the pond.

f. **Reduction of Toxicity, Mobility, or Volume.** Sampling done prior to the SI indicated there were no contaminants present in the cooling pond water. This alternative would not provide for the reduction of the volume of the water and solid waste in the pond.

g. **Feasibility.** Although the no action alternative may be easily implemented, this alternative is not suitable given current site accessibility, even though a fence surrounds the pond. This alternative is not suitable to the planned redevelopment of the site.

2. **Alternative 2, Off-Site (POTW) Treatment and Decommissioning.**

a. **Description.** Under Alternative 2, the liquid in the pond would be sampled and analyzed for waste characteristics. The water would then be drained and transported to the City's POTW. Any solid material in the pond also would be transported to the appropriate treatment/disposal facility. The pond and any associated lines and/or holding tanks would be decommissioned and/or removed for disposal.

b. **Overall Protection of Human Health and the Environment.** This alternative is protective of human health and the environment if properly implemented and controlled.

c. **Compliance with SCG.** Implementation of this alternative would comply with SCG.

d. **Short-Term Effectiveness.** Alternative 2 may allow for short-term impacts to the community due to increased truck traffic during on-site operations. It is anticipated that this alternative could be implemented quickly.

e. **Long-Term Effectiveness and Permanence.** The remedial action implemented under Alternative 2 would provide a permanent remedy for the cooling pond.

f. **Reduction of Toxicity, Mobility or Volume.** This alternative will reduce the toxicity, mobility, and volume of potentially hazardous substances associated with the cooling pond.

g. **Feasibility.** This alternative is suitable to current and anticipated future site conditions. The required services and materials are readily available. The cost of implementing this alternative is comparatively high, but allows for flexibility during the redevelopment. Appendix G summarizes costs associated with this alternative.

4.3 COMPARATIVE ANALYSIS

The following summarizes the selection of appropriate management alternatives for each Area of Concern. Table 4-1 summarizes the costs for each management alternative.

A. **Area of Concern 1 – Miscellaneous Drums and Waste Piles.** Three remediation alternatives were evaluated in detail for Area of Concern 1: no action, off-site disposal and solidification/stabilization. Alternative 1 did not satisfy any of the six evaluating criteria. The no further action alternative (Alternative 1) has been rejected at this time because the contents of many of the drums are unknown, and because many of the identified waste areas represent safety hazards if left in place. Alternative 2, off-site disposal, satisfied all six of the criteria, as did Alternative 3, off-site disposal and on-site solidification/stabilization. Based on the anticipated redevelopment and the desire to provide flexibility in the redevelopment, Alternative 3 is selected.

B. **Area of Concern 2 – Building Ruins.** Three remediation alternatives were evaluated in detail for Area of Concern 2: no further action, stabilization of the buildings, and removal. Alternative 1 did not satisfy any of the six evaluating criteria. The no action alternative (Alternative 1) has been rejected at this time because the current condition of some of the buildings represents a safety hazard. Alternative 2, stabilization of the buildings, satisfied five of the six criteria, but failed to provide an effective long-term or permanent solution. Alternative 3, removal, satisfied all six criteria. Based on satisfaction of all six criteria, Alternative 3 is selected.

C. **Area of Concern 3 – Wood Block Floor with Impacted Soil/Residue.** Three remediation alternatives were evaluated in detail for Area of Concern 3: no further action, encapsulation, and removal. The no action alternative (Alternative 1) did not satisfy any of the six evaluating criteria. Alternative 1 has been rejected at this time because of the potential risks to human health identified by the risk assessment. Alternative 2, encapsulation, satisfied five of the six criteria, but may not be feasible, depending on future redevelopment of the site. The areas occupied by the wood block floors may interfere with new construction at the site. Alternative 3, off-site disposal, satisfied all six criteria. Based on satisfaction of all six criteria, Alternative 3 is selected.

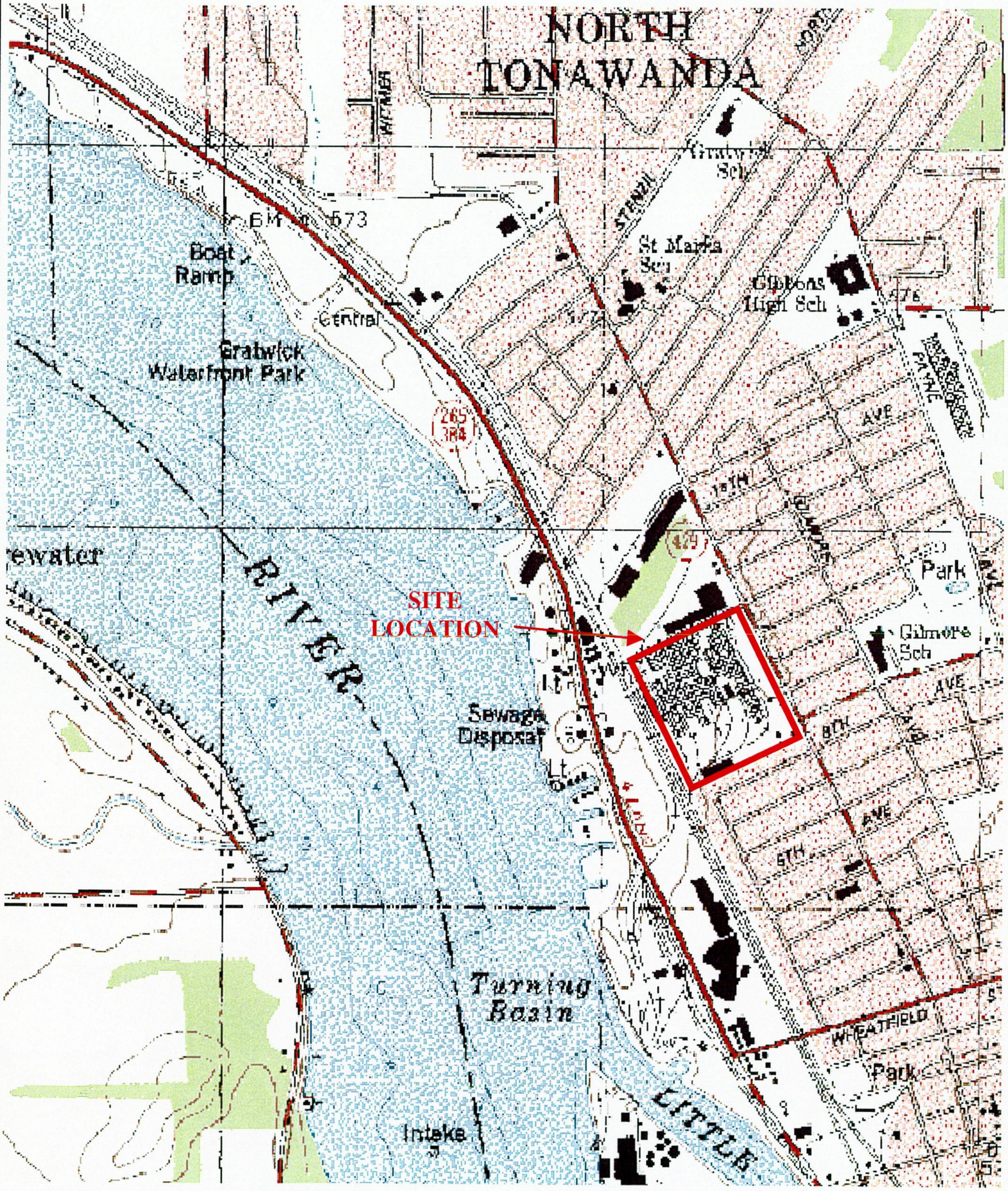
D. **Area of Concern 4 – Impacted Soil.** Four remediation alternatives were evaluated in detail for Area of Concern 4: no further action, cap with soil, cap with asphalt, and excavation in selected areas based on how the site will be redeveloped, with off-site disposal of excavated material. The no-action alternative (Alternative 1) did not satisfy any of the six evaluating criteria. Alternative 1 has been rejected at this time because of the potential risks to human health and the environment. Alternative 2, cap with soil, satisfied five of the six criteria, but may not be feasible, depending on future redevelopment of the site. The bermed areas may interfere with new construction at the site. Alternative 3, cap with asphalt, satisfied five of the six criteria. The widespread distribution of the total metals contamination may interfere with future on-site construction. Alternative 4, excavation of selected areas with off-site disposal, satisfied all six criteria and is selected.

E. **Area of Concern 5 – Underground Storage Tanks.** Three remediation alternatives were evaluated in detail for Area of Concern 5: no further action, closure in place, and removal and off-site disposal. The no action alternative has been rejected at this time because of the potential risks to human health and the environment. The no-action alternative (Alternative 1) did not satisfy any of the six evaluating criteria. Alternative 2, closure in place, satisfied five of the six criteria. Alternative 2 may not be feasible depending on future redevelopment of the site. The areas occupied by USTs may interfere with new construction at the site. Alternative 3, removal and off-site disposal, satisfied all six criteria. Based on satisfaction of all six criteria, Alternative 3 is selected.

F. **Area of Concern 6 – Impacted Groundwater.** Three remediation alternatives were evaluated in detail for Area of Concern 6: no further action, institutional controls and removal and off-site disposal. The no action alternative (Alternative 1) satisfied five of the six criteria, but has been rejected at this time because it is not actively protective of human health and the environment. Alternative 2, institutional controls, satisfied all six of the criteria. Alternative 3, off-site disposal, satisfied five of the six criteria. The future redevelopment of the site may affect the feasibility of Alternative 3 due to new construction. Based on satisfaction of all six criteria, Alternative 2 is selected.

G. **Area of Concern 7 – Cooling (Quench) Pond.** Two remediation alternatives were evaluated in detail for Area of Concern 7: no further action and off-site (POTW) treatment and decommissioning. The no action alternative (Alternative 1) did not satisfy any of the six evaluating criteria and has been rejected at this time because of the potential risks to human health and the environment. Alternative 2, off-site (POTW) treatment and decommissioning, satisfied all six criteria. Based on satisfaction of all six criteria, Alternative 2 is selected.

FIGURES



Stearns & Wheler, LLC
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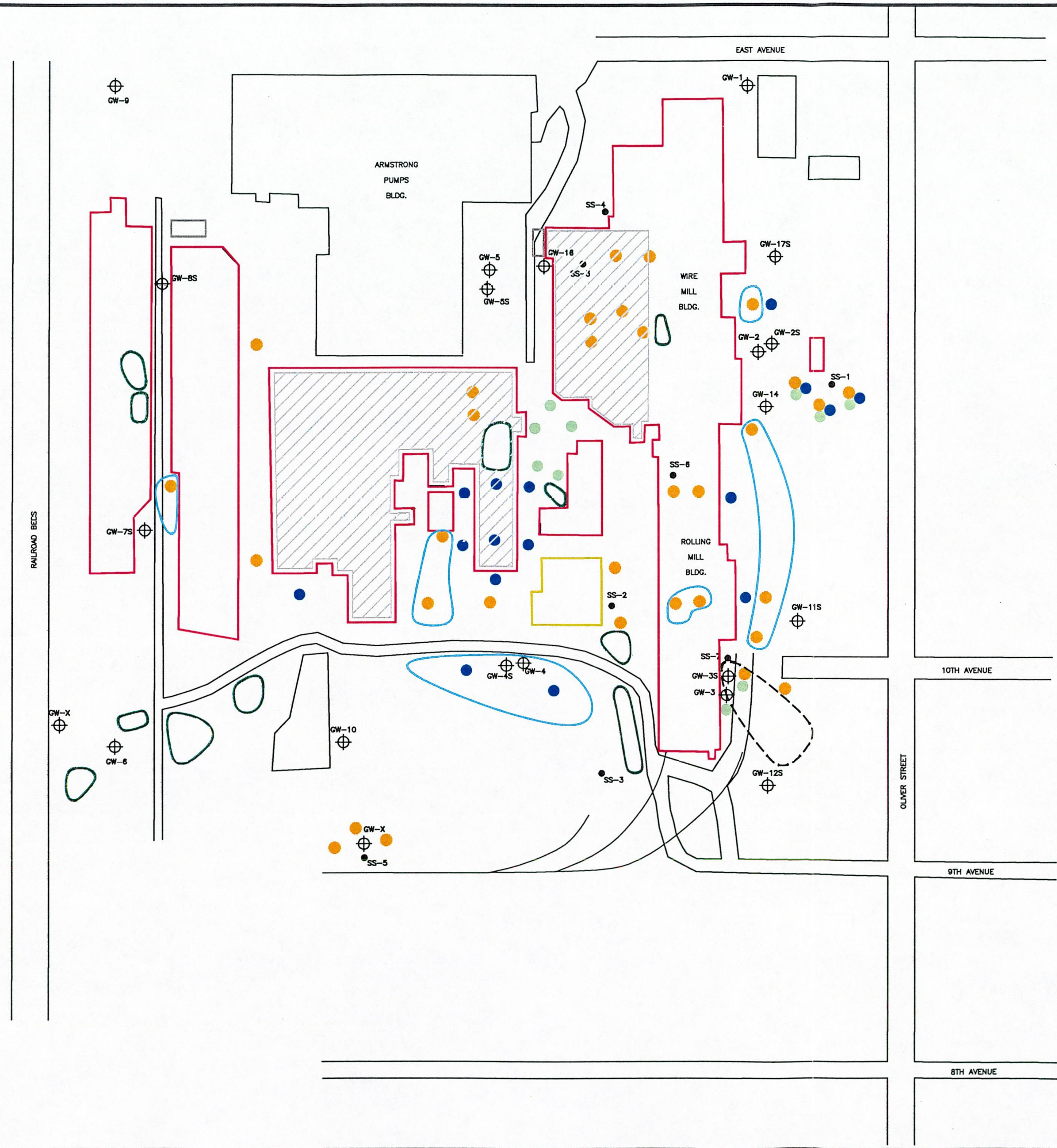
CAZENOVIA, NEW YORK

DATE: 11/99 JOB No: 80049.10

CITY OF NORTH TONAWANDA
ROBLIN STEEL SITE

FIGURE 1
REMEDIAL ALTERNATIVES REPORT
SITE LOCATION



LEGEND

GW-12S	MONITORING WELL	
	SURFACE SOIL SAMPLE – PAHs	
	SURFACE SOIL SAMPLE – PCBs	
	SURFACE SOIL SAMPLE – METALS	
	AOC–1	MISCELLANEOUS DRUMS AND WASTE PILES
	AOC–2	BUILDING RUINS
	AOC–3	WOOD BLOCK FLOOR & IMPACTED RESIDUE
	AOC–4	IMPACTED SOIL *
	AOC–5	USTs
	AOC–6	IMPACTED GROUNDWATER
	AOC–7	COOLING POND

* LIMITS AND LOCATIONS OF IMPACTED SOIL ARE ESTIMATES AND FOR PURPOSES OF GENERAL LOCATION INFORMATION ONLY

N

150 0 150 300
1"=150'

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 11/99 JOB No.: 80049FA

CITY OF NORTH TONAWANDA
ROBLIN STEEL SITE

FIGURE 2
REMEDIAL ALTERNATIVES REPORT
AREAS OF CONCERN

M:\80049fa\bypme\ROBST_DWG
99/11 CAZ PME rev. by ame 7\27\01
H:\80049fa\by pme\80049FF2a.DWG

M:\80049\10\FIG\80049103.dwg Wed Jun 06 15:53:41 2001 Plotted from

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

It is a violation of New York State Education Law for any person, unless acting under the direction of a licensed professional engineer, to alter an item on this drawing in any way. If an item is altered, the altering engineer shall affix to the item his/her seal and the notation "altered by" followed by his/her signature and the date of such alteration, and a specific description of the alteration.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
1	FOR APPROVAL					
	HCC	9/00				

PROJECT SUPERVISOR ______ DEPARTMENT SUPERVISOR ______

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE

Stearns&Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

ROBLIN STEEL
CITY OF NORTH TONAWANDA, NEW YORK

FIGURE 3
SOIL SAMPLE LOCATIONS

JOB NO. 80049 CONTRACT SHEET F-3

TABLES

TABLE 2-1

Results of Preliminary Screening - Remedial Options for Area of Concern 1

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

General Response Action	Process Option	Description	Screening Summary
No Action	No Action	Allow waste materials to remain in place	Required for Comparison; otherwise rejected
Prevent Direct Contact with Waste Materials	Institutional Controls	Create fenced staging area or storage building for waste	Easily Implemented May not be effective if not maintained. Comparative low cost.
	Cover waste	Cover with low permeability soil	Easily Implemented May not be effective for liquid wastes. Comparative low cost.
Prevent Direct Contact with Waste Materials, Prevent Leachate Generation	Containment	Create land disposal cell	Not as easily implemented. May not be effective for liquid wastes. Higher cost.
	Containment	Solidification / Stabilization	Only appropriate for waste piles (scale/slag) Not effective for liquids or organics Relatively low cost Fairly easily implemented
	Remove / Dispose Off Site	Transport to permitted disposal facility	Easily Implemented Effective for all Waste materials Relatively low cost

Note: Shaded Options have been rejected from further consideration.

TABLE 2-2

Preliminary Remedial Alternatives - Area of Concern 1

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES		
Option	Portion of Site	1	2	3
No Action	All waste materials	*		
Access Restrictions	Designated Waste Staging Area			*
Waste Characterization	All waste materials		*	*
Off-Site Disposal (permitted facility or POTW)	Tires		*	*
	Drums		*	*
	Waste Piles (scale/slag)		*	
	Waste Piles (building debris)		*	*
	Lime		*	
Overpacking	All unlabeled drums		*	*
Stabilization / Solidification	Waste Piles (scale/slag)			*

TABLE 2-3

Results of Preliminary Screening - Remedial Options for Area of Concern 2
Building Ruins

Roblin Steel Remedial Alterntives Report
City of North Tonawanda, NY

General Response Action	Process Option	Description	Alternative	Screening Summary
No Action	No Action	Allows buildings to remain as they exist	1	Retained for comparison only
Prevent Direct Contact with building ruins and potential injury from collapse	Stabilize buildings to prevent further deterioration	May require some demolition for safety reasons. Requires that all buildings are safe for the public	2	Easily Implemented Does not allow for Redevelopment options Relatively low cost.
	Recycle bricks and metal building materials. Dispose of materials at C&D landfill.	Requires demolition of seven buildings. Requires some actions on other areas of concern.	3	Easily Implemented Potential higher cost. Allows for Redevelopment flexibility. Prepares area for future development with different types of buildings.

Note: Shaded Options have been rejected from further consideration.

TABLE 2-4

Preliminary Remedial Alternatives - Area of Concern 2

Building Ruins

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES	
Option	Portion of Site	2	3
Stabilize Buildings	All on site buildings	*	
Recycle materials of value and demolish buildings	All on site buildings		*

<u>TABLE 2-5</u>

Results of Preliminary Screening - Remedial Options for Area of Concern 3
Wood Block Floors with Impacted Soil/Residue

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

General Response Action	Process Option	Description	Screening Summary
No Action	No Action	Allow the wood block floors with imapcted soil/residue to remain in place	Required for comparison
Prevent Direct Contact with the wood block floors (with impacted soil/residue)	Encapsulate	Construct a floor over the existing wood block floor	Not as easily implemented Would not facilitate site development Relatively low cost.
	Remove	Remove and dispose of the wood blocks and soil/residue	Not as easily implemented Effective over time. Comparatively higher cost.

TABLE 2-6

Preliminary Remedial Alternatives - Area of Concern 3
Wood Block Floors with Impacted Soil/Residue

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES		
Option	Portion of Site	1	2	3
No Action	All wood block flooring	*		
Cover Wood Blocks	All wood block flooring		*	
Remove and Dispose of the wood blocks and residue	All wood block flooring			*

Table 2-7

Summary of SVOC and PCB Concentrations in Surface Soil (Area of Concern 4)

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

Compound	NYSDEC Clean-up Goal (ug/kg)	Off-site / Background SS-62	Outdoor Soil Sample Results - Entire site. Frequency of Detection	Minimum Conc. (ug/kg)	Maximum Conc. (ug/kg)	Mean Conc. (ug/kg)
Naphthalene	13,000	215	19 of 19	6	3,700	122
2-Methylnaphthalene	36,400	215	18 of 19	14	1,500	176
Acenaphthylene	41,000	215	19 of 19	3	1,500	169
Acenapthene	50,000	215	18 of 19	5	4,300	139
Fluorene	50,000	215	18 of 19	6	4,500	214
Phenanthrene	50,000	16	19 of 19	7	41,000	1,525
Anthracene	50,000	215	19 of 19	6	7,900	428
Fluoranthene	50,000	34	19 of 19	10	43,000	1,954
Pyrene	50,000	28	19 of 19	22	**70,000**	2,557
Benzo(a)anthracene	224	12	18 of 19	52	**26,000**	**1,250**
Chrysene	400	20	19 of 19	22	**28,000**	**1,314**
Benzo(b)fluoranthene	1,100	17	18 of 19	100	**29,000**	**1,670**
Benzo(k)fluoranthene	1,100	19	18 of 19	60	**20,000**	**1,534**
Benzo(a)pyrene	61	14	18 of 19	57	**23,000**	**1,221**
Indeno(1,2,3-c,d)pyrene	3,200	12	18 of 19	15	**17,000**	397
Dibenzo(a,h)anthracene	14	215	17 of 19	5	**8,200**	**187**
Benzo(g,h,i)perylene	50,000	11	18 of 19	42	11,000	365
Total PAHs		183		727	327,300	16,778
PCB 1260 (SS-32,33,34 only)	1000	13	3 of 3	1,000	**19,000**	**4,305**

Soil Clean-up Criteria are listed in NYSDEC TAGM HWR-94-4046, dated January 1994.
Shaded cell indicates compound was not detected. Value listed is 1/2 the detection limit.
Bold indicates concentration exceeds clean-up criteria.

Table 2-8

Summary of Metals Concentrations in Surface Soil - Area of Concern 4

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

Compound (mg/kg)	NYSDEC Clean-up Goal (mg/kg)	Off-site / Background SS-62*	Eastern USA background conc. (mg/kg)	Frequency of Detection	Minimum Conc. (mg/kg)	Maximum Conc. (mg/kg)	Mean Conc. (mg/kg)
Aluminum	SB	11,000	33,000	14 of 14	1,230	9,510	3,688
Antimony	SB	0.85UN	N/A	14 of 14	**2.10**	**116**	**8.57**
Arsenic	7.5/SB	5	3 - 12	14 of 14	**12.1**	**44.0**	**23.8**
Barium	300/SB	46	15 - 600	14 of 14	50.6	**584**	109
Beryllium	0.16/SB	0.5B	0 - 1.75	14 of 14	0.22	**1.20**	**0.56**
Cadmium	1/SB	1.0B	0.1 - 1	14 of 14	**1.80**	**295**	**22.5**
Calcium	SB	46,100E	130 - 35,000	14 of 14	2,180	41,400	8,069
Chromium	10/SB	14.9E	1.5 - 40	14 of 14	**25.6**	**551**	**117**
Cobalt	30/SB	5.0B	2.5 - 60	14 of 14	6.90	**168**	21.9
Copper	25/SB	17.6E	1 - 50	14 of 14	**69.4**	**698**	**255**
Iron	2,000/SB	16,500	2,000 - 550,000	14 of 14	**55,500**	**515,000**	**135,336**
Lead	SB****	15.4	****	14 of 14	**103**	**1,390**	**336**
Magnesium	SB	24,900	100 - 5,000	14 of 14	245	13,300	1,767
Manganese	SB	348	50 - 5,000	14 of 14	**437**	**3,810**	**1,106**
Mercury	0.1	0.04B	0.001 - 0.2	13 of 14	0.04	**1.10**	**0.21**
Nickel	13/SB	12.9	0.5 - 25	14 of 14	**38.6**	**502**	**116**
Potassium	SB	1,900	8,500 - 43,000	14 of 14	71.4	874	316
Selenium	2/SB	0.64U	0.1 - 3.9	11 of 14	**2.20**	**20**	**6.82**
Silver	SB	0.21U	N/A	12 of 14	0.11	**1.60**	**0.44**
Sodium	SB	154B	6,000 - 8,000	14 of 14	152	753	517
Thallium	SB	1.1U	N/A	8 of 14	0.06	**6.40**	**1.29**
Vanadium	150/SB	19.9	1 - 300	14 of 14	7.30	111	21.8
Zinc	20/SB	76.2	9 - 50	14 of 14	**156**	**3,540**	**691**

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)

Bold values indicate concentrations above clean-up objectives and background concentrations.

****Background levels for lead vary widely.

U indicates compound was not detected

B indicates compound was detected in blank.

TABLE 2-9

Results of Preliminary Screening - Remedial Options for Area of Concern 4

Impacted Soil

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

General Response Action	Process Option	Description	Alternative	Screening Summary
No Action	No Action	Leave soil as is.	1	Retained for comparison purposes only
Prevent Contact with Contaminated Soil	Institutional Controls	Improve access restrictions		Easily implemented Likely to be ineffective over time Comparative low cost.
	Cap with layer of clean soil	Cap areas of contaminated soil with minimum of 12-inches clean soil	2	Easily implemented Effectively prevents contact Comparatively low cost.
Prevent Contact with Contaminated Soil, Prevent Leaching of Contaminants into Groundwater	Cap with asphalt	Pave over areas of impacted soil.	3	Easily implemented Effectively prevents contact Comparatively moderate cost.
	Excavate, On-site Treatment	Excavate areas of impacted soil, treatment with soil washing		Not as easily implemented Effective in meeting goals High cost.
	Excavate, On-site Disposal	Excavate and consolidate impacted soil, place in on site disposal cell		Not as easily implemented Effective in meeting goals High cost.
	Excavate, Off-site Disposal	Excavate, dispose off-site in permitted facility	4	Easily implemented Effective in meeting goals Comparatively moderate cost.

Note: Shaded Options have been rejected from further consideration.

TABLE 2-10

Preliminary Remedial Alternatives - Area of Concern 4

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES			
Option	Portion of Site	1	2	3	4
No Action	All	*			
Excavate	Areas of Impacted Soil		*		*
Cap with clean soil	Areas of Impacted Soil		*		*
Pave with Asphalt	Areas of Impacted Soil			*	*
Off-Site Disposal	Excavated, impacted soil				*

TABLE 2-11

Results of Preliminary Screening - Remedial Options for Area of Concern 5

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

General Response Action	Process Option	Description	Screening Summary
No Action	No Action	Allow USTs to remain in place	Required for Comparison - Rejected at this time
Prevent Direct Contact with USTs and Contents, Prevent leaks from tank.	Close in place	Locate tank, remove contents, clean, fill with concrete	Easily Implemented Effective if appropriate fill used. Relatively low cost.
	Remove Tank	Locate tank, remove contents, clean, remove tank.	Easily Implemented Effective, Meets regulatory approval Potential higher cost.

Note: City is currently developing work plan to implement Tank Removal.
Shaded Options have been rejected from further consideration.

TABLE 2-12
Preliminary Remedial Alternatives - Area of Concern 5
Underground Storage Tanks
Roblin Steel Remedial Alternatives Report
City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES	
		2	3
Option	Portion of Site		
Close in place	All USTs	*	
Remove tank and backfill	All USTs		*

Table 2-13
Historical Analytical Results - VOCs in Area of Concern 6
Impacted Groundwater
Roblin Steel RA Report
City of North Tonawanda, NY

Contaminant	GW Std [1] (µg/L)	Results for samples collected during PSA (1995)	Jul-98	Dec-98
VOCs - Monitoring Wells MGW-3S - Historical Analytical Results				
cis-1,2-Dichloroethene	5	70	25	62
Trichloroethene	5	86	66	56
Tetrachloroethene	5	180	68	40

* Laboratory results from PSA and July 1998 sampling rounds are for both isomeric forms of 1,2-DCE.

[1] GW standard as listed in NYSDEC DOW TOGS 1.1.1, revised June 1998.

TABLE 2-14

Results of Preliminary Screening - Remedial Options for Area of Concern 6

Impacted Groundwater

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

General Response Action	Process Option	Alternative	Description	Screening Summary
No Action	No Action	1	No actions toward groundwater	Lowest cost, easily implemented, may be effective protection
Prevent Exposure to Impacted Groundwater	Institutional Controls	2	Deed restrictions, or monitoring and point of use treatment units	Easily implemented Potential to be effective over time. Comparative low cost.
Prevent Exposure, Minimize Groundwater Migration, Provide for Attainment of Standards at Property Boundary	Groundwater Collection/Off-site Treatment	3	Install recovery well, send water to City POTW for Treatment	Easily implemented Effective over time. Comparative moderate cost.
	Groundwater Collection/On-site Treatment		Install recovery well and Treatment Unit	Not as easily implemented Effective over time. Comparatively higher cost.
	In Situ Treatment		Install Air Sparging System	Not as easily implemented Effective over time. Comparatively higher cost.

Note: Shaded Options have been rejected from further consideration.

TABLE 2-15

Preliminary Remedial Alternatives - Area of Concern 6

Impacted Groundwater

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES		
Option	Portion of Site	1	2	3
No Action	Area of impacted groundwater	*		
Deed Restrictions	Area of impacted groundwater		*	*
Groundwater Collection and off-site treatment	Area of impacted groundwater			*

TABLE 2-16

Results of Preliminary Screening - Remedial Options for Area of Concern 7

Cooling Pond

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

General Response Action	Process Option	Description	Alternatives	Screening Summary
No Action	No Action		1	Retained for comparison purposes only
Prevent Access to pond	Institutional Controls	Restrict access to pond with fencing. Fence already in place		Easily implemented low cost Rejected. Not a long term solution
Decommission pond	Off-site treatment (City POTW) of water	Characterize contents. If acceptable, haul to City POTW, decommission/demolish pond and associated piping	2	Eliminates physical and chemical risks associated with pond. Higher cost

Note: Shaded Options have been rejected from further consideration.

TABLE 2-17

Preliminary Remedial Alternatives - Area of Concern 7

Cooling Pond

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

TECHNOLOGY TYPE/PROCESS OPTION		REMEDIAL ALTERNATIVES
Option	Portion of Site	2
Collect and treat water at City POTW, Dismantle structure	Pond and associated piping	*

TABLE 2-18
Summary of Remediation Alternatives

Roblin Steel Remedial Alternatives Report

City of North Tonawanda, NY

AOC	Description	Alternative	Description	Preferred Alternative
1	Miscellaneous Drums and Waste Piles	1	No Action	
		2	Off-site Disposal	*
		3	Solidification/Stabilization	
2	Building Ruins	1	No Action	
		2	Stabilize Buildings	
		3	Demolish Buildings	*
3	Block Floors and Impacted Soil/Residue	1	No Action	
		2	Encapsulate	
		3	Dispose off-site	*
4	Impacted Soil	1	No Action	
		2	Cap with soil	
		3	Cap with asphalt	
		4	Off-site Disposal	*
5	Underground Storage Tanks	1	No Action	
		2	Close in place	
		3	Remove	*
6	Impacted Groundwater	1	No Action	
		2	Institutional controls	*
		2	Treatment at POTW	
7	Cooling Pond	1	No Action	
		2	Offsite (POTW) treatment and decommissio	*

Table 3-1
PAH Concentrations in Soil, Areas 3 and 4
Roblin Steel
North Tonawanda, NY
Area 3 PAHs - June 2000

Compound (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-8 A Surface Soil (0-.5')	6-00-8 B Sub-Surface (2-2.5')	6-00-9 A Surface Soil (0-.5')	6-00-9 B Sub-Surface (2-2.5')	6-00-13 A Surface Soil (0-.5')	6-00-13 B Sub-Surface (2-2.5')
Naphthalene	13.0	0.082 J	0.022 J	0.150 J	0.046 J	0.100 J	0.080 J
2-Methylnaphthalene	36.4	0.140 J	0.030 J	0.170 J	0.094 J	0.120 J	0.066 J
Acenaphthylene	41.0	0.250 J	0.046 J	0.260 J	0.200 J	0.170 J	0.024 J
Acenaphthene	50.0	0.079 J	0.050 J	0.380 J	0.036 J	0.220 J	0.230 J
Fluorene	50.0	0.150 J	0.055 J	0.500 J	0.110 J	0.210 J	0.180 J
Phenanthrene	50.0	1.400	0.500	3.800	0.780	2.900	1.900
Anthracene	50.0	0.450	0.150 J	1.200	0.270 J	0.610 J	0.470 J
Fluoranthene	50.0	1.900	0.750	4.300	0.990	3.300	2.400
Pyrene	50.0	1.800	0.780	4.400	0.940	3.300	2.000
Benzo(a)anthracene	0.224	**1.300**	**0.470**	**3.200**	**0.700**	**2.100**	**1.400**
Chrysene	0.4	**1.500**	**0.510**	**3.000**	**0.690**	**2.500**	**1.600**
Benzo(b)fluoranthene	1.1	**1.700**	0.350 J	**2.600**	0.500	**1.800**	**1.600**
Benzo(k)fluoranthene	1.1	1.100	0.410 J	**1.600**	0.570	**2.000**	**1.400**
Benzo(a)pyrene	0.061	**1.200**	**0.430**	**2.700**	**0.580**	**1.900**	**1.100**
Indeno(1,2,3-cd)pyrene	3.2	0.270 J	0.350 J	2.600	0.350 J	0.340 J	0.110 J
Dibenzo(a,h)anthracene	0.014	**0.130 J**	**0.130 J**	**1.000**	**0.120 J**	**0.170 J**	U
Benzo(g,h,I)perylene	50.0	0.170 J	0.360 J	2.500	0.260 J	0.220 J	0.090 J
TOTAL PAH		13.621	5.393	34.360	7.236	21.960	14.650

Bold entry indicates concentration in exceedence of Cleanup Objective

J - Indicates that the reported value is an estimate

U - Indicates that the compound was not present above detection limits

Table 3-1, continued
PAH Concentrations in Soil, Areas 3 and 4
Roblin Steel
North Tonawanda, NY
Area 4 PAHs - June 2000

Compound (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-1 A Surface Soil (0-.5')	6-00-1 B Sub-Surface (2.5-3')	6-00-2 A Surface Soil (0-.5')	6-00-2 B Sub-Surface (2.5-3')	6-00-3 A Surface Soil (0-.5')	6-00-3 B Sub-Surface (2.5-3')	6-00-4 A Surface Soil (0-.5')	6-00-4 B Sub-Surface (2.5-3')	6-00-5 A Surface Soil (0-.5')	6-00-5 B Sub-Surface (2.5-3')	6-00-22 A Surface Soil (0-.5')
Naphthalene	13.0	0.180 J	U	**35.000 J**	U	0.120 J	U	0.500 J	0.120 J	0.067 J	U	1.600 J
2-Methylnaphthalene	36.4	0.190 J	0.016 J	21.000 J	U	0.140 J	U	0.930	0.230 J	0.075 J	U	1.100 J
Acenaphthylene	41.0	0.037 J	U	35.000 J	U	0.240 J	U	0.120 J	U	0.180 J	0.004 J	2.100 J
Acenaphthene	50.0	0.140 J	U	31.000 J	U	0.270 J	U	U	0.022 J	0.100 J	U	3.300 J
Fluorene	50.0	0.160 J	U	44.000 J	U	0.300 J	U	U	0.033 J	0.092 J	U	4.100 J
Phenanthrene	50.0	1.400	U	**220.00**	0.007 J	3.100	0.003 J	0.850	0.130 J	1.100	0.005 J	28.000
Anthracene	50.0	0.350 J	U	**63.000 J**	0.002 J	1.100	U	0.350 J	0.042 J	0.410 J	0.002 J	8.500 J
Fluoranthene	50.0	1.500	U	**310.00**	0.008 J	4.300	0.004 J	0.590 J	0.016 J	1.400	0.032 J	40.000
Pyrene	50.0	1.700	U	**260.00**	0.008 J	5.700	0.004 J	0.740 J	0.100 J	1.500	0.044 J	34.000
Benzo(a)anthracene	0.224	**0.830**	U	**220.00**	0.004 J	**3.200**	0.002 J	**0.520 J**	0.014 J	**1.200**	0.030 J	**20.000**
Chrysene	0.4	**0.880**	U	**210.00**	0.008 J	**3.000**	0.002 J	**0.790**	0.031 J	**1.500**	0.026 J	**20.000**
Benzo(b)fluoranthene	1.1	0.530 J	U	**200.00**	U	**3.100**	0.002 J	0.880	U	**1.800**	0.016 J	**17.000**
Benzo(k)fluoranthene	1.1	0.520 J	U	**130.00**	U	**2.000**	0.003 J	0.640 J	U	**1.300**	0.023 J	**17.000**
Benzo(a)pyrene	0.061	**0.570 J**	U	**180.00**	U	**2.800**	0.003 J	**0.420 J**	U	**1.100**	0.028 J	**18.000**
Indeno(1,2,3-cd)pyrene	3.2	0.570 J	U	**140.00**	0.005 J	2.000	U	0.090 J	0.009 J	0.220 J	0.024 J	**16.000**
Dibenzo(a,h)anthracene	0.014	**0.250 J**	U	**54.000 J**	U	**0.830 J**	U	U	U	**0.098 J**	0.010 J	**6.300 J**
Benzo(g,h,I)perylene	50.0	0.470 J	U	**140.00**	0.008 J	1.900	U	0.080 J	0.033 J	0.140 J	0.040 J	18.000
TOTAL PAH		10.277	0.016	2293.00	0.050	34.100	0.023	7.500	0.780	12.184	0.284	255.000

Bold entry indicates concentration in exceedence of Cleanup Objective

J - Indicates that the reported value is an estimate

U - Indicates that the compound was not present above detection limits

Table 3-2

PCB Concentrations in Soil, Area 3

Roblin Steel

North Tonawanda, NY

June 2000

Aroclor (mg/Kg)	**Rec. Soil Cleanup Objective (ppm)**	**6-00-38A** Surface (0-.5')	**6-00-39A** Surface (0-.5')	**6-00-40A** Surface (0-.5')	**6-00-41A** Surface (0-.5')	**6-00-42A** Surface (0-.5')	**6-00-43A** Surface (0-.5')
Aroclor-1016		U	U	U	U	U	U
Aroclor-1221		U	U	U	U	U	U
Aroclor-1232		U	U	U	U	U	U
Aroclor-1242		U	U	U	U	U	U
Aroclor-1248		U	U	U	U	U	U
Aroclor-1254		U	U	0.28	U	U	U
Aroclor-1260		1.60	12.00	0.49	2.50	400.00	19.00
TOTAL PCBs	1.0	**1.60** *	**12.00** *	0.77	**2.50** *	**400.00** *	**19.00** *

* - Indicates concentration in exceedence of Cleanup Objective

U - Indicates that the aroclor was not present above detection limits

Table 3-3
Metals Concentrations in Soil (Total and TCLP)
Roblin Steel
North Tonawanda, NY
June 2000

AREA 1 - Total Metals (Select Metals)

METALS (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-23		6-00-24	6-00-25		6-00-26		6-00-27		6-00-28	6-00-29
		A Surface Soil (0-.5')	B Native Soil (3-3.5')	A Surface Soil (0-.5')	A Surface Soil (0-.5')	B Fill Sample (1-2')	A Surface Soil (0-.5')	B Native Soil (2.5-3')	A Surface Soil (0-.5')	B Fill Sample (1-1.5')	A Surface Soil (0-.5')	A Surface Soil (0-.5')
Arsenic	7.5	**12.6**	3.2	**11.90**	**13.4**	2.3	6.3	6.8	**20.1**	4	**31.80**	**14.00**
Cadmium	1	**4.5**	0.044	**14.90**	**4.8**	0.049	**2.4**	0.063	0.49	0.044	**5.90**	**1.90**
Chromium	10	**29.4**	7.5	**15.30**	**43**	8.8	**21.9**	**18.3**	**86.8**	8.6	**33.80**	**81.20**
Lead	SB	93.6	8.8	161.00	283	26.4	98.3	34.5	324	8.9	1750.00	160.00

METALS (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-30		6-00-31		6-00-32		6-00-33	6-00-34		6-00-35	
		A Surface Soil (0-.5')	B Native Soil (3-3.5')	A Surface Soil (0-.5')	B Fill Sample (2.5-3')	A Surface Soil (0-.5')	B Native Soil (2.5-3')	A Surface Soil (0-.5')	A Surface Soil (0-.5')	B Fill Sample (2.5-3')	A Surface Soil (0-.5')	B Fill Sample (2.5-3')
Arsenic	7.5	**15.8**	1.2	**16.2**	2.3	5.9	0.75	**11.20**	**23.3**	5.9	5.8	**21.4**
Cadmium	1	0.059	0.047	0.6	0.044	**3.3**	0.043	**33.00**	**7.9**	0.057	0.048	**3.6**
Chromium	10	**24.4**	**13.6**	**51.1**	8.5	**23.9**	**11.3**	**17.80**	**58.8**	5.2	**39.2**	**30.6**
Lead	SB	61.3	8.2	60.4	11.5	63.4	7.9	90.80	174	16.5	34.2	136.0

Bold entry indicates concentration in exceedence of Cleanup Objective
SB - site background

AREA 1 - TCLP - (Select Metals)

METALS (mg/Kg)	Regulatory Level (mg/L)	6-00-24 A Surface Soil (0-.5')	6-00-28 A Surface Soil (0-.5')	6-00-29 A Surface Soil (0-.5')	6-00-33 A Surface Soil (0-.5')
Arsenic	5.0	0.0080	U	U	U
Cadmium	1.0	0.0784	0.01830	0.00560	0.0632
Chromium	5.0	0.0013	0.00035	0.00034	0.0011
Lead	5.0	0.0927	0.00460	U	0.0226

U - Indicates that the compound was not present above detection limits

Table 3-3, continued

Metals Concentrations in Soil (Total and TCLP)

Roblin Steel

North Tonawanda, NY

June 2000

AREA 2 - Total Metals (Select Metals)

METALS (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-17	6-00-18	6-00-19		6-00-20	
		A Surface Soil (0-.5')	A Surface Soil (0-.5')	A Surface Soil (0-.5')	B Native Soil (3-3.5')	A Surface Soil (0-.5')	B Fill Sample (2-2.5')
Arsenic	7.5	**8.50**	**37.00**	**38.1**	1.7	**27.8**	**20.8**
Cadmium	1	**5.90**	**45.20**	**23.0**	0.28	**15.4**	U
Chromium	10	**47.30**	**68.10**	**78.4**	**12.0**	**78.8**	**39.5**
Lead	SB	83.60	421.00	3710.0	10.7	731.0	6.2

Bold entry indicates concentration in exceedence of Cleanup Objective

SB - site background

AREA 2 - TCLP - (Select Metals)

METALS (mg/Kg)	Regulatory Level (mg/L)	6-00-17 A Surface Soil (0-.5')	6-00-18 A Surface Soil (0-.5')
Arsenic	5.0	U	0.0039
Cadmium	1.0	0.0226	0.0330
Chromium	5.0	U	0.0010
Lead	5.0	0.0078	0.0043

U - Indicates that the analyte was not present above detection limits

Table 3-3, continued

Metals Concentrations in Soil (Total and TCLP)

Roblin Steel

North Tonawanda, NY

June 2000

AREA 3 - Total Metals (Select Metals)

METALS (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-10 A Surface Soil (0-.5')	6-00-10 B Native Soil (2.5-3')	6-00-11 A Surface Soil (0-.5')	6-00-11 B Fill Sample (1-2')	6-00-12 A Surface Soil (0-.5')	6-00-12 B Fill Sample (1-2')	6-00-14 A Surface Soil (0-.5')	6-00-14 B Native Soil (2.5-3')	6-00-15 A Surface Soil (0-.5')	6-00-15 B Native Soil (2.5-3')
Arsenic	7.5	**7.8**	4.7	5.0	**18.0**	**17.0**	**30.5**	**18.9**	1.8	**17.2**	**13.2**
Cadmium	1	**1.9**	0.062	**1.2**	U	**104.0**	**1.5**	**6.8**	U	**4.2**	**1.1**
Chromium	10	8.3	8.5	7.9	5.7	**59.3**	**206.0**	**97.5**	**13.5**	**62.5**	**19.7**
Lead	SB	54.6	32.7	213.0	11.8	1460.0	1100.0	215.0	10.7	46.2	81.1

METALS (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-16 A Surface Soil (0-.5')	6-00-16 B Native Soil (2.5-3')	6-00-36 A Surface Soil (0-.5')	6-00-36 B Fill Sample (1-2')	6-00-37 A Surface Soil (0-.5')	6-00-37 B Native Soil (2.5-3')	6-00-44 A Surface Soil (0-.5')	6-00-45 A Surface Soil (0-.5')
Arsenic	7.5	**15.5**	5.8	**28.1**	**15.6**	**21.4**	7.0	**13.10**	**12.60**
Cadmium	1	**4.9**	U	**39.7**	**57.4**	**1420.0**	**571.0**	**76.90**	**11.30**
Chromium	10	**79.5**	7.8	**59.0**	**28.0**	**137.0**	9.2	**43.50**	**218.00**
Lead	SB	155.0	42.1	428.0	412.0	418.0	16.4	337.00	169.00

* - Indicates concentration in exceedence of Cleanup Objective

U - Indicates that the analyte was not present above detection limits

SB - site background

AREA 3 - TCLP (Select Metals)

METALS (mg/Kg)	Regulatory Level (mg/L)	6-00-44 A Surface Soil (0-.5')	6-00-45 A Surface Soil (0-.5')
Arsenic	5.0	0.0040	U
Cadmium	1.0	0.3220	0.0344
Chromium	5.0	0.0014	0.0020
Lead	5.0	0.0153	0.0187

U - Indicates that the analyte was not present above detection limits

<u>**Table 3-3, continued**</u>

Metals Concentrations in Soil (Total and TCLP)

Roblin Steel

North Tonawanda, NY

June 2000

AREA 4 - Total Metals (Select Metals)

METALS (mg/Kg)	Rec. Soil Cleanup Objective (ppm)	6-00-6		6-00-7		6-00-21
		A Surface Soil (0-.5')	B Native Soil (3.5-4')	A Surface Soil (0-.5')	B Fill Sample (1-2')	A Surface Soil (0-.5')
Arsenic	7.5	**9.3**	2.1	**13.5**	2.9	**42.90**
Cadmium	1	1.0	0.18	0.4	U	**2.50**
Chromium	10	**19.6**	7.5	**45.0**	5.2	**248.00**
Lead	SB	484.0	7.0	88.1	7.6	393.00

* - Indicates concentration in exceedence of Cleanup Objective

U - Indicates that the analyte was not present above detection limits

SB - site background

AREA 4 - TCLP (Select Metals)

METALS (mg/Kg)	Regulatory Level (mg/L)	6-00-21 A Surface Soil (0-.5')
Arsenic	5.0	0.0047
Cadmium	1.0	0.0086
Chromium	5.0	0.0080
Lead	5.0	0.1270

Table 4-1
Summary of Remedial Management Cost Estimates for Each Area of Concern
Remedial Action Alternatives Report
Roblin Steel - North Tonawanda, NY

AREA OF CONCERN (AOC)	CAPITAL COST	ANNUAL O&M COST	TOTAL COST (Present Worth)
AOC -1 Miscellaneous Drums and Waste Piles			
Alternative 1 - No Further Action	$0	$4,000	$30,000
Alternative 2 - Off-Site Disposal	$1,150,000	$0	$1,150,000
Alternative 3 - Off-Site Disposal/On-Site Solidification/Stabilization	$850,000	$0	$850,000
AOC - 2 Building Ruins			
Alternative 1 - No Further Action	$0	$4,000	$50,000
Alternaive 2 - Stabilization of the Buildings	$1,000,000	$0	$1,000,000
Alternative 3 - Removal	$1,500,000	$0	$1,500,000
AOC - 3 Wood Block Floor with Impacted Soil/Residue			
Alternative 1 - No Further Action	$0	$2,000	$25,000
Alternative 2 - Encapsulation	$880,000	$1,200	$890,000
Alternative 3 - Off-Site Disposal	$14,000	$0	$14,000
AOC - 4 Impacted Soil			
Alternative 1 - No Further Action	$0	$2,000	$20,000
Alternative 2 - Cap with Soil	$360,000	$1,200	$370,000
Alternative 3 - Cap with Asphalt	$1,320,000	$1,200	$1,330,000
Alternative 4 - Off-Site Disposal	$690,000	$0	$690,000
AOC - 5 Underground Storage Tanks			
Alternative 1 - No Further Action	$0	$5,000	$60,000
Alternative 2 - Close in Place	$35,000	$0	$35,000
Alternative 3 - Tank Removal and Disposal	$13,000	$0	$13,000

Table 4-1, continued

Summary of Remedial Management Cost Estimates for Each Area of Concern

AREA OF CONCERN (AOC)	CAPITAL COST	ANNUAL O&M COST	TOTAL COST (Present Worth)
AOC - 6 Impacted Groundwater			
Alternative 1 - No Further Action	$0	$3,000	$40,000
Alternative 2 - Institutional Controls	$8,000	$3,000	$50,000
Alternative 3 - Removal and Off-Site Disposal	$39,000	$6,600	$66,000
AOC - 7 Cooling (Quench) Pond			
Alternative 1 - No Further Action	$0	$2,000	$30,000
Alternative 2 - Structure Removal and Decommissioning/Disposa	$72,000	$0	$72,000

APPENDICES

APPENDIX A

AREA OF CONCERN 1
COMPARATIVE COST ESTIMATES

TABLE A-1
COST ESTIMATE

Area of Concern 1; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost

There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspections[1]	6	Man-day	$ 400	$2,400
Annual Site Inspection	0.5	Man-day	600	$300
Annual Review	1	Lump Sum	1,000	$1,000

ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS	$4,000
Present Worth of Annual Operating Cost (10 Year Project life, i = 7%)	$30,000
REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST	$30,000

[1] Assumes monthly inspections require one person and take approximately 4-hrs.

TABLE A-2
COST ESTIMATE
Area of Concern 1; Remedial Alternative 2 - Off-Site Disposal
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 2, Off-Site Disposal

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Characterization of drum contents	4	sample	$ 1,000	4,000
Drum Disposal [1]	4	loads	350	1,400
Characterization of mill slag piles [2]	2	sample	1,000	2,000
Disposal of slag piles (nonhazardous) [2]	9000	tons	40	360,000
Disposal of tires [3]	40	loads	350	14,000
Disposal of Building materials [4]	13,360	tons	35	468,000
Recycle Building materials [4]	3,340	tons	6.50	22,000
On-site supervision	8	Man weeks	2,000	16,000
Health and Safety Plan	1	LS	4,000	4,000
Total Direct Capital Costs				$1,000,000

Indirect Capital Cost

Engineering, Legal (5%)	$50,000
Contingency (10%)	$100,000
Total Indirect Capital Costs	$150,000
Total Estimated Capital Cost	$1,150,000

[1] Assume 80 Drums

[2] Assume slag pile dimensions of 200' x 80' x 10' = 160,000 cu ft = 6,000 CY * 1.5 tons/CY = 9,000 tons

[3] Assume tire pile dimensions of 100' x 100' x 6' = 60,000 cu ft = 2,220 CY = 40 truck loads

[4] Assume six rubble piles, average dimensions of 100' x 100' x 5' = 11,000 CY * 1.5 tons/CY = 16,700 tons.
Recycle 20% of brick, 80% of building material is sent to C&D landfill at cost of $35/ton.

TABLE A-2 (Continued)
ALTERNATIVE 2, Off-Site Disposal

Operating and Maintenance Costs

There are no ongoing Operating and Maintenance Costs associated with this alternative.

Estimated Annual Operating and Maintenance Costs		$0
	Present Worth of Annual Operating Cost (10 Year Project life, i = 7%)	$0
Total Estimated Capital Cost		$1,150,000
REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST**		$1,150,000

TABLE A-3
COST ESTIMATE
Area of Concern 1; Remedial Alternative 3 - Off-Site Disposal/On-Site Solidification
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 3: Off-Site Disposal/On-Site Solidificaiton

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Characterization of drum contents	4	sample	$ 1,000	4,000
Drum Disposal [1]	4	loads	350	1,400
Testing waste for use as aggregate	1	L S	10,000	10,000
Disposal of Excess waste material [2]	6,000	ton	40	240,000
Disposal of tires [3]	40	loads	350	14,000
Disposal of Building materials [4]	11,700	tons	35	410,000
Recycle Building materials [4]	5,000	tons	6.50	33,000
On-site supervision	1	LS	15,000	15,000
Health and Safety Plan	1	LS	4,000	4,000
Total Direct Capital Costs				$730,000

Indirect Capital Cost

Engineering, Administrative (5%)	$37,000
Legal (Enact Deed Restrictions)	$5,000
Contingency (10%)	$73,000
Total Indirect Capital Costs	$120,000
Total Estimated Capital Cost	$850,000

[1] Assume 80 Drums

[2] Assume slag pile dimensions of 200' x 80' x 10' = 160,000 cu ft = 6,000 CY * 1.5 tons/CY = 9,000 tons. Estimate assumes that 1/3 of slag is recycled at no cost.

[3] Assume tire pile dimensions of 100' x 100' x 6' = 60,000 cu ft = 2,220 CY = 40 truck loads

[4] Assume six rubble piles, average dimensions of 100' x 100' x 5' = 11,000 CY * 1.5 tons/CY = 16,700 tons. Recycle 30% of brick, 70% of building material is sent to C&D landfill at cost of $35/ton.

TABLE A-3 (Continued)
ALTERNATIVE 3: Off-Site Disposal/On-Site Solidificaiton

There are no ongoing Operating and Maintenance Costs associated with this alternative.

Estimated Annual Operating and Maintenance Costs		$0
	Present Worth of Annual Operating Cost (10 Year Project life, i = 7%)	$0
Total Estimated Capital Cost		$850,000
REMEDIAL ALTERNATIVE 3 TOTAL ESTIMATED COST**		$850,000

APPENDIX B

AREA OF CONCERN 2
COMPARATIVE COST ESTIMATES

TABLE B-1
COST ESTIMATE
Area of Concern 2; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost
There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspections[1]	6	Man-day	$ 400	$2,400
Annual Site Inspection	0.5	Man-day	600	$300
Annual Review	1	Lump Sum	3,000	$1,500

ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS $4,000

Present Worth of Annual Operating Cost (30 Year Project life, i = 7%) $50,000

REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST $50,000

[1] Assumes monthly inspections require one person and last approximately 4-hours.

TABLE B-2

COST ESTIMATE

Area of Concern 2; Remedial Alternative 2 - Stabilization of Buildings

Roblin Steel

City of North Tonawanda, NY

ALTERNATIVE 2, Stabilization of Buildings

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Building Survey (for Asbestos Containing Materials)	6	per bldg	$ 1,000	6,000
Demolition, Remove and Dispose of Rubble [1]	19,853	tons	35.00	700,000
Demolition, Recycling of Rubble [1]	6,618	tons	6.50	43,000
Stabilize remaining walls [1]	1	L S	250,000	250,000

Total Direct Capital Costs $1,000,000

Indirect Capital Cost

Engineering, Legal, Contingencies (3%) $30,000

Total Indirect Capital Costs $30,000

Total Estimated Capital Cost $1,000,000

Operating and Maintenance Costs

There are no ongoing Operation, Maintenance, and Monitoring Costs associated with this alternative.

REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST** $1,000,000

[1] Assumes building demolition/recycling of brick volumes as follows:

Partial Confer Plastic Building E - Walls = 500' x 90' x 2' (area x thickness if knocked down) = 90,000 CF = 3,334 CY = 5,00

Partial Large Brick Building - Walls = 300' x 640' x 2' (area x thickness if knocked down) = 384,000 CF = 14,222 CY = 21,00

Partial Small Burned Brick Building - Walls = 8500sf x 2' (area x thickness if knocked down) = 17.000 CF = 630 CY = 945 to

Assume half of walls can be stabilized. Therefore material to be disposed = 473 tons.

Assume 25% of material can be recycled. the remainder must be sent for disposal as C&D waste.

Small Electrical Controls Building is intact.

TABLE B-3
COST ESTIMATE
Area of Concern 2; Remedial Alternative 3 - Demolition, Removal, Disposal of Rubble
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 3: Demolition, Removal, Disposal of Rubble

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Building Survey (for Asbestos Containing Materials)	6	per bldg	$ 1,000	6,000
Demolition	1	L S	20,000	20,000
Removal and disposal of Building Materials[1]	38,291	tons	35	1,300,000
Removal and recyclint of Building Materials[1]	12,764	tons	6.50	100,000
Total Direct Capital Costs				$1,430,000
Indirect Capital Cost				
Engineering, Administrative, Legal (3%)				$43,000
Contingency (5%)				$71,500
Total Indirect Capital Costs				$110,000
Total Estimated Capital Cost				$1,500,000

Operating and Maintenance Costs

There are no ongoing Operation, Maintenance, and Monitoring Costs associated with this alternative.

Estimated Annual Operating and Maintenance Costs	$0
Present Worth of Annual Operating Cost (10 Year Project life, i = 7%)	$0
REMEDIAL ALTERNATIVE 3 TOTAL ESTIMATED COST	$1,500,000

[1] Assumes building demolition/recycling of brick volumes as follows:

Partial Confer Plastic Building E - Walls = 500' x 90' x 2' (area x thickness if knocked down) = 90,000 CF = 3,334 CY = 5,000 T
Partial Confer Plastic Building slab = 500' x 90' x 1' = 45,000 CF = 1,667 CY = 2,500 T
Partial Large Brick Building - Walls = 300' x 640' x 2' (area x thickness if knocked down) = 384,000 CF = 14,222 CY = 21,000
Partial Large Brick Building Slab = 60' x 640' x 1' = 384,000 CF = 14,222 CY = 21,000 T
Partial Small Burned Brick Building - Walls = 8500sf x 2' (area x thickness if knocked down) = 17,000 CF = 630 CY = 945 T
Partial Small Burned Brick Building - slab = 8500sf x 1' = 8,500 CF = 315 CY = 475 T
Small Electrical Controls Building walls and slab = 20 x 40 x 2 + 20 x 40 x 1 = 2400 CF = 135 T
Assume 25% of material can be recycled

APPENDIX C

AREA OF CONCERN 3
COMPARATIVE COST ESTIMATES

TABLE C-1
COST ESTIMATE
Area of Concern 3; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost
There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspections[1]	3	Man-day	$ 400	$1,200
Annual Site Inspection	0.5	Man-day	600	$300
ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS				$2,000
Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)				$25,000
REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST				$25,000

[1] Assumes monthly inspections require one person and last approximately 2-hours.

TABLE C-2
COST ESTIMATE
Area of Concern 3; Remedial Alternative 2 - Encapsulation
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 2, Encapsulation of Wood Block Floor

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Volume of Concrete [1]	2,400	CY	$ 350	$800,000
Total Direct Capital Costs				$800,000

Indirect Capital Cost

Contingency, Engineering, Admin (10%)	$80,000
Total Estimated Capital Cost	$880,000

[1] Wood block floor in demolished wire mill building = 225 x 150 ft = 33750 sf x 0.5 ft thick = 625 CY
Wood block floor in large brick building = 320 x 300 ft = 96000 sf x 0.5 ft thick = 1780 CY
Assume concrete would be used, final thickness = 6 inches.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Annual Site Inspection [2]	3	Man-day	400	$1,200
ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS				$1,200
Present Worth of Annual Operating Cost (20 Year Project life, i = 7%)				$10,000
Total Estimated Capital Cost				$880,000
REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST**				$890,000

[2] Assumes monthly inspections require one person and last approximately 2-hours.

TABLE C-3
COST ESTIMATE
Area of Concern 3; Remedial Alternative 3 - Disposal
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 3: Disposal

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Waste Characterization	3	samples	$ 1,000	$3,000
Remove material, clean slab, dispose off site[1]	132	tons	45	$5,900
Total Direct Capital Costs				$10,000

Indirect Capital Cost

Engineering, Administrative, Legal (20%)	$2,000
Contingency (20%)	$2,000
Total Indirect Capital Costs	$4,000
Total Estimated Capital Cost	$14,000

[1] Wood block floor in demolished wire mill building = 225 x 150 ft = 33750 sf x 0.5 ft thick = 625 CY
Wood block floor in large brick building = 320 x 300 ft = 96000 sf x 0.5 ft thick = 1778 CY
Assume weight of wood floor is 110 lb/cu yd

Operating and Maintenance Costs

There are no on-going operating, maintenance, or monitoring costs associated with this alternative.

Present Worth of Annual Operating Cost (10 Year Project life, i = 7%)	$0
Total Estimated Capital Cost	$14,000
REMEDIAL ALTERNATIVE 3 TOTAL ESTIMATED COST	$14,000

APPENDIX D

AREA OF CONCERN 4
COMPARATIVE COST ESTIMATES

TABLE D-1
COST ESTIMATE
Area of Concern 4; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost

There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspections[1]	3	Man-day	$ 400	$1,200
Annual Site Inspection	0.5	Man-day	600	$300
Estimated Annual Operating and Maintenance Costs				$2,000
	Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)			$20,000
REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST				$20,000

[1] Assumes monthly inspections require one person and last approximately 2-hours.

TABLE D-2
COST ESTIMATE

Area of Concern 4; Remedial Alternative 2 - Cap With Clean Soil
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 2, Cap With Clean Soil

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Volume of Soil [1]	15,400	CY	$ 18	$300,000
Total Direct Capital Costs				$300,000

Indirect Capital Cost

Engineering, Administrative, Legal (10%)	$30,000
Contingency (10%)	$30,000
Total Indirect Capital Costs	$60,000
Total Estimated Capital Cost	$360,000

[1] Total Area of Impacted Soil = 415,000 sf.
Assume final thickness of soil to be used = 1 ft.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Annual Site Inspection	2	Man-day	600	$1,200
Estimated Annual Operating and Maintenance Costs				$1,200

Present Worth of Annual Operating Cost (20 Year Project life, i = 7%)	$10,000
Total Estimated Capital Cost	$360,000
REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST**	$370,000

TABLE D-3
COST ESTIMATE
Area of Concern 4; Remedial Alternative 3 - Cap With Asphalt
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 3: Cap With Asphalt

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Volume of Asphalt [1]	46,100	SQ. YD.	$ 25	$1,200,000
Total Direct Capital Costs				$1,200,000

Indirect Capital Cost

Engineering, Administrative, Legal (5%)	$60,000
Contingency (5%)	$60,000
Total Indirect Capital Costs	$120,000
Total Estimated Capital Cost	$1,320,000

[1] Total Area of Impacted Soil = 415,000 sf.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Annual Site Inspection	2	Man-day	600	$1,200
Estimated Annual Operating and Maintenance Costs				$1,200
Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)				$10,000
Total Estimated Capital Cost				$1,320,000
REMEDIAL ALTERNATIVE 3 TOTAL ESTIMATED COST**				$1,330,000

TABLE D-4
COST ESTIMATE
Area of Concern 4; Remedial Alternative 4 - Off-Site Disposal
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 4: Off-Site Disposal

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Characterization of Soil	10	sample	$ 1,000	10,000
Disposal of Soil (nonhazardous) [1]	23,100	tons	25	580,000
Disposal of Soil (hazardous) [1]	2	tons	385	800
On-site supervision	1	L S	10,000	10,000
Health and Safety Plan	1	LS	4,000	4,000

Total Direct Capital Costs $600,000

Indirect Capital Cost

Engineering, Legal (5%)	$30,000
Contingency (10%)	$60,000

Total Indirect Capital Costs $90,000

Total Estimated Capital Cost $690,000

[1] Assume total area of impacted soil (415,000 sf) to be excavated to a depth of 1 ft.
415,000 cu ft = 15,370 cy. 15,370 cy x 1.5 cy/ton = 23,100 tons. Assume 2 tons soil with PCBs > 50 ppm.

Operating and Maintenance Costs

There are no ongoing Operating and Maintenance Costs associated with this alternative.

Estimated Annual Operating and Maintenance Costs $0

Total Estimated Capital Cost $690,000

REMEDIAL ALTERNATIVE 4 TOTAL ESTIMATED COST** $690,000

APPENDIX E

AREA OF CONCERN 5
COMPARATIVE COST ESTIMATES

TABLE E-1
COST ESTIMATE
Area of Concern 5; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost
There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspections[1]	12	Man-day	$ 400	$4,800
Annual Site Inspection	0.5	Man-day	600	$300
Estimated Operating and Maintenance Costs				$5,000
	Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)			$60,000
REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST				$60,000

TABLE E-2
COST ESTIMATE
Area of Concern 5; Remedial Alternative 2 - In Place Closure
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 2, In Place Closure

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Volume of Concrete required to fill USTs. [1]	99	CY	$ 300	$30,000
Removal of UST Contents	1	Load	200	$200
Disposal of UST Contents (nonhazardous)	2,000	Gallons	0.65	$1,300
Total Direct Capital Costs				$32,000

Indirect Capital Cost

Engineering, Administrative, Legal (10%)	$3,000
Contingency (15%)	$3,200
Total Indirect Capital Costs	$3,000
Total Estimated Capital Cost	$35,000

[1] Assume 2 - 10,000 gallon USTs = 99 cy of concrete to fill.
Assume 1 Vac Truck load to remove contents.

Operating and Maintenance Costs
There are no on-going operating, maintenance, or monitoring costs associated with this alternative.

Estimated Operating and Maintenance Costs	$0
Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)	$0
Total Estimated Capital Cost	$35,000
REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST**	$35,000

TABLE E-3
COST ESTIMATE
Area of Concern 5; Remedial Alternative 3 - Tank Removal and Disposal
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 3: Tank Removal and Disposal

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Waste Characterization	2	samples	$ 1,000	$2,000
UST Removal and Off-Site Disposal	1	L.S.	7,500	$7,500
Total Direct Capital Costs				$10,000

Indirect Capital Cost	
Engineering, Administrative, Legal (20%)	$2,000
Contingency (15%)	$1,000
Total Indirect Capital Costs	$3,000
Total Estimated Capital Cost	$13,000

Operating and Maintenance Costs

There are no on-going operating, maintenance, or monitoring costs associated with this alternative.

Estimated Operating and Maintenance Costs	$0
Present Worth of Annual Operating Cost (30 Year Project life, i = 5%)	$0
Total Estimated Capital Cost	$13,000
REMEDIAL ALTERNATIVE 3 TOTAL ESTIMATED COST	$13,000

APPENDIX F

AREA OF CONCERN 6
COMPARATIVE COST ESTIMATES

TABLE F-1
COST ESTIMATE
Area of Concern 6; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost

There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Annual Site Inspection/Monitoring	1	LS	3,000	$3,000
ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS				$3,000
Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)				$40,000
REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST				$40,000

TABLE F-2
COST ESTIMATE
Area of Concern 6; Remedial Alternative 2 - Institutional Controls
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 2, Institutional Controls

Direct Capital Cost

- **There are no capital costs associated with implementation of this alternative.**

	Quantity	Units	Unit Cost	Total Cost
Indirect Capital Cost				
Engineering, Administrative, Legal	40	hours	$ 150	$6,000
Contingency (25%)				$1,500
Total Indirect Capital Costs				$8,000
Total Estimated Capital Cost				$8,000

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Annual Site Inspection/Monitoring	1	LS	3,000	$3,000
Estimated Annual Operating and Maintenance Costs				$3,000
Present Worth of Annual Operating Cost (30 Year Project life, i = 7%)				$40,000
Total Estimated Capital Cost				$8,000
REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST**				$50,000

<u>**TABLE F-3**</u>
COST ESTIMATE
Area of Concern 6; Remedial Alternative 3 -Removal and Off-Site Disposal
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 3: Removal and Off-Site Disposal

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Installation of Recovery Well	1	LS	$ 10,000	$10,000
Installation of On-Site 10,000 Holding Tank	1	LS	10,000	$10,000
Monthly Sampling of Recovered Groundwater	12	samples	100	$1,200
Quarterly Monitoring - 3 Wells	12	samples	100	$1,200
Transport and Disposal at POTW [1]	12	events	1,000	$12,000
Total Direct Capital Costs				$30,000

Indirect Capital Cost

Engineering, Administrative, Legal (20%)	$6,000
Contingency (15%)	$3,000
Total Indirect Capital Costs	$9,000
Total Estimated Capital Cost	$39,000

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspection and Monitoring	6	Man-day	600	$3,600
Annual Site Inspection/ Monitoring	1	LS	3,000	$3,000

Estimated Annual Operating and Maintenance Costs	$6,600
Present Worth of Annual Operating Cost (5 Year Project life, i = 7%)	$27,000
Total Estimated Capital Cost	$39,000
REMEDIAL ALTERNATIVE 3 TOTAL ESTIMATED COST	$66,000

[1] Assumes no cost for disposal

APPENDIX G

AREA OF CONCERN 7
COMPARATIVE COST ESTIMATES

TABLE G-1
COST ESTIMATE
Area of Concern 7; Remedial Alternative 1 - No Action
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 1, No Action

Direct Capital Cost
There are no capital costs associated with implementation of this alternative.

Operating and Maintenance Costs

	Quantity	Units	Unit Cost	Total Cost
Monthly Site Inspections[1]	4	Man-day	$ 400	$1,600
Annual Site Inspection	0.5	Man-day	600	$300
ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS				$2,000
	Present Worth of Annual Operating Cost (30 Year Project life, i = 5%)			$30,000
	REMEDIAL ALTERNATIVE 1 TOTAL ESTIMATED COST			$30,000

TABLE G-2
COST ESTIMATE
Area of Concern 7; Remedial Alternative 2 -Removal and Off-Site Disposal
Roblin Steel
City of North Tonawanda, NY

ALTERNATIVE 2: Structure Removal and Off-Site Disposal/Decommissioning

Direct Capital Cost

	Quantity	Units	Unit Cost	Total Cost
Liquid Removal and Disposal [1]	10	Days	$ 850	$8,500
Clean Gravel Fill [2]	2,778	tons	12	$33,000
Concrete Liner Disposal	675	tons	30	$20,000
Total Direct Capital Costs				$60,000

Indirect Capital Cost

Engineering, Administrative, Legal (10%)	$6,000
Contingency (10%)	$6,000
Total Indirect Capital Costs	$12,000
Total Estimated Capital Cost	$72,000

Operating and Maintenance Costs
There are no on-going operating, maintenance or monitoring costs associated with this alternative.

Estimated Annual Operating and Maintenance Costs	$0
Present Worth of Annual Operating Cost (30 Year Project life, i = 5%)	$0
Total Estimated Capital Cost	$72,000
REMEDIAL ALTERNATIVE 2 TOTAL ESTIMATED COST	$72,000

[1] Assume Cooling Pond 100 ft x 100 ft x 5 ft = 50,000 cu ft = 374,026 gallons.
Transport by Vac Truck (3,000 gal/load) to POTW. 374,026 gallons = 125 loads. Assume 10 days use of Vac truck.

[2] Assume Cooling Pond 100 ft x 100 ft x 5 ft = 50,000 cu ft = 1852 CY x 1.5 tons/CY = 2,778 tons

[3] Assume concrete liner. Sides = 100 ft x 5 ft x 4 = 2,000 sq ft. Floor = 100 ft x 100 ft =10,000 sq ft.
Total area of concrete is 12,000 sq ft. Assume concrete is 1 ft thick = 12,000 cu ft = 450 CY x 1.5 CY/ton = 675 tons.

APPENDIX H

ADDITIONAL SOIL SAMPLING AND ANALYSIS PLAN
DATED MAY 24, 2000

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
One Remington Park Drive • Cazenovia, NY 13035
(315) 655-8161 • fax (315) 655-4180

FILE COPY

May 24, 2000

Mr. John Hyden
Environmental Engineer I
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Re: Sampling Plan - Additional Soil Samples
Roblin Steel Site
DEC Brownfield Project No. B00025-9
North Tonawanda, Niagara County
S&W No. 80049.0

Dear Mr. Hyden:

In order to complete the assessment of remedial alternatives required to finish the Remedial Alternatives Report (RAR) for the Roblin Steel Site, we feel that additional soil samples are needed to verify the extent of identified hot spot areas of contaminants in surface soil. Once quantities of soil requiring remedial management can be determined, cost estimates can be prepared for each of the remedial alternatives identified in the draft RAR and the alternatives can be screened in accordance with the specialized screening criteria. The following sections describe the proposed additional soil sampling effort, and how the data will be used to complete the RAR.

EXTENT OF PAH IMPACTS

A total of 19 surface soil samples were collected and analyzed for total PAHs during the site investigation field work. Although several of the soil samples were found to contain individual PAH compound concentrations greater than the individual compound cleanup goal as listed in DHWR TAGM 4046, only three samples (SS-45, SS-52, and SS-54) were found to contain total carcinogenic PAHs greater than 50 ppm. Further only two of the same three samples were found to contain individual PAH concentrations greater than 50 ppm. No samples were found to contain total PAHs greater than 500 ppm, however due to the high concentrations of carcinogenic PAHs in the three sample locations, we feel that the extent of the PAH impacts in the three areas should be better defined.

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In order to better define the extent of PAH impacts in each of these three areas, we propose to collect three additional surface soil (0-6 inch) samples in the vicinity of each of the three sampling locations with observed exceedances. The three surface soil samples will be used to determine the areal extent of the surface hot spots. In addition, in each of the sampling locations, a second sample will be collected from a depth of 2.0 – 2.5 feet or from a depth based on field observations, in order to assess the vertical extent of each of the identified "hot spots." The depth of the sample will depend on whether an interface between obvious stained soil is apparent in the upper 4 feet. In general, our investigation to date has indicated that the top 1 to 2 feet across the site consists of fill. We have assumed that the impacted material is limited to this fill, and the native material under the fill is relatively unimpacted. If a visible demarcation is apparent, the sample will be collected from the stained soil present at the interface between visibly stained fill and apparently clean fill. If no interface is observed, a sample will be collected from the 2.0 – 2.5 foot interval. Each sample will be analyzed for total PAHs using USEPA Method 8270C for PAHs only. The soil sample locations are illustrated on the attached Figure 1.

EXTENT OF PCB IMPACTS

During the SI activities, 11 surface soil samples were collected and analyzed for total PCBs. Of these, two samples were found to contain total PCBs in excess of the 1 ppm cleanup goal for PCBs in surface soil (SS-32 with 4.2 ppm total PCBs and SS-34 with 19 ppm total PCBs). To determine the areal extent of these hot spots, a total of six additional surface soil samples will be collected and analyzed for total PCBs using USEPA Method 8080. The soil sample locations are illustrated on the attached Figure 1. The six samples will be collected from the 0–6 inch interval.

EXTENT OF SOIL IMPACTS ASSOCIATED WITH METALS

A total of 14 surface soil samples were collected during the SI activites and analyzed for total metals. All 14 of these samples were found to contain some individual metals at concentrations exceeding TAGM 4046 cleanup goals. However, the metals that were found at concentrations of concern included arsenic, cadmium, chromium, and lead. Each of these metals is also of concern from a regulatory point of view because if TCLP concentrations exceed certain thresholds the soil can be considered a toxicity-characteristic hazardous waste. In several samples, concentrations of the metals cadmium, chromium, and lead were elevated such that the soil might potentially fail TCLP testing. Therefore, additional samples are warranted to determine the areal extent and depth of the elevated metals concentrations and to determine if any of the hot spots are associated with TCLP concentrations that would result in the soil being a hazardous waste.

In order to determine whether concentrations of metals in the surface soil are indicative of hazardous waste, a total of nine samples will be collected in the vicinity of previous soil samples SS-19, SS-21, SS-24, SS-25, SS-36, SS-40, SS-43, SS-46, and SS-51. Each sample will be analyzed for total arsenic, cadmium, chromium, and lead, and each sample will also be analyzed for TCLP cadmium, chromium, and lead.

In order to determine the areal extent of the metal impacts an additional 22 surface soil samples will be collected and analyzed for total arsenic, cadmium, chromium, and lead. Additional samples will be collected to characterize the depth of impact. At 11 of the 31 surface sampling locations, a deeper sample will be collected from the base of the fill material or from a depth of 2 to 2.5 feet if the interface is not evident. These samples will be collected to determine if the entire thickness of the fill is impacted. At another 11 of the 31 surface sampling locations, a deeper sample will be collected from the native soil below the fill. If the fill-native soil interface is not evident, the sample will be collected from a depth of 4 to 4.5 feet. Figure 1 shows the proposed locations of the additional samples.

At this time, we propose to undertake this work in mid-to-late June. Please provide us with your comments and questions on the proposed actions before June 6. If we do not receive a response, we will proceed as described here.

Very truly yours,

T. Lawrence Hineline, CPG
Associate

TLH/DKC/smp

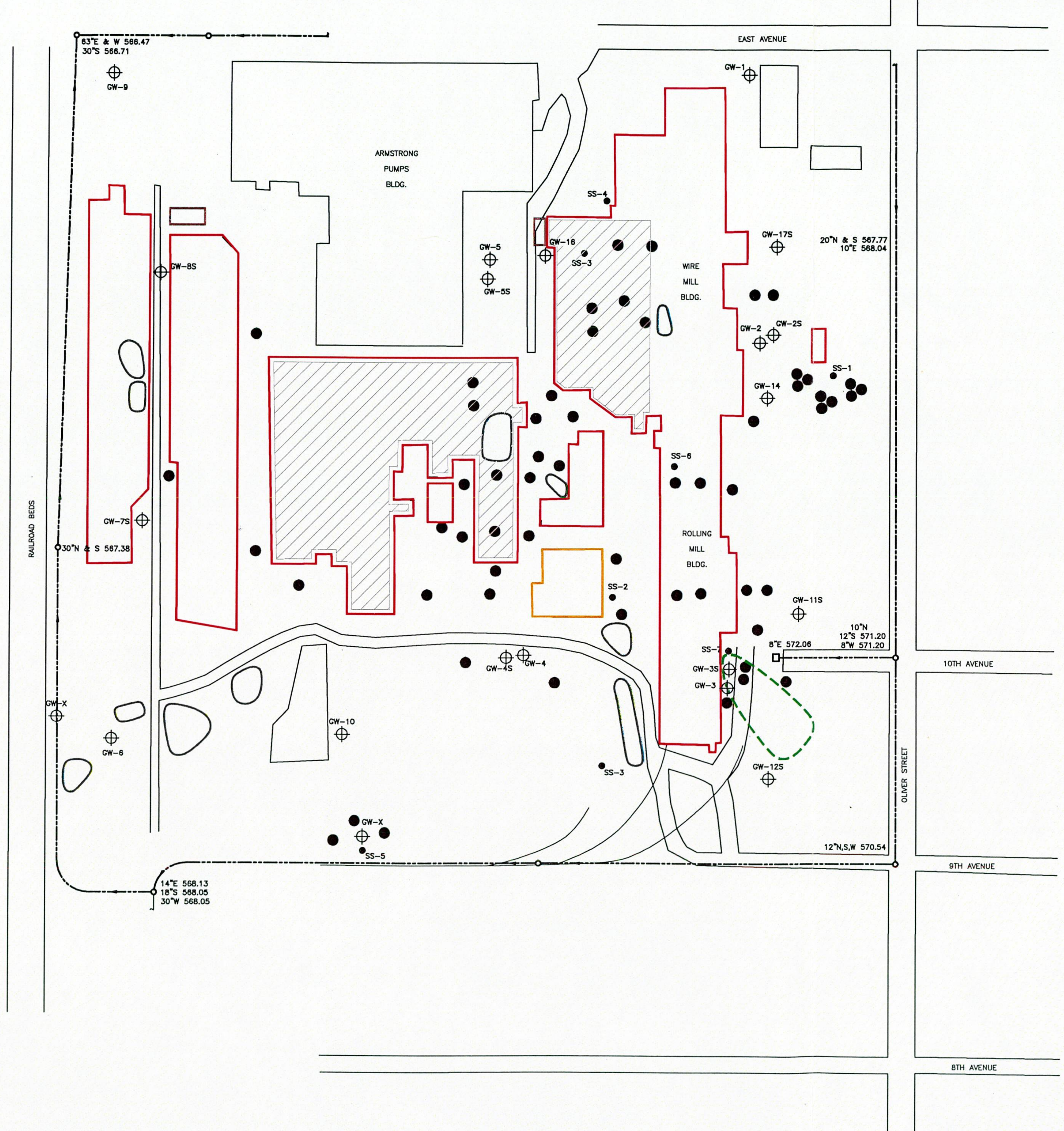
pc: Dale Marshall, P.E., City Engineer, North Tonawanda, NY
Dan King, NYSDEC – Buffalo, NY
Robert A. Armstrong, P.E., Stearns & Wheler, LLC – Amherst, NY Office

Table 1
Summary of Phase II Sampling
Roblin Steel Remedial Alternatives Analysis
City of North Tonawanda

Previous Sampling Location	Analysis	Surface (0-.5')	Sub Surface (2-2.5')
45	PAH	3	3
52	PAH	3	3
54	PAH	3	3
24	PCB	3	
32	PCB	3	

Previous Sampling Location		Samples for Total Metals(1)				
	Shallow 1 (Surface Soils)	Additional Surface Samples	Medium (Lower fill Material)	Deep (Native Soil)	Total TCLP Samples	Total Tot. Met. Samples
19	TCLP/Total(1)	3	2	1	1	7
20/21	TCLP/Total	3	2	1	1	7
24	TCLP/Total	1	1	1	1	4
25	TCLP/Total	2	1	1	1	5
36	TCLP/Total	3	1	1	1	6
39/40	TCLP/Total	3	1	1	1	6
43	TCLP/Total	2	1	2	1	6
44/46	TCLP/Total	2	1	2	1	6
51	TCLP/Total	3	1	1	1	6
				Totals	9	53

(1) TCLP and total metals include As, Cd, Cr, Pb



LEGEND

GW-12S	MONITORING WELL
AOC-1	MISCELLANEOUS DRUMS AND WASTE PILES
AOC-2	BUILDING RUINS
AOC-3	WOOD BLOCK FLOOR & IMPACTED RESIDUE
AOC-4	IMPACTED SOIL – SEE ATTACHED FIGURE 3 FOR IMPACTED SOIL AREA LOCATIONS
AOC-5	USTs
AOC-6	IMPACTED GROUNDWATER
AOC-7	COOLING POND

150 0 150 300

1"=150'

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 11/99 JOB No.:80049FA

CITY OF NORTH TONAWANDA
ROBLIN STEEL SITE

FIGURE 2
REMEDIAL ALTERNATIVES REPORT
AREAS OF CONCERN

PME D:\JOBS\ROBLIN STL\ROBSTL.DWG
99/11 CAZ PME
PME D:\JOBS\ROBLIN STL\80049PF2.DWG