PROPOSED REMEDIAL ACTION PLAN
FORMER FLINTKOTE PLANT SITE

Environmental Restoration Project
City of Lockport, Niagara County, New York
Site No. B-00161-9

February 2006

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act
Environmental Restoration Project

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Former Flintkote Plant Site. The presence of hazardous substances has created threats to human health and/or the environment that are addressed by this proposed remedy.

The 1996 Clean Water/Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration (Brownfields) Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated the property can then be reused.

As more fully described in Sections 3 and 5 of this document, on-site disposal has resulted in the presence of hazardous substances, including semivolatile organic compounds (SVOCs) and metals. These hazardous substances have contaminated the soils and sediment at the site, and have resulted in:

- A threat to human health associated with current and potential exposure to soils and sediment; and

- An environmental threat associated with the impacts of contaminants to the adjacent Eighteenmile Creek, and potentially to groundwater.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy to allow for recreational use of the site:

- Construction of a minimum 2 foot thick, clean soil cover with demarcation layer over the non-hazardous fill materials on the 300 Parcel of the site;

- Excavation of hazardous fill materials to native soils or bedrock (where native soils are absent) on the 198 Parcel, Island and Water Street Section (WSS) of the site. These materials would be disposed off-site in an approved facility;

- Removal of sediments from the Building

C sump and trench drain, and evaluate options to address sediments in the Building D deep basement;

- Removal of sediment from a portion of an outfall pipe to Eighteenmile Creek and closure of the pipe in place;

- Abatement of asbestos containing materials (ACMs). These materials would be disposed off-site in an approved facility;

- Demolition of all buildings to four feet below grade. Removal of C&D debris from exterior portions of the site. These materials would be disposed off-site in an approved facility;

- Installation of a minimum 2 foot thick, clean soil cover with demarcation layer over the demolished building footprint;

- A remedial design program to provide the details necessary to implement the remedial program;

- Development of a site management plan to address residual contamination, use restrictions, and maintenance of the soil cover;

- Imposition of an environmental easement; and

- Periodic certification of the institutional and engineering controls.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the July 2005 “Site Investigation Report” (SI), the October 2005 “Remedial Alternatives Report” (RAR), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Lockport Public Library
23 East Avenue
Lockport, N.Y.
(716) 433-5935
Hours: Mon. - Thu., 10 AM - 9 PM;
Fri. & Sat., 10 AM - 5 PM

or,

NYSDEC Region 9 Buffalo Office
270 Michigan Avenue
Buffalo, N.Y. 14203
(716) 851-7220
Hours: Mon.- Fri. 8:30 AM - 4:45 PM
Attention Mr. Glenn May
8:30 am - 4:30 pm by appointment only

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 7 to March 23, 2006 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for February 27, 2006 at the Lockport Public Library beginning at 6:30 pm.

At the meeting, the results of the SI/RAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. May at the above address through March 23, 2006.

The NYSDEC may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former Flintkote Plant Site is an abandoned industrial property that occupies approximately six acres at 198 and 300 Mill Street in the City of Lockport, Niagara County, New York (Figure 1). Niagara County currently owns the 300 Mill Street portion of the site, while a private individual owns the 198 Mill Street portion. The majority of the site is situated along the eastern bank of Eighteenmile Creek, and is bordered by commercial property to the north, vacant land to the south, Mill Street to the east, and Eighteenmile Creek to the west (Figure 2). A small portion of the site, however, is located along the western bank of Eighteenmile Creek, and is bounded to the south by residential properties along Water Street. This portion of the site is referred to as the Water Street Section (WSS).

The site is bisected by William Street (Figure 2), which divides the site into north (300 Parcel) and south (198 Parcel) sections. William Street is no longer open to vehicular traffic. The section of 300 Mill Street between Eighteenmile Creek and the millrace is referred to as the Island.

The topography of the majority of the site is relatively flat-lying in the areas of the buildings with a steep downward slope toward Eighteenmile Creek and the millrace.

The majority of the buildings on the 198 Parcel have been razed, with remaining portions consisting of former basement walls, concrete columns and concrete floors. The buildings that remain on the 300 Parcel consist of stone, brick and concrete construction with wooden or concrete roof deck structures. These buildings are severely deteriorated, with the majority of the buildings having some structural deficiencies. There are numerous openings in the floors, roof systems are partially or completely collapsed, and stairways and hand rails are in poor condition.

The northern area of the site includes a steel water tower, boiler stack and former coal bunkers (Figure 2). A number of debris piles are also located across the site (Figure 2).

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Flintkote began operations as a manufacturer of felt and felt products in 1928, when the property was purchased from the Beckman Dawson Roofing Company. In 1935, Flintkote began production of sound-deadening and tufting felt for installation and use in automobiles. Manufacturing of this product line was continued at Flintkote until December, 1971, when operations ceased and the plant closed. It is also believed that Flintkote manufactured composite laminates similar to those produced at the Former Spaulding Composites Company in Tonawanda, New York. Such material was observed in the southernmost demolished building on the 300 Mill Street Property.

The disposal history of the site is largely unknown, although aerial photographs suggest that disposal of fill on the island was taking place by 1938. The nature of the fill material at that time is unknown. It has also been reported that ash resulting from the burning of municipal garbage was dumped at the site. The fill material on the 198 Parcel and Island is consistent with such a source.

3.2: <u>Remedial History</u>

The portion of the property consisting of Building A and its surrounding area was formerly listed as Site No. 932072 in the Registry and assigned a Classification Code of 3. This classification is given to sites that do not present a significant threat to public health or the environment and that further action can be deferred. The basis for listing the site in the Registry was the presence of seven drums containing sweepings, solid materials and polychlorinated biphenyl (PCB) transformer oil stored in the basement of Building A. During an inspection of the site on May 12, 1983 as part of a Phase I Investigation, the drums were observed to be stored in accordance with federal regulations. Analyses of the waste oil (March 1983) indicated that none of the oil contained more than 2 parts per million (ppm) of PCBs. In January 1984 the Thomas E. Carter Trucking Company, at the time the owner of the property, had these drums removed from the site by a waste oil processor. As a result of this action the site was removed from the Registry in 1985.

In 1989, the City of Lockport Building Inspection Department reported to the NYSDEC that a number of drums containing chemicals were found in various locations throughout the buildings at 300 Mill Street. Subsequent investigation revealed that 28 of these drums contained hazardous wastes. These drums were disposed off site in May, 1991 by a NYSDEC Drum Removal Action.

Analytical results of two ash samples from the Island and two sediment samples from the millrace were included in an April 1996 NYSDEC study entitled "*Trackdown of Chemical Contaminants to Lake Ontario from New York State Tributaries*". The ash samples contained mercury, dioxins and furans, while the sediment samples contained significant concentrations of PCBs. As a result, the Former Flintkote Plant Site was cited by the NYSDEC Division of Water (DOW) as a potential source of contaminants to Eighteenmile Creek.

Sediment and ash samples were also collected by the NYSDEC Division of Environmental Remediation (DER) in August 1996. These analyses confirmed the presence of PCBs in the millrace sediment; the two ash samples collected from the island failed the Toxicity Characteristic Leaching Procedure (TCLP) Regulatory Limit for lead. The findings and conclusions of the April 1996 study and the results of the August 1996 sampling event indicated the need for additional investigation at the site.

In late 1999 the NYSDEC conducted an investigation of the entire Flintkote property, with the results of that investigation presented in a September 2000 report entitled "*Site Investigation Report, Former Flintkote Plant Site*". This investigation revealed that the Flintkote property received various wastes, refuse and debris over the years, with much of these wastes being visible at the surface and along the embankments of Eighteenmile Creek and the millrace. The subsurface investigation revealed that most of the waste at the site is ash containing glass, coal, coke, slag, ceramic, bottles, brick, buttons and wood.

The site was also the subject of a United States Environmental Protection Agency (USEPA) removal action in 2002, which focused on the removal of friable asbestos containing materials within the site's buildings and on-site debris. A total of 170 cubic yards of asbestos containing debris and 180 cubic yards of debris that did not contain asbestos were disposed offsite at an approved facility.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. Niagara County will assist the state in its efforts by providing all information to the state which identifies PRPs. The County will also not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 5: SITE CONTAMINATION

Niagara County has recently completed a site investigation/remedial alternatives report (SI/RAR) to determine the nature and extent of contamination by hazardous substances at this environmental restoration site.

5.1: Summary of the Site Investigation

The purpose of the SI was to further define the nature and extent of contamination resulting from previous activities at the site by filling in data gaps in the NYSDEC's 1999 investigation. Both investigations combined, therefore, constitute the SI for the Former Flintkote Plant Site. The SI was conducted in two phases: the first phase was completed by the NYSDEC between October and November 1999, while the second phase was completed by Niagara County between September and October 2003. The field activities and findings of both investigations are described in Niagara County's July 2005 "Site Investigation Report.

The following activities were conducted during the SI:

- Research of historical information;
- Installation of 67 soil borings and 16 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of 15 new and existing monitoring wells (the 16th well is continually dry);
- Collection of 2 surface water samples from Eighteenmile Creek;
- Collection of 7 aquatic sediment samples from Eighteenmile Creek and the millrace;
- Collection of 10 surface soil samples for chemical analysis;
- Completion of in-situ hydraulic conductivity tests on 2 overburden and 3 bedrock wells;
- Collection of 1 surface water and 3 sediment samples from sumps and deep basements within the on-site buildings;
- Collection of 1 waste sample (a felt/tar-like material) from a column inside one of the on-site buildings;
- Completion of a visual asbestos survey of the existing buildings and debris piles; and
- Completion of a topographic survey and base map of the entire site.

To determine whether the soil, waste, sediment, surface water and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC

"Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels". Two surface soil samples were collected from off-site locations to define background soil concentrations in the vicinity of the site. The metals results from these samples were similar, suggesting that they are representative of background metals concentrations. As a result, the average concentrations of the metals detected in these two samples were used as the Site Background value for comparison with metals data from on-site soil/fill samples as prescribed in TAGM 4046. These values are shaded in Table 1.

- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."

Based on the SI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the SI report.

5.1.1: <u>Site Geology and Hydrogeology</u>

At the Former Flintkote Plant Site four major geologic units were encountered. These units, in order of increasing depth, are as follows:

- Topsoil described as a brown to dark brown silty soil with varying amounts of natural organic matter (e.g., leaves and rootlets). This unit was often encountered above fill material, but was absent in some areas of the site. Where encountered, the thickness of the topsoil layer was usually less than 0.2 feet;

- Fill material consisting primarily of various colored ash containing glass, coal, coke, slag, buttons, ceramic and brick. This material was encountered in 55 of the 67 borings completed at the site. Miscellaneous wastes (i.e., felt paper, foam, grinding powder, tar) were also encountered in some of the borings and on the ground surface. Where encountered, the thickness of the fill material ranged from 0.9 to 24.9 feet;

- A glaciolacustrine deposit consisting primarily of mottled, brown to reddish brown, silty clay and clayey silt containing traces of fine grained sand and fine gravel. This material was encountered in 52 of the 67 borings completed at the site. This deposit directly overlies bedrock, and where encountered, ranged in thickness from 0.1 to 9.8 feet; and

- Sandstone bedrock of the Grimsby Formation. This sandstone has a marbleized red and white appearance with lesser occurrences of gray and grayish-green. Depth to bedrock at the site ranged from 1.6 to 26.7 feet, with the greater depths associated with the thicker fill areas.

Groundwater underlying the 198 and 300 Parcels of the site occurs primarily in the fractured sandstone bedrock, and moves in a westerly direction toward the millrace and Eighteenmile Creek. Saturated conditions were not encountered in the overburden soils on the eastern-most portion of the site. As groundwater migrates to the west, it discharges from the bedrock into the overburden along the base of the sloped bedrock surface. Groundwater continues to migrate westward within the fill material and discharges to Eighteenmile Creek and the millrace.

The depth to groundwater in the overburden wells ranged from 2.3 to 24.0 feet below ground surface (bgs), while the depth to groundwater in the bedrock wells ranged from 9.7 to 26.2 feet bgs.

5.1.2: Nature of Contamination

As described in the SI report, soil, fill, groundwater, surface water and sediment samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) and inorganics (metals).

The primary SVOC contaminants of concern include dibenzo(a,h)anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene. These contaminants belong to a class of SVOCs known as polycyclic aromatic hydrocarbons (PAHs). PAHs are a group of over 100 different chemicals that are common in the environment. Sources of PAHs include incomplete combustion of coal, oil, gasoline, garbage and wood from stoves, automobiles and incinerators.

PCBs were also detected in soils and fill throughout the site at low concentrations (less than 10 ppm).

The primary inorganic contaminants of concern include antimony, arsenic, barium, chromium, copper, lead, mercury, nickel, silver and zinc.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for waste, soil, and sediment. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in surface soil/fill, subsurface ash fill, subsurface native soil, creek and millrace sediment, groundwater, creek surface water, sediments in buildings, waste in buildings and standing water in buildings, and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil/Fill

Ten surface soil/fill samples were collected during the SI from throughout the site (Figure 3). These samples were collected from previously identified areas of concern and from areas selected to represent conditions across the site. The contaminants of concern in these samples include SVOCs, metals, and to a lesser degree PCBs (Table 1). The SVOCs detected consisted primarily of polycyclic aromatic hydrocarbons (PAHs). Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and dibenzo(a,h)anthracene were detected at concentrations that most frequently exceeded the TAGM 4046 soil cleanup objectives (Table 1). Because the ash found at the site appears related to the combustion of both coal and municipal garbage, the presence of PAHs in the waste material is not surprising.

PCBs were only detected in 3 of the surface soil/fill samples with the concentration of each sample exceeding the TAGM 4046 surface soil cleanup objective for PCBs (1.0 ppm).

Metals were also detected in the surface soil/fill samples collected during the SI. Of these compounds, antimony, arsenic, barium, chromium, copper, lead, mercury, nickel, silver and zinc were detected at concentrations that most frequently exceeded the TAGM 4046 soil cleanup objectives (Table 1).

Subsurface Ash Fill

A total of sixty-seven soil borings were completed throughout the site during the SI (Figure 4). Twenty-six samples of the subsurface ash fill were collected from these borings and analyzed for SVOCs. Like the surface soil/fill samples, the SVOCs detected consisted primarily of PAHs. Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and dibenzo(a,h)anthracene were detected at concentrations that most frequently exceeded the TAGM 4046 soil cleanup objectives (Table 1).

Eighteen subsurface ash fill samples were analyzed for PCBs. Although PCBs were detected in these samples, none of the concentrations exceeded the TAGM 4046 subsurface soil cleanup objective for PCBs (10.0 ppm).

Twenty-seven samples of the subsurface ash fill were collected and analyzed for metals, with eighteen of these samples analyzed for the characteristics of hazardous waste using the Toxicity Characteristic Leaching Procedure (TCLP). Of the metals detected, antimony, arsenic, chromium, copper, lead, mercury, nickel, silver and zinc were detected at concentrations that most frequently exceeded the TAGM 4046 soil cleanup objectives (Table 1). A summary of the TCLP data for cadmium and lead is also given in Table 1, which reveals that some of the subsurface ash fill exceeds regulatory values and would be considered a characteristic hazardous waste.

The SI estimated the presence of approximately 46,500 cubic yards of ash fill at the Former Flintkote Plant Site.

Subsurface Soil - Native

Samples of the native soil underlying the ash fill were also collected for analysis to determine if these soils were preventing the downward migration of contaminants from the fill into the upper bedrock. The contaminants of concern in these samples include SVOCs (PAHs) and metals (Table 1). Table 1 indicates that there is a significant decrease in the concentrations of individual PAHs in the native soils when compared to the subsurface ash fill.

Metals were also detected in the subsurface native soil samples collected during the SI. Like the SVOC data, concentrations of individual metals are significantly lower in the native soil samples than in the subsurface ash fill (Table 1).

These data suggest that significant downward migration of contaminants to the upper bedrock underlying the Former Flintkote Plant Site is not occurring.

Creek and Millrace Sediment

Seven sediment samples were collected from Eighteenmile Creek and the millrace during the SI (Figure 5). The contaminants of concern in these samples include SVOCs (PAHs), PCBs and metals (Table 1). Of the PAHs detected, the concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene most frequently exceeded the sediment SCGs (Table 1).

PCBs were detected in 6 of the 7 sediment samples with the concentration in 5 samples exceeding the TAGM 4046 surface soil cleanup objective for PCBs (1.0 ppm).

Metals were also detected in the sediment samples collected from Eighteenmile Creek and the millrace. Of these compounds, chromium, copper, lead, mercury, nickel, silver and zinc were detected at concentrations that most frequently exceeded the sediment SCGs.

Groundwater

Eighteen groundwater samples from on-site monitoring wells (Figure 6) were collected during the SI. A summary of the detected compounds is given in Table 1. The contaminants of concern in these samples include metals, and to a lesser degree SVOCs and PCBs (Table 1).

The only SVOC detected was pentachlorophenol, which was only detected in one well (MW-1RK). Likewise, PCBs were only detected in one well (198-F). The concentrations of both compounds, however, exceeded their respective groundwater standards (Table 1).

Metals were the primary contaminants detected in site groundwater, but only in the samples that were not filtered to remove entrained ash and soil particles prior to analysis. For these samples, the metals that most frequently exceeded their respective groundwater standards were antimony, arsenic, chromium, copper, lead, mercury, nickel and zinc (Table 1). For the filtered samples, none of the detected concentrations exceeded groundwater standards (Table 1). The difference in these analytical results is likely caused by the soil and ash particles in the unfiltered samples, which become analyzed along with the groundwater.

Creek Surface Water

Two surface water samples were collected from Eighteenmile Creek during the SI (Figure 5). The primary contaminants detected in these samples were metals, although none of the detected concentrations exceeded surface water standards (Table 1).

Sediments in Buildings

Three sediment samples from within on-site buildings were collected during the SI (Figure 3). These samples were collected from lower portions of the buildings where contaminants originating from most areas of the building would likely be deposited (e.g., deep basements, sumps). The contaminants of concern in these samples include SVOCs (PAHs and some phthalates), PCBs and metals (Table 1). Of the PAHs detected, the concentrations of benzo(a)anthracene, benzo(a)pyrene and chrysene most frequently exceeded the TAGM 4046 soil cleanup objectives (Table 1). Of the phthalates detected, the concentration of bis(2-ethylhexyl)phthalate most frequently exceed the TAGM 4046 soil cleanup objective for this contaminant (Table 1).

PCBs were detected in all three sediment samples, with the concentrations of two of the samples exceeding the TAGM 4046 surface soil cleanup objective (Table 1). One sample contained PCBs at a concentration of 108 ppm, making these sediments hazardous waste by exceeding the 50 ppm hazardous waste threshold criterion.

Metals were also detected in the sediment samples collected from within site buildings. Of these compounds, antimony, arsenic, chromium, copper, lead, mercury, nickel, silver and zinc were detected at concentrations that most frequently exceeded the TAGM 4046 soil cleanup objectives (Table 1).

Waste in Buildings

One waste sample of a felt/tar-like material from within an on-site building was collected during the SI (Figure 3). The contaminants of concern in this sample include SVOCs, PCBs, pesticides and metals (Table 1). The only SVOCs detected were di-n-butyl phthalate and pentachlorophenol, with the concentrations of both compounds exceeding their respective TAGM 4046 soil cleanup objectives (Table 1). It is important to note, however, that the laboratory detection limits for the SVOCs that were not detected were significantly elevated, so it is possible that other SVOCs are present in the felt/tar-like material.

PCBs and one pesticide (dieldrin) were also present in the felt/tar-like material, with the concentrations of these contaminants exceeding the TAGM 4046 soil cleanup objectives (Table 1).

Metals were also detected in the felt/tar-like material. Of these compounds, antimony, chromium, copper, lead, mercury, silver and zinc were detected at concentrations that exceeded the TAGM 4046 soil cleanup objectives (Table 1).

Standing Water in Buildings

One sample of standing water from the deepest basement of the on-site buildings was collected during the SI (Figure 3). The contaminants of concern in this sample include PCBs and one pesticide (dieldrin) detected at concentrations that slightly exceeded their respective surface water standards (Table 1).

Several metals were also detected in the standing water sample, although none of the detected concentrations exceeded surface water standards (Table 1).

Asbestos Containing Materials

The results of the visual asbestos survey identified several areas of suspect asbestos containing materials (ACM) in the on-site buildings. Most of the suspect ACM would likely be classified as non-friable or non-friable organically bound, including roofing material, window glazing, materials within the debris piles, floor tile mastic, electrical wire, insulation/backer board, transite panels, gaskets, canvas cloth and tar. The suspect ACM that would likely be identified as friable was generally found in small quantities. If determined to contain asbestos, however, some of the larger quantities would include prefabricated roofing blocks, fire brick inside furnaces, and the brick mortar associated with the coal silo, chimney and building structures. It is important to note that the visual asbestos assessment did not include the sampling or analysis of suspect ACM.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR.

There were no IRMs performed at this site during the SI/RAR.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 5.3 of the SI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Completed pathways of exposure to site-related contaminants exist on-site at this time. The include:

- Dermal contact, incidental ingestion and inhalation of contaminated dust/soil particles in surface and subsurface soil/fill to persons known to trespass on the site for the purpose of excavating artifacts from the Island portion of the site; and

- Dermal contact, incidental ingestion and inhalation of waste materials contained within the buildings, associated debris, sump/drainage structure sediments, felt/tar materials and standing water in building basements to persons known to trespass in the buildings.

Potential pathways of exposure to site-related contaminants which could occur in the future include:

- Dermal contact, incidental ingestion and inhalation of contaminated surface and subsurface soil/fill to construction workers or site trespassers; and

- Inhalation of asbestos fibers released from damaged and friable asbestos containing materials in the buildings.

Public water serves the area; therefore, ingestion of contaminated groundwater is unlikely and any future use of groundwater will be restricted via institutional controls. It is expected that future site use will be recreational; therefore, remediation and/or institutional controls (e.g., deed restrictions) will be required to mitigate known and potential future exposure pathways. The institutional controls would also require that any on-site excavations be performed under a site management plan that would address potential worker/community contact with residual contamination.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

A formal Fish and Wildlife Impact Analysis was not completed during the SI. Environmental impacts, however, were discussed in the SI report in Section 5.3, Potential Exposure Pathways. This section discusses existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways have been identified:

- Dermal contact with contaminated surface soil/fill, subsurface ash fill and sediment by terrestrial and aquatic organisms inhabiting the site and stream corridor;

- Inhalation of contaminated surface soil/fill and subsurface ash fill by terrestrial organisms inhabiting the site; and

- Ingestion of contaminated surface soil/fill, subsurface ash fill and sediment by terrestrial and aquatic organisms inhabiting the site and stream corridor.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND THE PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The proposed future use for the Former Flintkote Plant Site is recreational.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to SVOCs, PCBs, pesticides and metals in surface soil/fill, subsurface ash fill, creek and millrace sediment, unfiltered groundwater, sediments in buildings, waste in buildings and standing water in buildings;

- environmental exposures of flora or fauna to SVOCs, PCBs and metals in surface soil/fill, subsurface ash fill, and creek and millrace sediment;

- the release of contaminants from subsurface ash fill into groundwater that may create exceedances of groundwater quality standards; and

- the release of contaminants from surface soil/fill, subsurface ash fill, unfiltered groundwater, sediments in buildings, waste in buildings and standing water in buildings into Eighteenmile Creek and the millrace through the discharge of contaminated storm water runoff, the discharge of contaminated sediments, waste and standing water in the buildings, and the erosion of contaminated surface soil/fill and subsurface ash fill.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient water quality standards;

- TAGM 4046 soil cleanup objectives; and

- sediment SCGs.

SECTION 7: <u>SUMMARY OF THE EVALUATION OF ALTERNATIVES</u>

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements. Potential remedial alternatives for the Former Flintkote Plant Site were identified, screened and evaluated in the RA report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: <u>Description of Remedial Alternatives</u>

The following potential remedies were considered to address the contaminated surface soil/fill, subsurface ash fill, groundwater, sediments and waste in buildings, standing water in buildings and asbestos containing materials at the site. Because the sediments in Eighteenmile Creek upstream of the Former Flintkote Plant site are significantly contaminated with PCBs and metals, remediation of the creek and millrace adjacent to the site will be addressed through the Eighteenmile Creek Corridor Site (Site Number 932121).

Alternative 1: No Action

Present Worth: *$0*
Capital Cost: *$0*
Annual OM&M: (Years 1-30): *$0*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2 – Exposure Pathway Removal

Present Worth: *$1,410,000*
Capital Cost: *$1,305,000*
Annual OM&M (Years 1-30): *$6,800*

This alternative would consist of a minimum 2 foot thick, clean soil cover with demarcation layer over non-hazardous fill materials on the 300 Parcel of the site, and the excavation and stabilization of hazardous fill materials from the Island, 198 Parcel and WSS. The stabilized fill materials would be placed back on the Island and 198 Parcel and capped with a minimum 2 foot thick, clean soil cover with demarcation layer. In addition, this alternative would also include the removal of sediment from the Building C sump and trench drain, and from the outfall pipe to Eighteenmile Creek. The remaining interior sumps would be addressed through institutional controls and access controls, while the outfall pipe would be closed in place. Lastly, asbestos containing materials would be abated and select portions of the buildings that are in danger of collapsing would be demolished. The remaining building openings would be secured to prevent access. Alternative 2 could be implemented during one construction season.

Institutional controls, along with a site management plan, would be required since contaminated materials would remain on site. Long-term monitoring of the soil cover would also be required.

Alternative 3 – Containment with Limited Removal

Present Worth: *$2,335,000*
Capital Cost: *$2,230,000*
Annual OM&M (Years 1-30): *$6,800*

This alternative would consist of a minimum 2 foot thick, clean soil cover with demarcation layer over non-hazardous fill materials on the 300 Parcel of the site, and a minimum 2 foot thick low permeability cover system including demarcation layer over the hazardous fill materials on the Island and 198 Parcel. Hazardous fill materials on the WSS would be excavated and disposed off-site. In addition, this alternative would also include the removal of sediment from the Building C sump and trench drain, and from a portion of the outfall pipe to Eighteenmile Creek. The outfall pipe would be closed in place. Contaminated sediment from the Building D deep basement would be stabilized in situ with cement. Lastly, asbestos containing materials would be abated and the buildings would be demolished to four feet below grade. A minimum 2 foot thick, clean soil cover with demarcation layer would be installed over the demolished buildings. Alternative 3 could be implemented during one construction season.

Institutional controls, along with a site management plan, would be required since contaminated materials would remain on site. Long-term monitoring of the soil cover would also be required.

Alternative 4 – Excavation and Containment

Present Worth: *$5,614,000*
Capital Cost: *$5,552,000*
Annual OM&M (Years 1-30): *$4,000*

This alternative would consist of a minimum 2 foot thick, clean soil cover with demarcation layer over non-hazardous fill materials on the 300 Parcel of the site, and the excavation of hazardous fill materials to native soil or bedrock (where native soil is absent) on the Island, 198 Parcel and WSS. These materials would be properly disposed off-site. Following the excavation and off-site disposal of contaminated materials, clean fill would be brought to the site and the site would be re-graded to promote positive drainage. In addition, this alternative would also include the removal of sediment from the Building C sump and trench drain, and from a portion of the outfall pipe to Eighteenmile Creek. The outfall pipe would be closed in place. Remedial options for the contaminated sediment in the Building D deep basement would be evaluated. Lastly, asbestos containing materials would be abated and the buildings would be demolished to four feet below grade. The asbestos containing materials and building debris would be properly disposed off-site. A minimum 2 foot thick, clean soil cover with demarcation layer would be installed over the demolished buildings. Alternative 4 could be implemented during one construction season.

Institutional controls, along with a site management plan, would be required since contaminated materials would remain on site. Long-term monitoring of the soil cover would also be required.

Alternative 5 – Complete Excavation

Present Worth: *$8,653,000*
Capital Cost: *$8,653,000*
Annual OM&M (Years 1-30): *$0*

This alternative would consist of the excavation and off-site disposal of all fill materials on the site. In addition, this alternative would also include the removal of sediment from the Building D deep basement, the Building C sump and trench drain, and the complete removal of the outfall pipe from Eighteenmile Creek to the building. Lastly, asbestos containing materials would be abated and the buildings would be demolished to four feet below grade. Following the excavation and off-site disposal of contaminated materials, clean fill would be brought to the site and the site would be re-graded to promote positive drainage. At the completion of this remedial alternative, the site would consist of an open grass area. Alternative 5 could be effectively implemented within one to two construction seasons.

Institutional controls, long-term monitoring and a site management plan would not be required as all contaminated materials would be removed from the site.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of environmental restoration projects in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the RA report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the

adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the SI/RA reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing Alternative 4, Excavation and Containment as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the SI and the evaluation of alternatives presented in the RAR.

Alternative 4 (Excavation and Containment) is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the fill materials that create the most significant threat to public health and the environment, and capping the remaining fill materials in place. Alternatives 2, 3, and 5 would also comply with the threshold selection criteria but to a lesser degree, with lower certainty or at greater cost.

Under Alternative 1 (No Action), the site and existing structures would remain in their current states. Existing access controls (i.e. partial chain-link fencing, boarded-up windows and doors, and police patrols) have not been fully effective in preventing trespassing, resulting in the potential for chemical and/or asbestos exposure to trespassers. Moreover, the structures are severely deteriorated, and this condition will continue to worsen, further diminishing the effectiveness of access controls and increasing the potential for contaminant releases to the surrounding community. As a result, the existing threats to public health and the environment are expected to increase over time as site conditions continue to erode. As this alternative does not satisfy the "threshold criteria" (it is not protective of human health and the environment, and does not achieve compliance with SCGs), it will not be considered for implementation at the Former Flintkote Plant Site.

Because Alternatives 2, 3, 4, and 5 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternative 2 (Exposure Pathway Removal) would satisfy the remediation goals for the protection of human health and the environment for the current use, but would not be protective of human health with respect to construction workers or the proposed future use as a recreational area because most of the contamination, although stabilized and covered with soils, would remain on-site under a soil cover and would exceed the majority of the SCGs. Alternatives 3 (Containment with Limited Removal), 4 (Excavation and Containment) and 5 (Complete Excavation), however, would satisfy the remediation goals for both the current and the proposed future use, although a future risk to construction and/or site workers would exist under Alternatives 3 and 4 as contaminated fill materials would remain on-site.

Alternatives 2 (Exposure Pathway Removal), 3 (Containment with Limited Removal), 4 (Excavation and Containment) and 5 (Complete Excavation) all have potential short term exposure risks to construction workers and the surrounding community (e.g., dust generation, noise, etc.) that would result during the implementation of these alternatives. These impacts, however, could be mitigated through standard construction practices. The application of common health and safety precautions would also minimize potential health risks to remedial contractors and the surrounding community during the implementation of these alternatives. Caution during excavation near the millrace and Eighteenmile Creek would be required to prevent impacts to these surface water bodies.

The soil covers (or cover systems) of Alternatives 2, 3 and 4 would be subject to weathering, erosion, and degradation from tree growth and vector intrusion. The potential for erosion of the soil covers or cover systems, however, would be reduced through the implementation of a semiannual monitoring program. Operation, maintenance, and monitoring (OM&M) of the covers would be conducted as needed. Additionally, exposure risks to construction workers and the surrounding community associated with future invasive activities at the site could be effectively minimized through the use of a site management plan and standard construction and health and safety precautions. Long-term effectiveness is best achieved by Alternative 5 as all contaminated materials would be removed from the site.

Under Alternatives 2 (Exposure Pathway Removal), 3 (Containment with Limited Removal), 4 (Excavation and Containment) and 5 (Complete Excavation), the volume of contaminants would be reduced through the removal of contaminants associated with the sump and trench drain in Building C, the outfall pipe to Eighteenmile Creek and asbestos containing materials within the existing buildings. The volume of contaminants would be further reduced under Alternatives 4 and 5 as hazardous (Alternatives 4 and 5) and non-hazardous (Alternative 5) fill materials would be excavated and disposed off-site.

For Alternative 2 (Exposure Pathway Removal), while the toxicity and mobility of contaminants within the hazardous fill would be reduced through the stabilization process and the installation of a soil cover, the stabilization process would result in an increase in the total volume of contaminated media on site. For Alternatives 3 (Containment with Limited Removal) and 4 (Excavation and Containment), the mobility of both organic and inorganic contaminants in the fill materials would be reduced by the cover systems. Alternative 5 would completely reduce the toxicity and mobility of the contaminants at the site.

The cost of the alternatives varies significantly. Although Alternatives 2 (Exposure Pathway Removal) and 3 (Containment with Limited Removal) are less expensive than Alternatives 4

(Excavation and Containment) and 5 (Complete Excavation), hazardous fill materials would remain on-site under these alternatives. Alternative 5 has the greatest cost because all contaminated materials would be removed from the site. The additional cost of this alternative compared to Alternative 4 (approximately $3,000,000) makes this alternative less favorable.

The estimated present worth cost to implement the remedy is $5,614,000. The cost to construct the remedy is estimated to be $5,552,000 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is $6,800.

The elements of the proposed remedy are as follows:

- Construction of a minimum 2 foot thick, clean soil cover with demarcation layer over the non-hazardous fill materials on the 300 Parcel of the site;
- Excavation of hazardous fill materials to native soils or bedrock (where native soils are absent) on the 198 Parcel, Island and Water Street Section (WSS) of the site. These materials would be disposed off-site in an approved facility;
- Removal of sediments from the Building C sump and trench drain, and evaluate options to address sediments in the Building D deep basement;
- Removal of sediment from a portion of an outfall pipe to Eighteenmile Creek and closure of the pipe in place;
- Abatement of asbestos containing materials (ACMs). These materials would be disposed off-site in an approved facility;
- Demolition of all buildings to four feet below grade. Removal of C&D debris from exterior portions of the site. These materials would be disposed off-site in an approved facility;
- Installation of a minimum 2 foot thick, clean soil cover with demarcation layer over the demolished building footprint;
- A remedial design program to provide the details necessary to implement the remedial program;
- Development of a site management plan to: (a) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) identify any use restrictions; and (c) provide for the operation and maintenance of the components of the remedy.
- Imposition of an institutional control in the form of an environmental easement that would (a) require compliance with the approved site management plan; (b) limit the use and development of the property to recreational uses only; (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; and (d) require the property owner to complete and submit to the NYSDEC a periodic certification.
- The property owner would provide a periodic certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls, are still in place, allow the NYSDEC access to the site, and that nothing has occurred that would impair

the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan; and

- Since the remedy results in untreated hazardous substances remaining at the site, a long term monitoring program would be instituted. This monitoring program would consist of semiannual inspections of the soil cover to document its continued effectiveness.

TABLE 1
Nature and Extent of Contamination
October 1995 - October 2003

SURFACE SOIL/ FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	0.22 - 110.0	0.224	9 of 10
	Benzo(a)pyrene	ND[c] - 20.0	0.061	9 of 10
	Benzo(b)fluoranthene	0.32 - 160.0	1.1	5 of 10
	Benzo(k)fluoranthene	ND - 200.0	1.1	6 of 10
	Chrysene	0.26 - 92.0	0.4	9 of 10
	Dibenzo(a,h)anthracene	ND - 16.0	0.014	6 of 10
PCBs	PCB - 1254	ND - 4.6	1.0	3 of 10
Inorganic Compounds	Antimony	1.5 - 149.0	2.0	8 of 10
	Arsenic	9.2 - 59.6	7.5	10 of 10
	Barium	64.2 - 2,440	300.0	6 of 10
	Chromium	11.1 - 186.0	14.0	8 of 10
	Copper	36.4 - 51,000	25.0	10 of 10
	Lead	57.6 - 7,610	53.0	10 of 10
	Mercury	0.25 - 10.8	0.1	10 of 10
	Nickel	16.4 - 549.0	18.0	9 of 10
	Silver	0.13 - 19.2	0.19	8 of 10
	Zinc	115.0 - 21,900	255.0	7 of 10

SUBSURFACE ASH FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND - 16.0	0.224	19 of 26
	Benzo(a)pyrene	ND - 12.0	0.061	20 of 26
	Benzo(b)fluoranthene	ND - 12.0	1.1	19 of 26
	Benzo(k)fluoranthene	ND - 16.0	1.1	9 of 26
	Chrysene	ND - 14.0	0.4	20 of 26
	Dibenzo(a,h)anthracene	ND - 1.5	0.014	8 of 26
PCBs	PCB - Total	ND - 6.8	10.0	0 of 18

TABLE 1
Nature and Extent of Contamination (Continued)

SUBSURFACE ASH FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Inorganic Compounds	Antimony	1.4 - 128.0	2.0	6 of 7
	Arsenic	10.3 - 188.0	7.5	27 of 27
	Barium	82.4 - 9,190	300.0	18 of 27
	Chromium	5.7 - 314.0	14.0	22 of 27
	Copper	42.4 - 35,800	25.0	27 of 27
	Lead	50.0 - 23,100	53.0	26 of 27
	Mercury	0.071 - 65.8	0.1	26 of 27
	Nickel	8.6 - 3,560	18.0	24 of 27
	Silver	ND - 23.6	0.19	21 of 27
	Zinc	74.8 - 13,000	255.0	22 of 27
Inorganic Compounds - TCLP[d]	Cadmium	ND - 1.58	1.0	1 of 18
	Lead	0.018 - 114.0	5.0	7 of 18

SUBSURFACE SOIL - NATIVE	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND - 3.2	0.224	2 of 10
	Benzo(a)pyrene	ND - 2.6	0.061	3 of 10
	Benzo(b)fluoranthene	ND - 2.9	1.1	1 of 10
	Benzo(k)fluoranthene	ND - 2.3	1.1	1 of 10
	Chrysene	ND - 3.1	0.4	2 of 10
	Dibenzo(a,h)anthracene	ND - 0.61	0.014	3 of 10
Inorganic Compounds	Antimony	ND - 6.8	2.0	2 of 11
	Arsenic	1.0 - 14.2	7.5	3 of 11
	Barium	22.8 - 87.7	300.0	0 of 11
	Chromium	4.9 - 13.9	14.0	0 of 11
	Copper	3.9 - 406.0	25.0	7 of 11
	Lead	2.7 - 914.0	53.0	2 of 11

TABLE 1
Nature and Extent of Contamination (Continued)

SUBSURFACE SOIL - NATIVE	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Inorganic Compounds (continued)	Mercury	ND - 0.629	0.1	2 of 11
	Nickel	6.1 - 26.8	18.0	2 of 11
	Silver	ND - 0.49	0.19	3 of 11
	Zinc	16.7 - 259.0	255.0	1 of 11

CREEK/MILLRACE SEDIMENT	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	1.2 - 480.0	1.3[e]	6 of 7
	Benzo(a)pyrene	0.98 - 98.0	1.3[e]	6 of 7
	Benzo(b)fluoranthene	1.8 - 390.0	1.3[e]	7 of 7
	Benzo(k)fluoranthene	0.68 - 260.0	1.3[e]	3 of 7
	Chrysene	1.1 - 450.0	1.3[e]	6 of 7
	Dibenzo(a,h)anthracene	ND - 100.0	NS[f]	
	Indeno(1,2,3-cd)pyrene	0.45 - 100.0	1.3[e]	4 of 7
	Phenanthrene	0.82 - 1,900	120[g]	1 of 7
PCBs	PCB - Total	ND - 8.8	1.0[h]	5 of 7
Inorganic Compounds	Antimony	2.1	LEL[i] - 2.0	1 of 1
			SEL[i] - 25.0	0 of 1
	Arsenic	2.1 - 36.8	LEL[i] - 6.0	2 of 7
			SEL[i] - 33.0	1 of 7
	Barium	81.7 - 784.0	NS	
	Chromium	17.7 - 167.0	LEL[i] - 26.0	5 of 7
			SEL[i] - 110.0	1 of 7
	Copper	108.0 - 7,550	LEL[i] - 16.0	7 of 7
			SEL[i] - 110.0	6 of 7
	Lead	189.0 - 5,940	LEL[i] - 31.0	7 of 7
			SEL[i] - 110.0	7 of 7

TABLE 1
Nature and Extent of Contamination (Continued)

CREEK/MILLRACE SEDIMENT	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Inorganic Compounds (continued)	Mercury	0.26 - 4.9	LEL[i] - 0.15	7 of 7
			SEL[i] - 1.3	1 of 7
	Nickel	19.1 - 333.0	LEL[i] - 16.0	7 of 7
			SEL[i] - 50.0	1 of 7
	Silver	0.39 - 15.4	LEL[i] - 1.0	5 of 7
			SEL[i] - 2.2	3 of 7
	Zinc	359.0 - 13,000	LEL[i] - 120.0	7 of 7
			SEL[i] - 270.0	7 of 7

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
SVOCs	Pentachlorophenol	ND - 200.0	1.0	1 of 17
PCBs	PCB - 1254	ND - 8.1	0.09	2 of 17
Inorganic Compounds - Unfiltered	Antimony	ND - 65.3	3.0	7 of 13
	Arsenic	ND - 238.0	25.0	11 of 18
	Barium	50.2 - 3,830	1,000	5 of 18
	Chromium	ND - 388.0	50.0	10 of 18
	Copper	ND - 13,200	200.0	13 of 18
	Lead	3.4 - 12,100	25.0	13 of 18
	Mercury	ND - 9.8	0.7	7 of 18
	Nickel	2.2 - 649.0	100.0	8 of 18
	Silver	ND - 26.2	50.0	0 of 18
	Zinc	6.4 - 34,100	2,000	10 of 18
Inorganic Compounds - Filtered	Arsenic	ND - 5.9	25.0	0 of 11
	Barium	28.6 - 353.0	1,000	0 of 11
	Chromium	ND - 1.1	50.0	0 of 11
	Lead	ND - 13.3	25.0	0 of 11

TABLE 1
Nature and Extent of Contamination (Continued)

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Inorganic Compounds - Filtered (continued)	Mercury	ND	0.7	0 of 11
	Silver	ND	50.0	0 of 11

CREEK SURFACE WATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Inorganic Compounds	Antimony	ND	3.0	0 of 1
	Arsenic	ND	50.0	0 of 2
	Barium	27.9 - 53.9	1,000	0 of 2
	Chromium	ND - 4.0	50.0	0 of 2
	Copper	1.9 - 5.4	200.0	0 of 2
	Lead	ND - 3.5	50.0	0 of 2
	Mercury	ND	0.7	0 of 2
	Nickel	2.5 - 2.8	100.0	0 of 2
	Silver	ND	50.0	0 of 2
	Zinc	3.9 - 27.2	2,000	0 of 2

SEDIMENTS IN BUILDINGS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	0.95 - 3.5	0.224	3 of 3
	Benzo(a)pyrene	ND - 4.8	0.061	2 of 3
	Benzo(b)fluoranthene	0.72 - 3.6	1.1	1 of 3
	Benzo(k)fluoranthene	0.78 - 3.8	1.1	1 of 3
	Bis(2-ethylhexyl)phthalate	ND - 120.0	50.0	2 of 3
	Chrysene	0.86 - 4.5	0.4	3 of 3
	Dibenzo(a,h)anthracene	ND - 0.85	0.014	1 of 3
	Dimethylphthalate	ND - 3.0	2.0	1 of 3
	Di-n-butyl Phthalate	ND - 41.0	8.1	1 of 3

TABLE 1
Nature and Extent of Contamination (Continued)

SEDIMENTS IN BUILDINGS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
PCBs	PCBs - Total	0.97 - 108.0	1.0	2 of 3
Inorganic Compounds	Antimony	13.9 - 279.0	2.0	3 of 3
	Arsenic	30.2 - 55.5	7.5	3 of 3
	Barium	248.0 - 357.0	300.0	1 of 3
	Chromium	93.7 - 180.0	14.0	3 of 3
	Copper	3,150 - 53,400	25.0	3 of 3
	Lead	484.0 - 13,600	53.0	3 of 3
	Mercury	1.5 - 8.1	0.1	3 of 3
	Nickel	140.0 - 288.0	18.0	3 of 3
	Silver	3.2 - 15.6	0.19	3 of 3
	Zinc	5,760 - 45,100	255.0	3 of 3

WASTE IN BUILDINGS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND (28.0)	0.224	0 of 1
	Benzo(a)pyrene	ND (28.0)	0.061	0 of 1
	Benzo(b)fluoranthene	ND (28.0)	1.1	0 of 1
	Benzo(k)fluoranthene	ND (28.0)	1.1	0 of 1
	Chrysene	ND (28.0)	0.4	0 of 1
	Dibenzo(a,h)anthracene	ND (28.0)	0.014	0 of 1
	Di-n-butyl Phthalate	14.0	8.1	1 of 1
	Pentachlorophenol	250.0	1.0	1 of 1
PCB/Pesticides	PCB - 1242	6.3	1.0	1 of 1
	Dieldrin	1.4	0.044	1 of 1
Inorganic Compounds	Antimony	33.1	2.0	1 of 1
	Arsenic	3.2	7.5	0 of 1
	Barium	92.2	300.0	0 of 1

TABLE 1
Nature and Extent of Contamination (Continued)

WASTE IN BUILDINGS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Inorganic Compounds (continued)	Chromium	27.0	14.0	1 of 1
	Copper	78.0	25.0	1 of 1
	Lead	586.0	53.0	1 of 1
	Mercury	1.3	0.1	1 of 1
	Nickel	7.2	18.0	0 of 1
	Silver	1.3	0.19	1 of 1
	Zinc	316.0	255.0	1 of 1

STANDING WATER IN BUILDINGS	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
PCB/Pesticides	PCB - 1248	0.6	0.09	1 of 1
	Dieldrin	0.1	0.004	1 of 1
Inorganic Compounds - Total	Antimony	ND	3.0	0 of 1
	Arsenic	ND	50.0	0 of 1
	Barium	46.2	1,000	0 of 1
	Chromium	3.9	50.0	0 of 1
	Copper	51.5	200.0	0 of 1
	Lead	5.8	50.0	0 of 1
	Mercury	0.1	0.7	0 of 1
	Nickel	8.2	100.0	0 of 1
	Silver	ND	50.0	0 of 1
	Zinc	268.0	2,000	0 of 1

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
[b] SCG = standards, criteria, and guidance values;
[c] ND = contaminant analyzed but not detected;
[d] TCLP = Toxicity Characteristic Leaching Procedure;
[e] human health bioaccumulation;
[f] NS = no standard or guidance value available;
[g] chronic toxicity to benthic aquatic life;

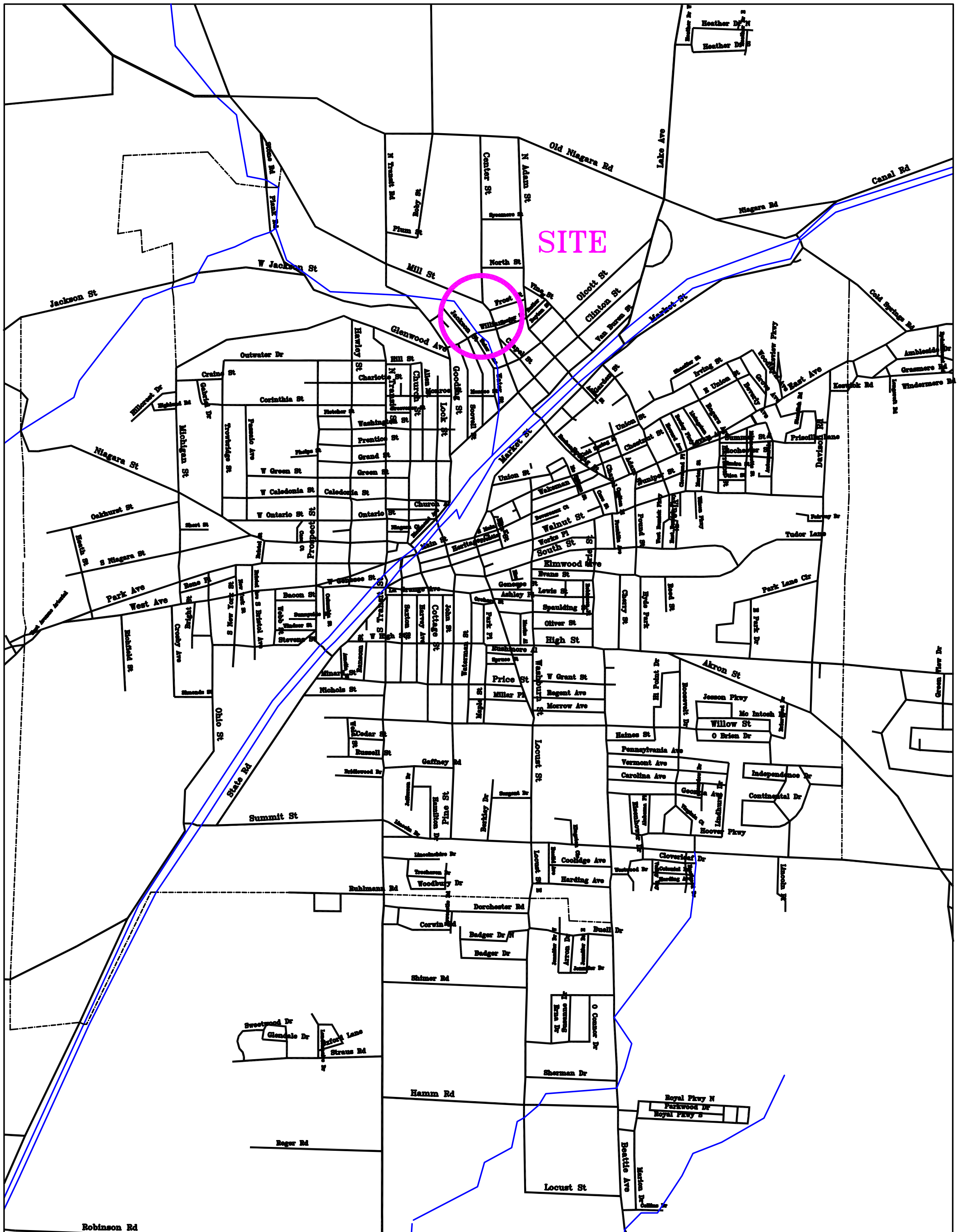
TABLE 1
Nature and Extent of Contamination (Continued)

[h] TAGM 4046 surface soil SCG for PCBs; and
[i] LEL = Lowest Effects Level and SEL = Severe Effects Level. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is exceeded, the impact is considered to be moderate.

Shaded SCGs represent site background values as determined during the SI.

TABLE 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
No Action	$0	$0	$0
Exposure Pathway Removal	$1,305,000	$6,800	$1,410,000
Containment with Limited Removal	$2,230,000	$6,800	$2,335,000
Excavation and Containment	$5,552,000	$4,000	$5,614,000
Complete Excavation	$8,653,000	$0	$8,653,000



Lockport Quadrangle

Scale Depends on Final Plotted Size

SITE LOCATION MAP

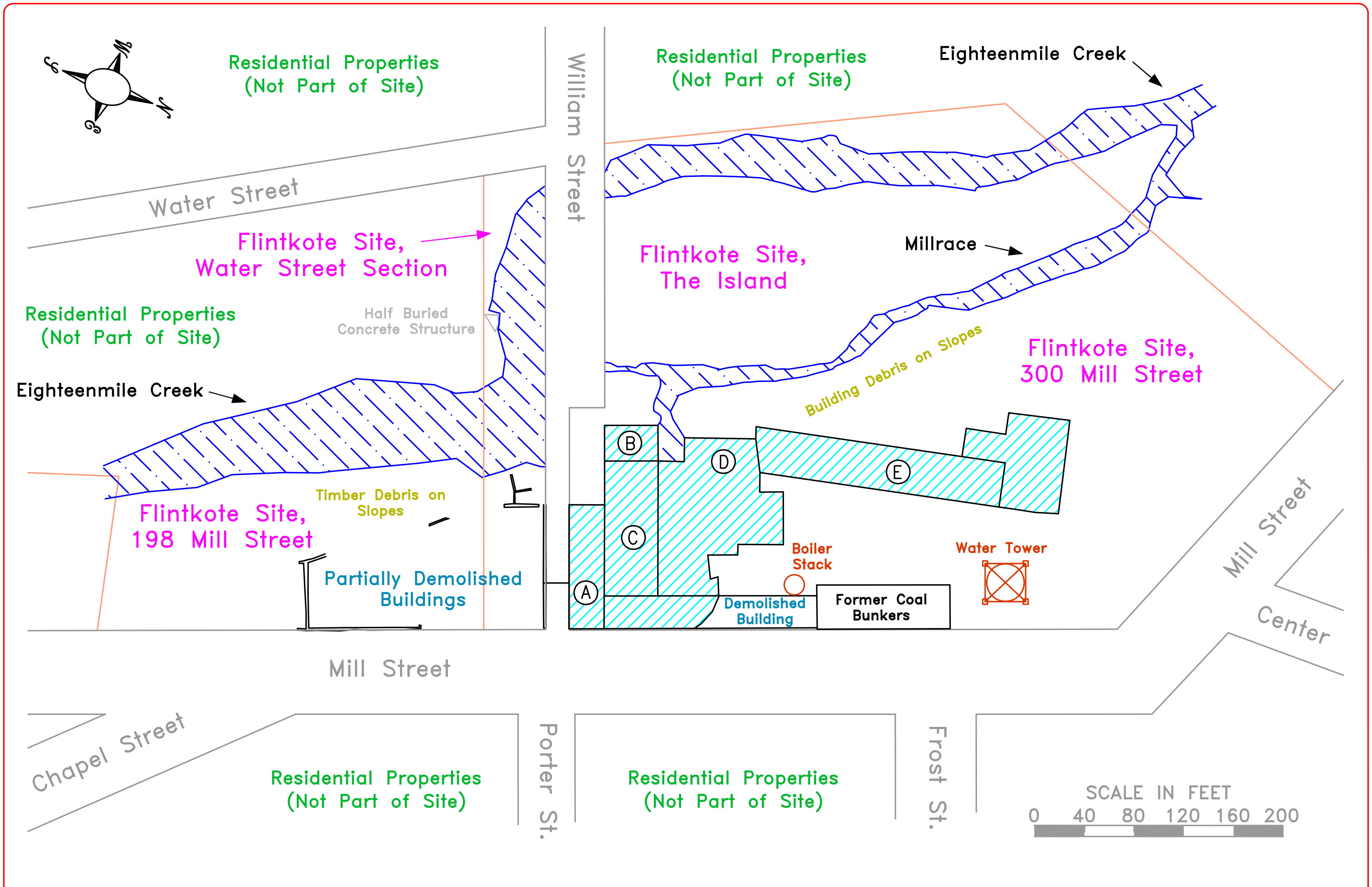
DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/29/00

DRAWING: LOCATION2.DWG

SITE: FORMER FLINTKOTE PLANT SITE

FIGURE 1

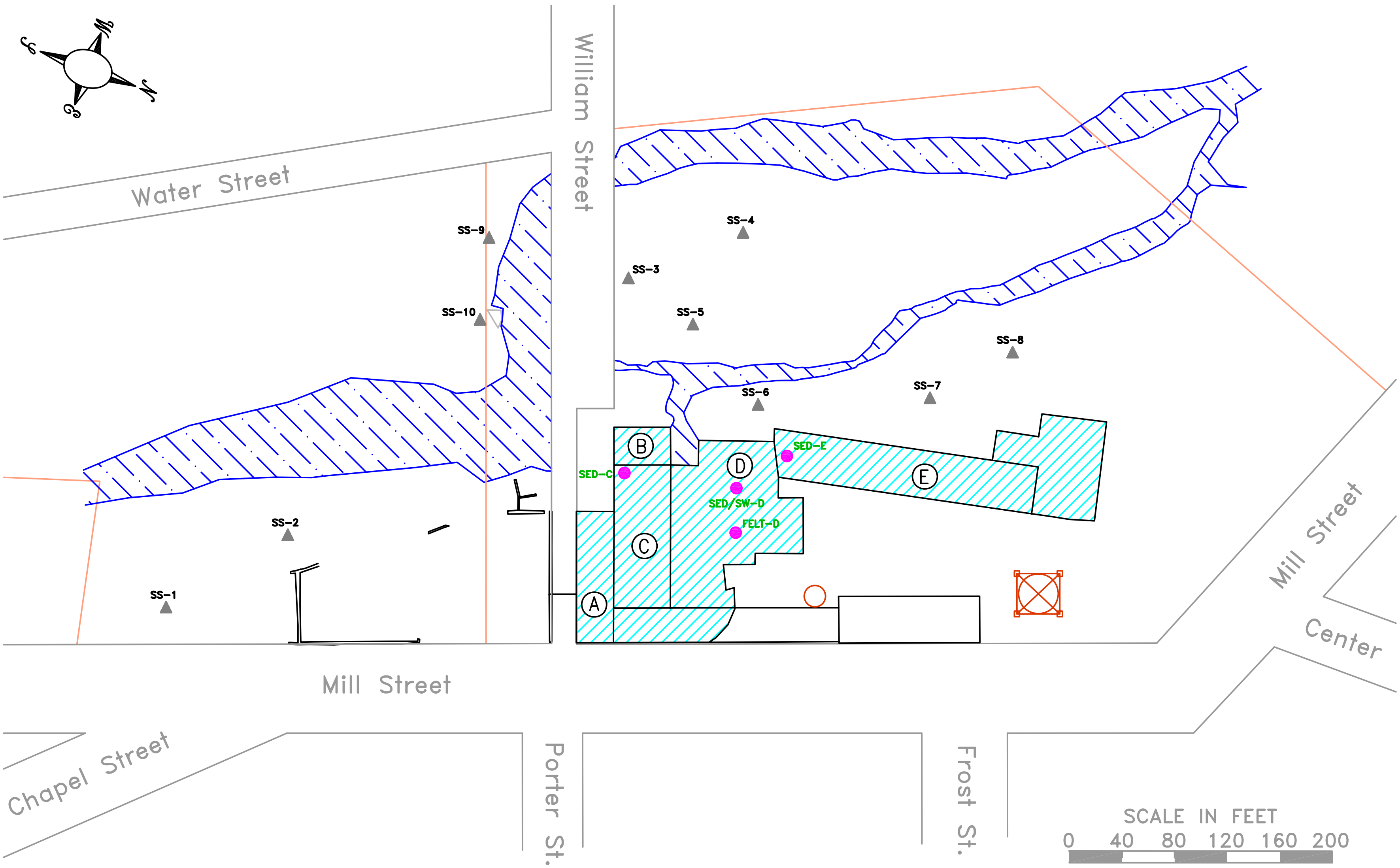


FLINTKOTE SITE MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/11/00 DRAWING: SITEMAP.DWG

SITE: FORMER FLINTKOTE PLANT SITE FIGURE 2



LEGEND:

- PROPERTY LINE
- ▲ SURFACE SOIL SAMPLE LOCATION (NIAGARA COUNTY INVESTIGATION)
- ● BUILDING SAMPLE LOCATION (NIAGARA COUNTY INVESTIGATION)

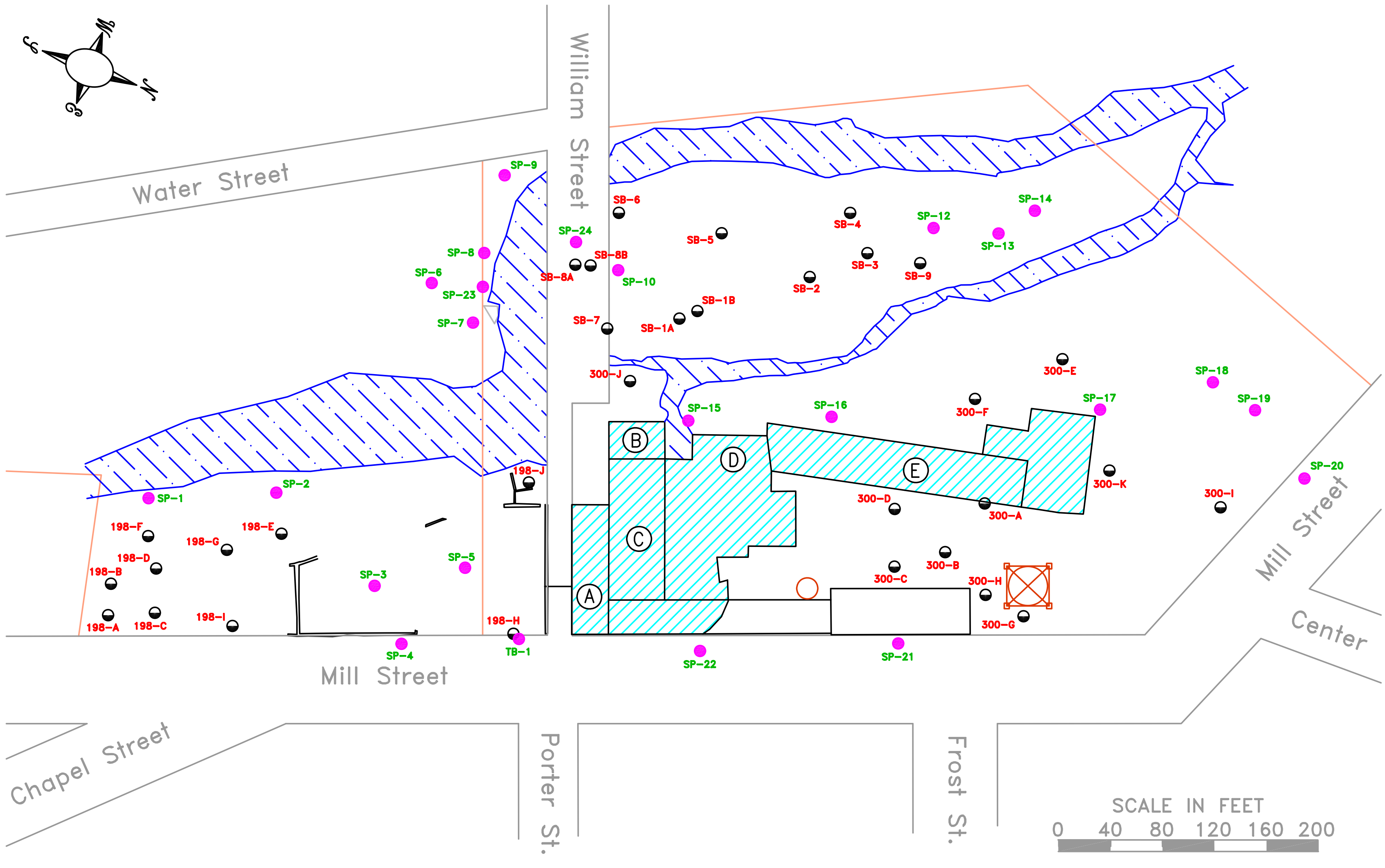
SURFACE SOIL & BUILDING SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/11/00 | DRAWING: SITEMAP.DWG

SITE: FORMER FLINTKOTE PLANT SITE

FIGURE 3



LEGEND:

PROPERTY LINE
SOIL BORING LOCATION (NYSDEC INVESTIGATION)
SOIL BORING LOCATION (NIAGARA COUNTY INVESTIGATION)

SOIL BORING LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/11/00 | DRAWING: SITEMAP.DWG

SITE: FORMER FLINTKOTE PLANT SITE

FIGURE 4

LEGEND:

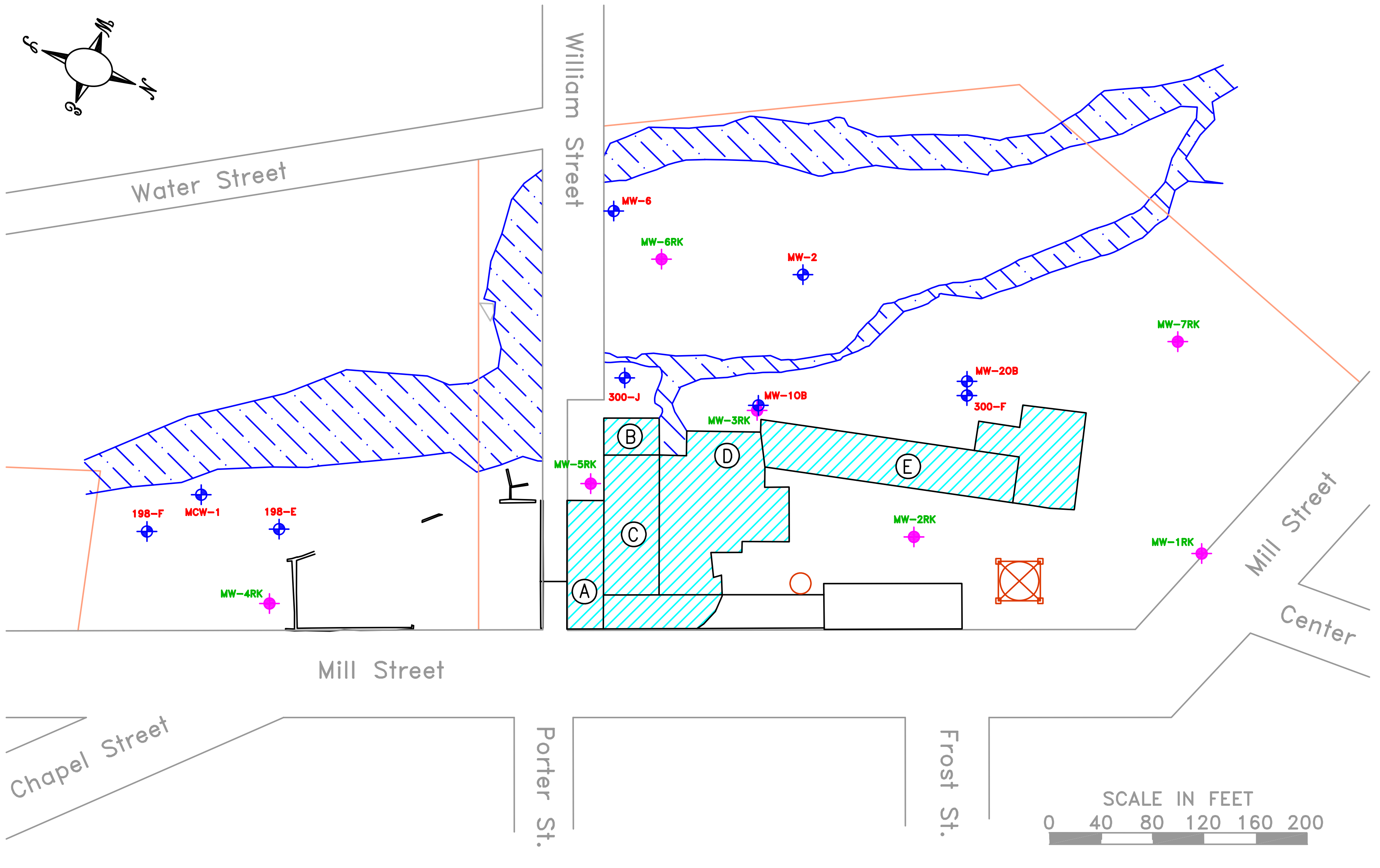
- PROPERTY LINE
- ▲ SURFACE WATER SAMPLE LOCATION (NYSDEC INVESTIGATION)
- ● SEDIMENT SAMPLE LOCATION (NYSDEC & NIAGARA COUNTY INVESTIGATION)

SEDIMENT & SURFACE WATER SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/11/00 DRAWING: SITEMAP.DWG

SITE: **FORMER FLINTKOTE PLANT SITE** **FIGURE 5**



LEGEND:

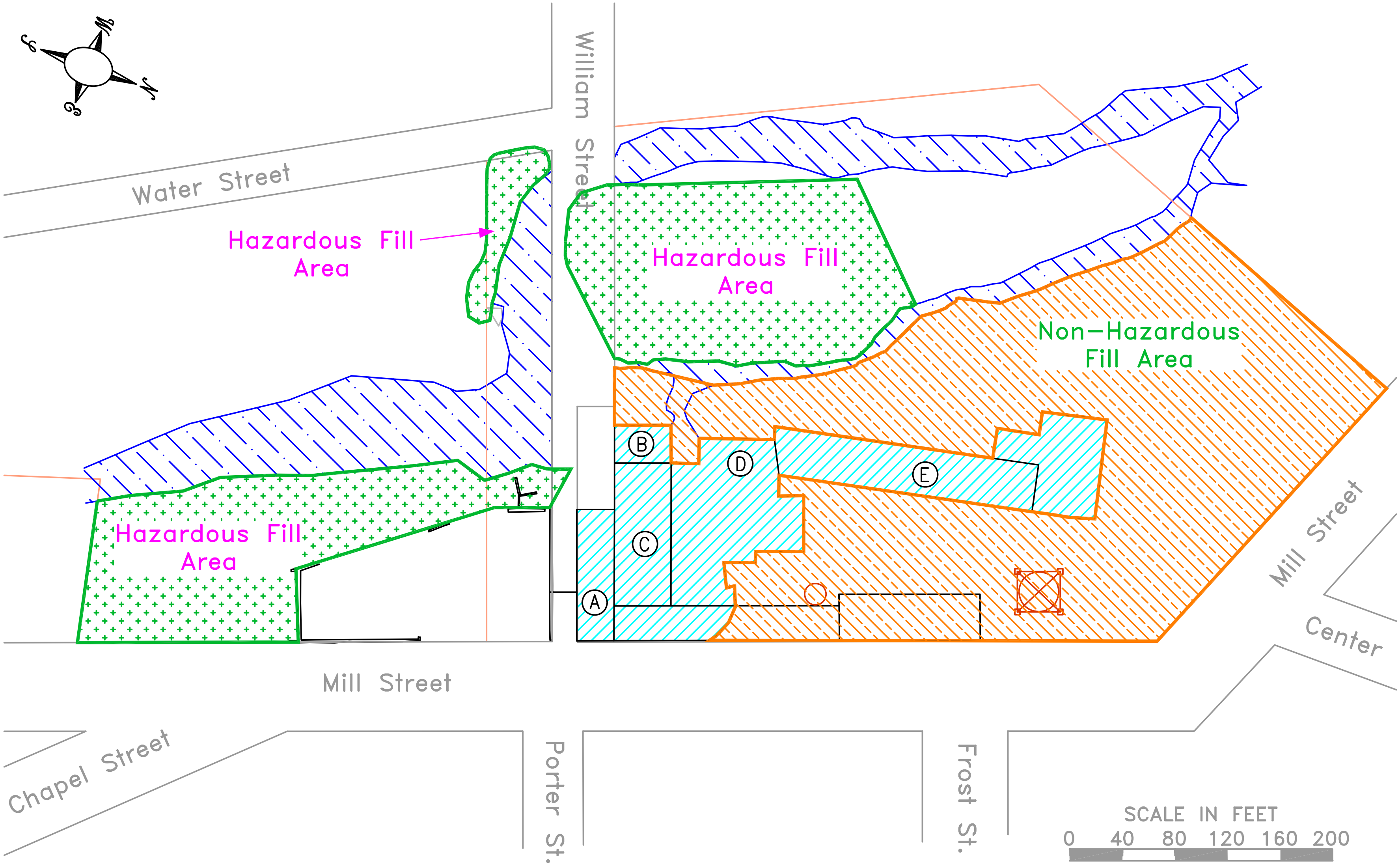
PROPERTY LINE
OVERBURDEN MONITORING WELL LOCATION
BEDROCK MONITORING WELL LOCATION

MONITORING WELL LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/11/00 DRAWING: SITEMAP.DWG

SITE: **FORMER FLINTKOTE PLANT SITE** **FIGURE 6**



LEGEND:

HAZARDOUS FILL AREAS

NON-HAZARDOUS FILL AREAS

LOCATION OF HAZARDOUS AND NON-HAZARDOUS FILL AREAS

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/11/00 DRAWING: SITEMAP.DWG

SITE: **FORMER FLINTKOTE PLANT SITE** **FIGURE 7**