

Addendum to the Remedial Action Plan for a Limited Residential Closure

**Windiate Park
Flint, Michigan**

August 1996



O'BRIEN & GERE
ENGINEERS, INC.

Addendum

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Flint, Michigan*


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Executive Summary

This Remedial Action Plan Addendum (RAP Addendum) was prepared to supplement the "Remedial Investigation and Feasibility Study for Windiate Park, Flint, Michigan" (RI/FS) dated February 1996 and the "Remedial Action Plan for a Limited Residential Closure for Windiate Park, Flint, Michigan" (RAP) dated February 1996. This RAP Addendum serves two purposes. First, this report presents additional data pertaining to the regional confining unit and the shallow water bearing unit in Windiate Park (Park). Second, this report identifies the proposed annexation of three parcels of land to the Park and their inclusion in the RAP. The following paragraphs provide a brief summary of the information presented in this RAP Addendum.

Subsequent to the submittal of the RI/FS and the RAP to the MDEQ in February 1996, the MDEQ requested confirmation of the regional clay confining unit in the Park and further assessment of the ground water quality in the lower portion of the upper water bearing zone in the Park. Pursuant to the MDEQ approved work plan, two soil borings were installed in the Park to confirm the presence of the regional confining unit and perform vertical ground water profiling. The clay confining unit was observed from approximately 30 ft below grade (fbg) to 34 fbg at the first boring location and from approximately 19 fbg to 23 fbg at the second boring location. Ground water data from vertical profiling performed at the two boring locations confirmed that ground water in the lower portion of the upper water bearing zone was not adversely impacted. Following MDEQ review of the preliminary data from these investigations, the RAP was approved.

Subsequent to the submittal of the RI/FS and the RAP to the MDEQ in February 1996, GM acquired three parcels of land that adjoin the Park. GM proposes to donate the properties to the City of Flint with the intent that the parcels will be annexed to the Park. Since substances of potential concern (SOPCs) were identified on two of the three parcels, remedial action was implemented on the

two impacted parcels to attain the closure criteria required for a "Limited Residential" closure as referenced in Section 20120 of Part 201 of PA 451.

The remedial action which has been performed on the two impacted parcels included the installation of a 2 ft thick soil cover, the implementation of deed restrictions, and the performance of maintenance activities. Evaluating the two remediated parcels against the closure criteria required for a "Limited Residential" closure, indicates that these closure criteria have been achieved. The three parcels will be annexed to the Park, pending MDEQ approval of this RAP Addendum.

1. Introduction

1.1. General

This document serves as an addendum to the "Remedial Action Plan for a Limited Residential Closure" (RAP) dated February 1996 for the Windiate Park (Park) property in Flint, Michigan. A Site Location Map is attached as Figure 1. The RAP identified the final remedy to address the environmental conditions within the limits of the Park and is compliant with Part 201 of the Natural Environmental Resources Act, 1994 PA 451 (Part 201, PA 451). The RAP was submitted to the Michigan Department of Environmental Quality (MDEQ) in February 1996.

The purpose of this Remedial Action Plan Addendum (RAP Addendum) is twofold. First, this RAP Addendum presents the results of further testing that was requested by the MDEQ since the submittal of the RAP and the "Remedial Investigation/Feasibility Study for Windiate Park, Flint, Michigan" (RI/FS) dated February 1996 which the testing confirmed the presence of a regional confining unit and that the lower portion of the upper water bearing zone was not adversely impacted.

Secondly, subsequent to submittal of the RAP, GM acquired three parcels of land that adjoin the Park. After acquiring the parcels, GM proposed to donate the properties to the City of Flint with the intent that the parcels would be annexed to the Park.

This RAP Addendum demonstrates that three vacant parcels of land proposed to be annexed to the Park meet the criteria for a "Limited Residential" closure, as referenced in Section 20120a of Part 201, PA 451.

This RAP Addendum is submitted in accordance with Part 201, PA 451 and Section 3.2 "Changes to the RAP" from the February 1996 RAP. As identified in Section 3.2 of the RAP, the remedial action plan will be modified to address new data, if necessary.

2. Regional Confining Unit Confirmation and Vertical Ground Water Profiling

2.1. General

Subsequent to submittal of the RI/FS and RAP in February 1996, the MDEQ requested further site specific information to confirm the presence of a regional confining unit and the performance of vertical ground water profiling in the Park. Pursuant to the MDEQ request and approved work plan, two additional soil borings were installed in the Park to confirm the presence of the regional clay confining unit and to further assess ground water quality in the lower portion of the upper water bearing zone. Work was performed in accordance with the February 13, 1996 and May 21, 1996 letter work plans submitted to the MDEQ. The work plans were verbally approved by the MDEQ.

The following sections discuss the methods and findings of the regional confining unit confirmation and vertical ground water profiling investigations.

2.2. Regional Confining Unit Confirmation

2.2.1. Field Activities

On May 29, 1996, two additional soil borings (CUSB-1 and CUSB-2) were installed in the Park at the locations shown on Figure 2. The borings were installed at areas in the Park where a shallow clay confining unit was not confirmed during previous remedial investigation (RI) activities. The borings were installed using 4.25 inch inside diameter hollow stem augers, with sampling initiated at a depth approximately equal to the top of screen of the nearest previously installed monitoring well. Continuous splitspoon sampling was performed in 2 ft intervals to a depth of approximately 4 ft into the encountered confining unit for confirmation that a substantial unit exists. Sampling was conducted in accordance with ASTM

method D2488-93. Soil samples from the 2 ft intervals were field screened using sensory and photoionization detector (PID) methods as the borings were advanced. The Microtip model PID was calibrated following manufacturer's instruction prior to usage. The PID was used for a preliminary indication of volatile organic presence and relative concentration. Soil samples were not submitted to a laboratory for analysis as field screening did not indicate the presence of impact. Decontamination procedures were performed in accordance with the February 13, 1996 letter work plan.

The soil samples from CUSB-1 and CUSB-2 were logged in accordance with the Unconsolidated Soil Classification System (USCS) by an O'Brien and Gere Engineers, Inc. (O'Brien & Gere) geologist. Soil boring logs which include detailed descriptions of the subsurface materials and PID readings at each soil boring location are included as Appendix A.

Soil cuttings and decontamination fluids produced during soil boring installation activities were containerized in DOT approved 55 gal steel drums to be disposed of properly at a later date.

2.2.2. Summary of Geologic Data and Confining Unit

At CUSB-1, splitspoon sampling was initiated at a depth of 6 ft below grade (fbg). The top of the confining unit was observed at approximately 30 fbg. Although the work plan proposed boring 2 ft into the regional clay unit, it was decided that an additional 2 ft split spoon sample of the clay should be collected for additional confirmation. Therefore, the top 4 ft of the clay confining unit was visually inspected. A clay unit was also observed at CUSB-1 from 23 fbg to 24.5 fbg; however, since this clay unit was less than 2 ft thick, it was not considered to be sufficient as a confining unit.

At CUSB-2, splitspoon sampling was initiated at a depth of 7 fbg. The confining unit was observed from approximately 19 fbg to 23 fbg, the bottom of the boring. Although the work plan proposed boring 2 ft into the regional clay unit, it was decided that an additional 2 ft split spoon sample of the clay should be collected for additional confirmation. Therefore, the top 4 ft of the clay confining unit was visually inspected.

The observed confining unit consisted of a brownish-grey clay, and is consistent with local water well records and information obtained during RI activities in the park. Site geology observed in the borings was consistent with the previous RI activities at the park. Overburden materials consisted of intermixed soils including sands, silts, clays, and organic materials (peats and marls). Fill material consisting of glass fragments was observed in CUSB-1 from approximately 6.5 fbg to 6.75 fbg. Fill material was not observed in CUSB-2.

The plan view of a geologic cross-section in the Park is presented on Figure 3. The geologic cross-section depicting subsurface materials is presented on Figure 4. The cross-section incorporates soil data from CUSB-1 and CUSB-2 with the soil data from the geologic cross-section referenced as Figure 22 in the "Remedial Investigation/Feasibility Study" (RI/FS) report dated February 1996.

2.3. Vertical Ground Water Profiling

2.3.1. Sampling Methods

Vertical ground water profiling was performed in the soil borings installed to confirm the confining unit. Ground water profiling was performed in accordance with the auger advance method described in the draft MDEQ ERD Hydrogeologic Study Guidance Document dated November 1990, procedures outlined in the May 21, 1996 letter work plan, and MDEQ comments.

Vertical ground water profiling was accomplished by installing temporary monitoring wells in each soil boring subsequent to the confirmation of the confining unit in each boring. The borings were completed by methods described in section 2.2.1. The temporary monitoring wells were constructed of 2 inch diameter, schedule 40 threaded flush joint stainless steel riser casing with 5 ft of 0.010 inch stainless steel slot screen. The initial temporary monitoring wells were installed in each boring with the bottom of each well screen set at the top of the confining unit.

Subsequent to setting the well screen with appropriate riser length at the desired sampling depth within the augers, the augers were retracted to approximately 2 to 3 ft above the top of the temporary well screen and the formation was allowed to collapse around the well screen and riser.

The temporary well was then developed to remove fine grained materials from the well screen. Development was accomplished by utilizing a surge block/pumping method. Well development enhances the hydraulic connection between the well and the surrounding water bearing unit allowing transmission of representative ground water for sampling.

Following development, and after allowing a short period of time for recharge in the well, the depth to ground water was measured at the well using a water indicator probe. A length of polyethylene tubing was then connected to a peristaltic pump and inserted into the well and pumping was initiated. Approximately three volumes of water from the well casing was removed. Ground water samples were then collected for laboratory analysis. During each sampling event, the MDEQ was on site to collect split samples for separate analysis. Following ground water sample collection at the temporary well, the well materials were then removed from within the augers and decontaminated using high pressure steam cleaning methods.

A second temporary monitoring well was then installed in CUSB-1 to screen a shallower interval in the water bearing zone. Subsequent to steam cleaning the well materials, the augers were retracted to the bottom of the next highest water bearing interval to be sampled (approximately 2 ft above the top of the previous well screen). The formation collapsed in the borehole as the augers were retracted, which minimizes mixing of the ground water intervals. The well screen with appropriate riser length was then set at the specified sampling depth within the augers. The augers were subsequently retracted to approximately 2 to 3 ft above the top of the temporary well screen and the formation was allowed to collapse around the well screen and riser. The second temporary well was then sampled in the same manner as the first temporary well. In order to sufficiently conduct vertical profiling in the shallow water bearing unit, two temporary monitoring wells were needed to augment existing ground water data, following the procedures approved by the MDEQ.

Based on the field observations (discussed in Section 2.3.2) at CUSB-2, a second temporary well was not installed at that boring location.

The ground water samples were submitted to O'Brien and Gere Laboratories, Inc. of Syracuse, New York for analysis of volatile organic compounds by EPA method 8260, semi volatile organic compounds by EPA method 8270, and dissolved lead, arsenic and barium by EPA methods 6000/7000. The ground water sample collected for dissolved lead, arsenic, and barium analysis was field filtered.

Quality assurance/quality control (QA/QC) samples consisting of matrix spike, matrix spike duplicate, blind duplicate, equipment rinsate blank and trip blank samples were collected in accordance with the Quality Assurance Project Plan (QAPP) provided in the November 1994 Windlate Park work plan. Samples selected for laboratory analysis were logged onto the chain-of-custody (COC) form upon labeling. The samples were then placed in an ice-cooled laboratory sample chest and packed for transportation to the laboratory.

Laboratory analyses were performed by O'Brien and Gere Laboratories, and included a Level III data package. The data were independently validated by O'Brien and Gere and summarized in accordance with the MDEQ approved Data Management Plan, a component of the November 1994 Windlate Park RI/FS work plan. The analytical data generated for this sampling event was evaluated based on quality assurance/quality control (QA/QC) criteria established by the United States Environmental Protection Agency (USEPA) and MDEQ.

2.3.2. Field Observations

Based on the installation of soil borings CUSB-1 and CUSB-2, the following field observations were noted:

- Since the confining unit was observed at approximately 30 fbg at CUSB-1, a temporary well was installed with the well screen set at a depth from approximately 25 fbg to 30 fbg. In addition, a clay unit was observed at boring location CUSB-1 from 23 fbg to 24.5 fbg and a second temporary well was installed with the well screen set at a depth from approximately 17 fbg to 22 fbg. Ground water was observed

at approximately 10 fbg in the well during both sampling events. No sheen or odor was observed from the ground water removed from the well during both sampling events.

A third temporary well was not placed higher in the shallow water bearing zone that was observed from 17 fbg to approximately 10 fbg. In accordance with the work plan, temporary well screens were proposed to begin 3 ft below the base of the nearest permanent well screen. The nearest permanent well screen (MW006) is set from approximately 6.7 to 11.7 fbg, and the top of a third well screen would be set less than 3 ft below the base of MW006.

- Since the top of the confining unit was observed at approximately 19 fbg at CUSB-2, a temporary monitoring well was installed with the screen set from approximately 14 fbg to 19 fbg. Ground water was observed at approximately 9 fbg in the well. No sheen or odor was observed from the ground water removed.

A second temporary well was not placed higher in the shallow water bearing zone, as the nearest permanent well screen is set from approximately 10.3 to 15.3 fbg (MW004), and a second well screen would overlap the screened interval of the first temporary well at CUSB-2.

2.3.3. Analytical Results

The validated analytical data without qualifiers or qualified by a "J" designation indicate that concentrations of the substances analyzed are below Generic Residential Health Based Drinking Water Values. These data combined with the previous data confirm that the upper water bearing zone in the Park has not been adversely impacted by the presence of fill material. Validated ground water analytical data, including data validation qualifiers, are summarized on Table 1. Copies of the laboratory reports and COCs are included in Appendix B. A copy of the Data Validation Memorandum for the analytical data is included in Appendix C.

3. Parcels to be Annexed to the Park

3.1. Background

Subsequent to submittal of the RAP to the MDEQ in February 1996, GM acquired three parcels of land adjacent to the Park identified as Parcel A, Parcel B, and Parcel C on Figure 2. After acquiring the parcels, GM proposed to donate the properties to the City of Flint with the intent that the parcels would be annexed to the Park.

As part of the RI activities performed in the Park and adjacent residential properties, several environmental investigations were conducted on Parcel A, Parcel B, and Parcel C. These investigations identified fill material and substances of potential concern (SOPCs) on Parcel A (arsenic, lead, and benzo(a)pyrene) and Parcel B (arsenic and lead). Neither fill material or SOPCs were identified on Parcel C. For purposes of screening, the SOPCs are defined as substances for which the maximum detected concentrations exceed the Generic Residential Direct Contact Value, per Operational Memorandum 8, Revision 4, dated June 5, 1995, or in the case of arsenic, the Site Specific Background Value as established in the RI/FS Report.

Since SOPCs were identified on Parcel A and Parcel B, remedial action was performed to facilitate annexation of the parcels. After performing site clearing activities, which included the demolition of residential structures on Parcel A and on Parcel B, a 2 ft thick soil cover, topsoil and sod layer was installed on the two impacted parcels.

3.2. Objective

The objective of this section is to demonstrate that the remedial action implemented on the two impacted parcels (Parcels A and B) resulted in the attainment of the closure criteria required for a "Limited Residential" closure as referenced in Part 201, PA 451 and that Parcel C needs no remedial action prior to annexing the parcels to the Park. The attainment of these closure criteria are discussed in detail in this section.

Also discussed in this section of the RAP Addendum are the parcel descriptions and history, subsurface investigation data, nature and extent of fill material and SOPCs, remedial action implemented, attainment of closure criteria, deed restrictions implemented, soil cover maintenance plan, and schedule of remedial action implementation.

3.3. Parcel Descriptions and History

The three parcels donated to the City of Flint and subsequently annexed to the Park are located within Section 29 and 30 of Township 7 North, Range 7 East in the City of Flint in Genesee County, Michigan. Parcel A and Parcel B are zoned for two family residential and Parcel C is zoned for single family residential. A Site Location Map which identifies the Park property is included as Figure 1. The three parcels are identified as Parcel A, Parcel B, and Parcel C on Figure 2. Legal descriptions of the three parcels are included in Appendix D.

Parcel A is approximately 0.4 acres in size. The surface topography of this parcel is generally flat. The parcel is covered with sod. A two story wood-framed boarding house (4123 Milton Drive) was formerly located on Parcel A. Review of historical information, including aerial photographs and tax records, indicate that the house was constructed in 1928. A gravel parking lot was formerly located south of the house. The remainder of Parcel A was formerly covered with grass, shrubs, and trees. The boarding house was demolished to grade in July 1996. The basement walls were collapsed to 3 fbg, the basement was filled with sand, and a permeable soil cover and sod were placed over the extent of the parcel. The soil cover was tied into the soil cover that was installed on the Park during the winter of 1995 and spring of 1996.

Parcel B is approximately 1.2 acres. The surface topography of this parcel moderately slopes downward toward the Park. The parcel is covered with sod. A single story wood-framed residential house (428 Shelly Lane) and the end section of Shelly Lane were formerly located on Parcel B. Based on review of historical aerial photographs, a house appeared to have existed in the vicinity of the former 428 Shelly Lane residence in 1925. The 428 Shelly Lane residence was located at the end of that former street. The remainder of Parcel B was formerly covered with grass, shrubs, and trees. Shelly Lane was vacated and the house was demolished to grade in July 1996. The basement walls were collapsed to 3 fbg, the basement was filled with sand, and a permeable soil cover and sod were placed over the extent of the parcel. The soil cover was tied into the existing soil cover previously installed in the Park.

Parcel C is approximately 0.6 acres. The surface topography of this parcel is moderately sloped upward from the former Park boundary to the residential properties southeast of the parcel. The extent of the parcel is covered with grass. Review of historical information, including aerial photographs and tax records, indicate that the property has been vacant dating back to the 1920s, the earliest known aerial photograph available.

3.3. Subsurface Investigation Data

3.3.1. Soil Investigations

Environmental investigations, including surface soil sampling, geoprobe boring installation, soil boring installation, soil vapor sampling, and vertical profile soil sampling, were conducted on nine separate occasions which included one or more of the three parcels. Eight of the nine investigations were conducted from August 1994 to June 1995 as part of the RI activities for the Park. Since the submittal of the Park RAP in February 1996, one surface soil investigation was conducted on Parcel C. The following Table 3-1 summarizes the environmental investigations which included Parcel A, Parcel B, and Parcel C.

Table 3-1. Summary of Soil Investigations

Parcel	Investigation	Date
A	Surface soil (MDEQ split)	August 1994
	Surface soil (MDEQ split)	November 1994
	Geoprobe borings	June 1995
B	Surface soil (MDEQ split)	August 1994
	Soil vapor survey	October 1994
	Surface soil (MDEQ split)	November 1994
	Surface soil	February 1995
	Soil boring	March 1995
	Geoprobe borings	June 1995
	Vertical profile borings	June 1995
C	Surface soil (MDEQ split)	August 1994
	Geoprobe borings	June 1995
	Surface soil	May 1996

The sampling locations for the investigations summarized in Table 3-1 are shown on Figure 2. The analytical data generated from the investigations are summarized in Tables 2 through 9 attached. The data summarized in Tables 2 through 8 were independently validated by O'Brien & Gere (Table 9 consists of soil vapor survey data which was not validated). These data were evaluated based on QA/QC criteria established by the USEPA and MDEQ. A copy of the Data Validation Report for the analytical data in Tables 2 through 7 is included in Appendix C of the RI/FS. A copy of the laboratory report forms and Data Validation Memorandum for the analytical data summarized in Table 8 are included as Appendices E and F, respectively. The results of the investigations identified in Table 3-1 are summarized in the following sections.

3.3.2. Nature and Extent of Fill Material

As part of the remedial action implemented on Parcel A and Parcel B (discussed in Section 3.4), site clearing activities were conducted on Parcel A and Parcel B in July 1996. A 2 ft thick soil cover with topsoil and sod was subsequently installed over the limits of Parcel A and Parcel B during August 1996. The soil cover installed on Parcel A and Parcel B was tied into the soil cover installed on the Park during the fall of 1995 and spring of 1996. As discussed in Section 3.4.1, a soil cover was not installed on Parcel C as part of a remedial action. However, some topsoil and sod was placed on this parcel to maintain proper Park drainage during installation of the soil cover on the Park as shown on Figure 6.

The new surface soil on Parcel A and Parcel B consists of clean silty sand and topsoil that was specified for the soil cover final remedy identified in Section 3 of the RAP. Analytical results of the soil cover and topsoil material indicate that metals are present at naturally occurring levels, below Generic Residential Direct Contact Values. These analytical results are discussed further in Section 3.4.4.

Subsurface fill material was identified on Parcel A from geoprobe borings installed during RI activities in June 1995. Subsurface fill material was identified on Parcel B from soil borings (March 1995), geoprobe borings (June 1995), and vertical profile borings (June 1995) installed during RI activities conducted for the Park. Subsurface fill material was not identified in geoprobe borings (June 1995) installed on Parcel C. Subsurface fill material extends from the Park underneath Parcels A and B to the estimated limits identified on Figure 2. The nature of the fill material consists of concrete, glass, rubber, rebar, cloth, slag material, general trash, wood, and tin cans intermixed with soil. The material was placed in the Park in the late 1940s and early 1950s.

Subsurface fill material on Parcel A was generally observed between 2 fbg to 6 fbg. Subsurface fill material on Parcel B was generally observed at several locations between 2 fbg to 5.5 fbg.

3.3.3. Identification of Substances of Potential Concern (SOPCs)

SOPCs in the soil and fill material were identified from extensive investigations and numerous samples collected on Parcel A and Parcel B. No SOPCs were identified from samples collected on Parcel C.

Based on the comparison of the soil data to the Generic Residential Direct Contact Values as shown in Tables 2 through 8 attached, the following SOPCs were identified for soil:

- Parcel A:
 - benzo(a)pyrene
 - arsenic and lead

- Parcel B:
 - arsenic and lead
- Parcel C:
 - No SOPCs were identified (i.e. all substances are below the Generic Residential Direct Contact Values)

The SOPCs identified above were evaluated with regard to potential migration and exposure pathways at Parcel A and Parcel B. The following paragraphs discuss these pathways in detail.

Leaching of substances to ground water The ground water monitoring well network in the Park is positioned such that ground water impacts on Parcel A and Parcel B, if ground water impacts exist, would likely be detected in down gradient monitoring wells in the Park. Ground water investigations (discussed in Section 2.2 of this RAP Addendum and Sections 5.4 and 6.3 of the RI/FS) demonstrated that although the fill material in the Park area has been in place for 40 to 50 years under shallow water table conditions, no substances were detected in the ground water at concentrations exceeding Generic Residential Health Based Drinking Water Criteria. Based on these investigations, it is evident that SOPCs in the material underlying the soil cover on the Park, Parcel A and Parcel B have not leached to ground water and therefore it is unlikely they will leach to ground water in significant concentrations in the future. Therefore, this migration pathway is not a concern for Parcel A and Parcel B.

Migration of substances to surface water Since surface water does not exist on or adjacent to Parcel A or Parcel B, the potential for migration to surface water does not exist. The presence of the soil cover on Parcel A and Parcel B prevents the potential for SOPCs to enter stormwater catch basins in the vicinity of these parcels.

Inhalation of substances Based on the low vapor pressure and high organic carbon partitioning coefficient (K_{oc}) and concentrations detected of the SOPCs identified in the soil on Parcel A and Parcel B, these substances are likely to be adsorbed to the soil particles and not likely to be in the vapor

phase. Therefore, these substances are not likely to be emitted to the atmosphere. In addition, the presence of the soil cover prevents the inhalation of particulates that may have SOPCs adsorbed onto them. The inhalation exposure pathway does not exist for SOPCs on Parcel A and Parcel B.

Ingestion and direct contact SOPCs are present in the soil and fill material on Parcel A and Parcel B, the presence of the soil cover eliminates the potential for ingestion and direct contact, thereby eliminating this exposure pathway.

3.3.4. Ground Water Investigations

Ground water monitoring wells were not installed on Parcel A, Parcel B, or Parcel C. However, as part of the RI activities conducted in the Park, nine ground water monitoring wells (MW001 through MW009) were installed to assess ground water quality and estimate flow conditions in the Park. As discussed in Section 5.9 of the RI/FS, the ground water in the southern area of the Park flows in an easterly direction and ground water in the central area and northern area of the Park flows northward toward a low lying area between MW001 and MW002 as shown on the ground water flow map included as Figure 4. The ground water monitoring well network in the Park is positioned such that ground water impacts on Parcel A, Parcel B, and Parcel C, if ground water impacts exist, would likely be detected in down gradient monitoring wells in the Park.

Ground water sample analytical results from two rounds of sampling from the monitoring wells did not indicate levels of substances above Generic Residential Health Based Drinking Water Values. The ground water results indicate that substances identified in subsurface soil and fill material have not adversely impacted ground water. This is consistent with testing on the fill areas within the Park in that ground water has not been adversely affected. Therefore, the substances in the subsurface soil and fill materials do not present a significant concern for leaching into the ground water.

3.4. Remedial Action

3.4.1. Remedial Action Objective

SOPCs were identified on Parcel A and Parcel B. SOPCs were not identified on Parcel C. Since SOPCs were identified on Parcel A and Parcel B, remedial action was conducted to achieve the requirements of Part 201, Act 451 for a "Limited Residential" closure prior to annexing these parcels to the Park. Since no SOPCs were identified on Parcel C, remedial action was not conducted on this parcel (Parcel C is not a "facility" as defined by Part 201, PA 451 and therefore response actions are not necessary).

In preparation for annexation to the Park, remedial measures were conducted on Parcel A and Parcel B to achieve the following remedial action objectives:

- Prevent exposure to impacted media by recreational users of the Park; and
- Prevent migration of impacted media off-site.

The remedial action in the Park, which achieved the objectives above, included the installation of a soil cover with topsoil and sod, the implementation of deed restrictions, and the performance of routine maintenance activities on the soil cover. The remedial action implemented in the Park achieves the "Limited Residential" criteria with deed restrictions for recreational use, in accordance with Part 201, PA 451. This section demonstrates how the extension of the soil cover from the Park to Parcel A and Parcel B would also be protective to recreational users and prevent potential migration of impacted media off-site, and thus achieves the same categorical criteria as the Park; "Limited Residential" closure with deed restrictions limiting the property to recreational use. Also discussed in this section are the zoning requirements, future use, soil cover construction, proposed deed restrictions, the maintenance plan, and the schedule of implementation specific to Parcel A and Parcel B. The proposed annexation of Parcel C, which does not require remediation, will be discussed as appropriate to maintain continuity throughout the Park.

3.4.2. Property Zoning

In accordance with Section 20120(a)(6) of Part 201, PA 451, a property for which a remedial action plan is proposed must have zoning that is consistent with the proposed categorical criteria. A "Limited Residential" closure with deed restrictions limiting the property to recreational use is proposed for Parcel A and Parcel B. Although Parcel C is not a facility (as defined by Part 201, PA 451) and thus does not require response activities, deed restrictions will be similar to the Park. Parcel A and Parcel B are zoned for two family residential and Parcel C is zoned for single family residential. Therefore, the limited residential (with recreational deed restrictions) closure proposed for Parcel A and Parcel B is consistent with the City of Flint's zoning designation. Deed restrictions will be implemented for the three parcels as outlined in Section 3.4.6. for the continued use of the property as a "Park".

3.4.3. Future Use

The intended future use of Parcel A, Parcel B, and Parcel C is recreational, which is consistent with the intended future use of the Park. The City of Flint is currently preparing plans for the enhancement of the Park and annexed parcels. Park enhancements considered include the installation of walking paths, basketball courts, picnic areas, child play areas, and trees/shrubs. One or more of these enhancements may be installed on portions of these three annexed parcels.

3.4.4. Soil Cover Construction and Analytical Data

Preparation of Parcel A and Parcel B for the soil cover installation included the demolition of the boarding house at 4123 Milton Drive and the residence at 428 Shelly Lane, abandonment of underground and aboveground utilities, and clearing and grubbing the areas. A minimum of 18 inches of soil cover and 6 inches of topsoil (minimum 24 inches total) was placed over the extent of the two parcels. Sod was then placed over the topsoil. The soil cover on each parcel was tied into the existing soil cover installed on the Park during the winter of 1995 and spring of 1996. Figure 6 identifies the approximate design thickness of the soil cover on Parcel A and Parcel B.

Samples of the soil cover material and the topsoil used in the construction of the cover were submitted to a laboratory for analysis. The soil cover material used on Parcel A and Parcel B was obtained from the same off-site borrow area that was used for the soil cover installed in the Park. Prior to the construction of the soil cover in the Park, one sample of the soil cover material was analyzed for the waste characterization parameters specified in 40 CFR 261.20 through 261.24 and total Michigan "10" metals, since metals are naturally occurring. The off-site borrow area for the topsoil was different than that used for the soil cover in the Park. One sample of the topsoil was analyzed for the parameters identified above. The laboratory analyses of the soil cover and topsoil materials confirmed that these media were not impacted. The laboratory analytical data forms for the samples of the soil cover material and the topsoil are included as Appendix G.

3.4.5. Attainment of Closure Criteria

Based on the investigations described in Section 2.2 of this report, SOPCs were detected in the material underlying the soil cover on Parcel A and Parcel B. Ground water investigations conducted in the Park area demonstrated that the fill material has not adversely impacted the ground water. No SOPCs were detected in the ground water at concentrations exceeding the Generic Residential Health Based Drinking Water Criteria.

In accordance with Part 201, PA 451, to obtain closure of a site the SOPCs remaining in the soil must be protective considering migration and exposure pathways pertinent to the site. In general, the potential migration and exposure pathways include: leaching of substances from soil to ground water, migration of substances in soil to surface water, inhalation of substances, direct contact with substances and ingestion of substances.

Based on the analysis of these migration and exposure pathways discussed in detail in Section 3.3 of this report, the closure criteria are achieved with the presence of the soil cover on Parcel A and Parcel B. Additionally, the implementation of deed restrictions on the parcels and the performance of maintenance on the soil covers are incorporated. These measures prevent uncontrolled excavation activities and provide for reparation of potential damages to the soil cover.

3.4.6. Deed Restrictions

Land use restrictions will be implemented for Parcel A, Parcel B, and Parcel C consistent with those for the Park. In accordance with Rule 299.5719, the land use restrictions will be detailed in a restrictive covenant recorded by the City of Flint and approved by MDEQ that will include:

- Restrictions on site activities which may potentially affect the integrity of the soil cover or interfere with maintenance activities;
- A requirement to provide notice to the MDEQ of the intent to convey property, such as; conveyance of title, easement or other;
- Permission for the MDEQ to access the Park and to inspect records;
- Descriptions of applicable land use or resource criteria use restrictions, including:
 - the prohibition of uncontrolled excavation or other activities which may potentially damage the soil cover; and
 - the notification of the MDEQ prior to performing sampling and analysis of impacted materials in the event transportation and/or disposal is performed.
- Notice that the property will be restricted to recreational use.

The deed restrictions will be implemented indefinitely. Modifications to the deed restrictions will be submitted to the MDEQ for approval.

The agreement between GM and the City of Flint and the agreement between GM, the City of Flint, and the Genesee County Drain Commission as discussed in Section 4.2 of the RAP will remain in effect as modified to accommodate the three parcels to be annexed.

3.4.7. Maintenance Plan

The maintenance activities outlined in Section 5 of the RAP will be implemented for Parcel A, Parcel B, and Parcel C. In summary, these maintenance activities will be performed by the City of Flint and include inspections of the soil cover on Parcel A and Parcel B, and regular mowing, hedging, and fertilizing on Parcel A, Parcel B, and Parcel C.

3.4.8. Schedule of Implementation

The remedial action for Parcel A and Parcel B is currently underway with the installation of the soil cover. The soil cover construction and placement of sod will be completed in August 1996.

At the completion of the soil cover installation in August 1996, the following inspection schedule for the Park, including Parcels A, B, and C, will be implemented by the City of Flint:

Table 3-2. Inspection Schedule

1996	1997	1998	> 1999
November 1	May 1	May 1	May 1
	November 1	November 1	

Inspection after the year 1999 will be performed on an annual level, or more frequently if conditions indicate a more frequent rate is necessary. Routine landscape care will be performed regularly during the spring, summer, and fall months.

3.4.9. Summary of Remedial Action

SOPCs were identified on Parcel A and Parcel B. SOPCs were not identified on Parcel C. In preparation for the annexation of Parcel A and Parcel B to the Park, remedial action was performed to attain the closure criteria necessary for a "Limited Residential" closure with recreational deed restrictions, the same categorical closure approved by the MDEQ for the Park. The MDEQ-approved remedial action implemented for the Park was also implemented for Parcel A and Parcel B. Evaluation of the potential migration and exposure

pathways pertinent to Parcel A and Parcel B indicate that the closure criteria have been achieved with the installation of the soil cover and implementation of deed restrictions and maintenance on these parcels.

Based on the evaluation of the potential migration and exposure pathways and attainment of closure criteria necessary for a "Limited Residential" closure, the remedial action objectives identified in Section 3.4.1 have been achieved with the remedial action implemented for Parcel A and Parcel B.