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Feasibility Study Report - Soil

Former Plainwell, Inc. Mill Property
Plainwell, Michigan

Prepared for: Weyerhaeuser NR Company

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Executive Summary

This document presents the Feasibility Study (FS) Report – Soil for the former Plainwell, Inc. Mill property located at 200 Allegan Street in Plainwell, Michigan (Site). The FS Report was prepared pursuant to the Statement of Work (SOW) for the Remedial Investigation (RI)/FS, and the terms of the Consent Decree for the Design and Implementation of Certain Response Actions at Operable Unit #4 and the Plainwell, Inc. Mill Property of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Consent Decree), which became effective February 22, 2005. The RI Report was submitted to the United States Environmental Protection Agency (U.S. EPA) on June 20, 2011, with revisions submitted on April 20, 2012 (Revision 1), July 10, 2012 (Revision 1), October 19, 2012 (Revision 2), and February 4, 2013 (Revision 2), based on comments received from and discussions with representatives of the U.S. EPA and the Michigan Department of Environmental Quality (MDEQ). The RI Report was approved by U.S. EPA on February 26, 2013.

The FS Report is briefly summarized below under the following four headings:

1. Remedial Action Objectives (RAOs).
2. Technologies Screening.
3. Alternatives Array.
4. Detailed Analysis of Remedial Alternatives.

Remedial Action Objectives

The RAOs provide the basis for developing remedial options for the site that will be protective of human health and the environment. The RAOs are based on the information gathered during the RI, U.S. EPA guidance, applicable or relevant and appropriate requirements (ARARs), and the conclusions of the Baseline Human Health Risk Assessment (HHRA) and Screening-Level Ecological Risk Assessment (SLERA) including exposure pathways to be addressed and preliminary remediation goals (PRGs). RAOs were developed for soil, groundwater, and ecological receptors.

Based on discussions with the U.S. EPA, the FS Report has been modified to address only soil and soil alternatives. Groundwater will be further evaluated through the submittal and implementation of an Interim Groundwater Work Plan, upon approval of U.S. EPA. Therefore, while RAOs have been developed and presented for groundwater in the FS Report, groundwater will be addressed subsequent to implementation of soil remedial action in a FS Addendum, if determined to be necessary based on the results of the additional groundwater evaluation, as it relates to achieving the presented RAOs.

Technologies Screening

The technologies screening developed general response actions for soil and ecological resources consistent with the RAOs. Areas and/or volumes of contaminated media were estimated, as applicable. Remedial technology types and process options were identified for each applicable general response action for each of the media of interest. The process options that were identified to be technically implementable were evaluated in greater detail to select one or a small number of process options to represent each remedial technology type. Each process option (alternative) was evaluated based on effectiveness, implementability, and cost.

Alternatives Array

The retained remedial technology types and process options were assembled into Site-wide comprehensive remedial alternatives by media.

The following remedial alternatives have been developed for soil:

- Soil Remedial Alternative 1 – No Action
- Soil Remedial Alternative 2 – Excavation, Consolidation, Capping, and Off-Site Disposal
  - Soil Remedial Alternative 2A to Meet Part 201 Generic Residential Cleanup Criteria and the Toxic Substances Control Act (TSCA) Cleanup Level for Bulk Polychlorinated Biphenyl (PCB) Remediation Waste in High Occupancy Areas (without further restrictions)
  - Soil Remedial Alternative 2B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 2C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 2D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

- Soil Remedial Alternative 3 – Excavation and Off-Site Disposal
  - Soil Remedial Alternative 3A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)
  - Soil Remedial Alternative 3B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 3C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 3D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

The remedial alternatives were screened against the short- and long-term aspects of effectiveness, implementability, and cost. Soil Remedial Alternatives 1, 2B, 2C, 3A, 3B, 3C, and 3D were retained for detailed analysis. Alternatives 2A and 2D were not retained because these alternatives are based on a Site-wide (i.e., in both anticipated residential and commercial/non-residential areas) cleanup to meet Part 201 Generic Residential Cleanup Criteria or the lower State Default Background Levels (SDBL) for metals (i.e., contaminants eligible for consolidation and capping). The Site-wide Preliminary Remediation Goals (PRGs) under Soil Remedial Alternatives 2A and 2D cannot be achieved if an on-Site consolidation and capping component is included, as the premise of the consolidation and capping component is the approved movement of soil impacted above the residential/SDBL PRGs and below the non-residential/commercial PRGs on a designated non-residential/commercial land use portion of the Site. For the purposes of Soil Remedial Alternatives 2A and 2D, the entirety of the Site is assumed to be residential land use there is no area designated for non-residential/commercial use for the consolidation and capping to occur where the final concentrations would not exceed the cleanup levels.

Detailed Analysis of Remedial Alternatives

The detailed analysis of remedial alternatives consists of an assessment of the individual alternatives against each of nine evaluation criteria, and a comparative analysis that focuses on the relative performance of each alternative against those criteria.

With the exception of Soil Remedial Alternative 1 (No Action), the retained alternatives address RAOs for identified exposure pathways in the same manner, but with varying degrees of effectiveness. All of the alternatives, except Soil Remedial Alternative 1 (No Action) achieve protection at the completion of construction. Alternatives 2B, 2C, 3B, 3C and 3D include implementation of engineering and/or institutional controls in conjunction with excavation and/or consolidation/capping activities.

The principal distinction between the Soil Remedial Alternative 2-Series options, and the Soil Remedial Alternative 3-Series options is the on Site consolidation and capping of inorganics-impacted materials, as opposed to off-Site disposal of all impacted material. The principal distinction between the sub-series alternatives within the Soil Remedial Alternative 2 and 3-Series is the level to which soil remediation occurs (i.e., 10^{-5}, 10^{-6}, etc.).

Based on the detailed and comparative analysis of the remedial alternatives, Soil Remedial Alternative 3B meets the remediation goals based on comparison criteria evaluated and is the most cost effective remedial alternative.

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List of Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
AST	Aboveground Storage Tank
BCOC	Bioaccumulative Chemical of Concern
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Chemical/Contaminant of Concern
Consent Decree	Consent Decree for the Design and Implementation of Certain Response Actions at Operable Unit #4 and the Plainwell, Inc. Mill Property of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
COPEC	Constituent of Potential Ecological Concern
CRA	Conestoga-Rovers & Associates
C_{sat}	Soil Saturation Concentration Screening Levels
CSM	Conceptual Site Model
CWA	Clean Water Act
cy	Cubic Yards
DCC	Direct Contact Criteria
DOT	Department of Transportation
DRO	Diesel Range Organics
DWC	Drinking Water Criteria
DWPC	Drinking Water Protection Criteria
ECO-SSL	Ecological Soil Screening Level
EPC	Exposure Point Concentration
ERA	Environmental Risk Assessment
ERM	Environmental Resources Management
ESV	Ecological Screening Value
FEMA	Federal Emergency Management Agency
FESLs	Flammability and Explosivity Screening Levels
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act of 1972
FS	Feasibility Study
ft bgs	feet below ground surface
GRA	General Response Action
GRCC	Part 201 Generic Residential Cleanup Criteria
GSIC	Groundwater Surface Water Interface Criteria
GSIPC	Groundwater Surface Water Interface Protection Criteria
GVIAC	Groundwater Volatilization to Indoor Air Inhalation Criteria
HHRA	Baseline Human Health Risk Assessment
HI	Hazard Index
HMW	High Molecular Weight

IC	Institutional Control
LARA	Licensing and Regulatory Affairs
LMW	Low Molecular Weight
LOAEL	Lowest Observed Adverse Effect Level
LOD	Limit of Detection
MCL	Maximum Contaminant Limit or Michigan Compiled Laws
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOAEL	No Observed Adverse Effect Level
NOM	Notice of Migration
NPDES	National Pollutant Discharge Elimination System
NPV	Net Present Value
NWI	National Wetlands Inventory
OM&M	Operations, Maintenance, and Monitoring
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbon
Part 201	Part 201, Environmental Remediation, 1994 PA 451 as amended
PCB	Polychlorinated Biphenyl
PDI	Pre-Design Investigation
POTW	Publicly Owned Treatment Works
PPM	parts per million
PRG	Preliminary Remediation Goal
PSIC	Particulate Soil Inhalation Criteria
RAO	Remedial Action Objective
RBC	Risk-Based Criteria
RBPRG	Risk-based Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
RMT	RMT, Inc.
SDBL	State Default Background Level
SDWA	Safe Drinking Water Act
Site	Former Plainwell, Inc. Mill Property
SLERA	Screening Level Ecological Risk Assessment
SOW	Statement of Work
SPLP	Synthetic Precipitation Leaching Procedure
SQ	Screening Quotient

SVIAC	Soil Volatilization to Indoor Air Inhalation Criteria
SVOC	Semi-Volatile Organic Compound
TBC	to be considered
TCRA	Time Critical Removal Action
TMV	Toxicity, mobility, or volume
TPH	Total Petroleum Hydrocarbons
TRV	Toxicity Reference Value
TSCA	Toxic Substances Control Act
UCL	Upper Confidence Limit
U.S.	United States
USC	United States Code
U.S. EPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VAS	Vertical Aquifer Sampling
VOC	Volatile Organic Compound
VSIC	Volatile Soil Inhalation Criteria
Weyerhaeuser	Weyerhaeuser NR Company
WWTP	Wastewater Treatment Plant

Section 1.0 Introduction

This Feasibility Study (FS) Report – Soil has been prepared by Conestoga-Rovers & Associates (CRA), on behalf of Weyerhaeuser NR Company (Weyerhaeuser), for submittal to the United States Environmental Protection Agency (U.S. EPA) Region 5 for the former Plainwell, Inc. Mill property located at 200 Allegan Street in Plainwell, Michigan (Site). The FS Report was prepared pursuant to the Statement of Work (SOW) for the Remedial Investigation (RI)/FS, and the terms of the Consent Decree for the Design and Implementation of Certain Response Actions at Operable Unit #4 and the Plainwell, Inc. Mill Property of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Consent Decree), which became effective February 22, 2005. The Site location is presented on Figure 1.1. The Site layout is presented on Figure 1.2.

As approved by the U.S. EPA on August 6, 2008, the RI was implemented in a phased approach. As a result, the RI was completed under a multi-volume work plan for the Site. To facilitate the evaluation of the Site related information as part of the development and implementation of the RI, the Site was divided into three areas based on their locations and noted historical environmental impacts. The three historical operational areas are as follows and are presented on Figure 1.3:

- Area 1 – Former wastewater sludge dewatering lagoons and aeration basin area
- Area 2 – Mill Buildings area
- Area 3 – North central portion area

The results of the investigations conducted on the aforementioned areas were evaluated relative to the anticipated future use scenarios based on the current redevelopment plan, which consists of 11 primary redevelopment areas. The 11 redevelopment areas are as follows and are presented on Figure 1.4:

- Residential Area 1
- Residential Area 2
- Residential Area 3
- Residential Area 4
- Waterfront Plaza
- Mixed Residential/Commercial Area 1
- Mixed Residential/Commercial Area 2
- Commercial Area 1

- Commercial Area 2
- Commercial Area 3
- Commercial Area 4

As defined in the Consent Decree, *"Mill Operation and Maintenance shall not include any operation and maintenance of any portion of the Mill Property, if any, located between the top of the banks of the Kalamazoo River and the middle of the Kalamazoo River stream bed. Any operation and maintenance of such river banks and adjacent stream bed sediments will be addressed as part of the remedial action to be developed by EPA for the Kalamazoo River Operable Unit"* (United States District Court Western District of Michigan Southern Division, 2005). Therefore, the Site includes areas up to the top of the Kalamazoo River bank. As identified above, Figure 1.4 presents the 11 redevelopment areas of the Site. The redevelopment areas bordering the Kalamazoo River and the Mill Race are defined to include the areas to the top of the bank along these waterways for the purposes of the FS Report and are depicted as such on Figure 1.4. Areas associated with the Kalamazoo River (i.e., beyond the top of the riverbank and Mill Race) are not included in the scope of the RI/FS and are being addressed as part of the river remedial activities.

The RI Report was submitted to the U.S. EPA on June 20, 2011, with revisions submitted on April 20, 2012 (Revision 1), July 10, 2012 (Revision 1), October 19, 2012 (Revision 2), and February 4, 2013 (Revision 2), based on comments received from and discussions with representatives of the U.S. EPA and the Michigan Department of Environmental Quality (MDEQ). The RI Report was approved by U.S. EPA on February 26, 2013.

The FS Report was submitted to the U.S. EPA on June 27, 2013. On November 1, 2013 Weyerhaeuser received comments on the June 27, 2013 FS Report. Subsequently, representatives from the U.S. EPA, MDEQ, TetraTech, Weyerhaeuser, and CRA participated in a conference call on November 13, 2013 related to the November 1, 2013 comments.

On December 20, 2013, Weyerhaeuser submitted a revised FS Report (Revision 1) in response to U.S. EPA comments on the FS Report, dated June 27, 2013 and U.S. EPA's November 1, 2013 comments.

On April 11, 2014 Weyerhaeuser received comments on the December 20, 2013 FS Report. Subsequently, representatives from the U.S. EPA, MDEQ, TetraTech, Weyerhaeuser, and CRA participated in a conference call on May 14, 2014. On May 22, 2014, Weyerhaeuser requested clarification on U.S. EPA's Response to EPA Comment No. 6 entitled "Response to EPA Specific Comment 10". In addition, Weyerhaeuser requested an extension of the due date for the

revised FS to 30 days from receipt of the clarification requested. The extension request was granted by U.S. EPA on June 6, 2014. A response to Weyerhaeuser's request for clarification was provided by U.S. EPA on July 8, 2014.

Based on discussions with the U.S. EPA, the FS Report has been modified to address only soil and soil alternatives. Groundwater will be further evaluated through the submittal and implementation of an Interim Groundwater Work Plan, upon approval of U.S. EPA. Therefore, while Remedial Action Objectives (RAOs) have been developed and presented for groundwater in the FS Report, groundwater will be addressed subsequent to implementation of soil remedial action in a FS Addendum, if determined to be necessary based on the results of the additional groundwater evaluation, as it relates to achieving the presented RAOs.

On August 7, 2014, Weyerhaeuser submitted a revised FS Report (Revision 2) in response to U.S. EPA comments on the FS Report, dated April 11, 2014.

On October 14, 2014 Weyerhaeuser received comments on the August 7, 2014 FS Report (Revision 2). Responses to the October 14, 2014 comments are addressed under separate cover and incorporated herein, as applicable.

1.1 Purpose of Report and Report Organization

The overall objective of the RI/FS was to identify and investigate any environmental concerns regarding prior use of the Site. As provided in the SOW, the objectives of the RI/FS for the Site are as follows:

- **To determine the nature and extent of the contamination to assess risk and support development and evaluation of remedial alternatives** – Collect the data necessary to adequately characterize the nature and extent of contamination at the Site, consistent with the requirements of the National Oil and Hazardous Substance Pollution Contingency Plan (March 8, 1990)(NCP) and the Consent Decree.
- **To evaluate potential risk** – Assess any current and potential risks to human health or the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants at or from the Site.
- **To develop and evaluate remedial alternatives** – Develop and evaluate alternatives, consistent with reasonably anticipated future land use(s) at the Site, for remedial action to prevent, mitigate, control, or eliminate risks posed by any release or threatened release of historical contaminants present at or from the Site.

The purpose of the FS Report is to analyze and present the relevant information needed to allow decision makers to select a site remedy that will protect human health and the environment. The FS Report has been prepared consistent with the anticipated future use scenarios based on the current redevelopment plan. In the event that the Site redevelopment plan is modified, the remedial alternatives may need to be reviewed, and potentially re-issued, to ensure that the assumptions and scenarios evaluated are consistent with the proposed future use of the Site. In correspondence dated January 14, 2013, Weyerhaeuser submitted a revised RI/FS Schedule to U.S. EPA for the tasks remaining pursuant to the SOW. The revised RI/FS scheduled included the incorporation of Task 5: Identification of Remedial Action Objectives and Task 6: Development and Screening of Remedial Alternatives of the SOW into Task 7: Feasibility Study, consistent with the provisions of the SOW. U.S. EPA approved the consolidation of the remaining tasks and schedule on May 16, 2013.

The FS Report is organized as follows:

- Section 1.0 provides an introduction, including purpose and objectives, report organization, site background, and the nature and extent of contamination.
- Section 2.0 identifies the RAOs that, when met, will result in control of potential risks to public health and the environment posed by contamination identified at the site. The RAOs specify the contaminants and media of interest, completed exposure pathways, and preliminary remediation goals (PRGs). The RAOs are based on existing data and information contained in the approved RI Report. Section 2.0 includes a discussion of contaminant sources, affected media, exposure pathways to be addressed, applicable or relevant and appropriate requirements (ARARs), and risk-based preliminary remediation goals (RBPRGs).
- Section 3.0 provides the technologies screening, including general response actions, areas and volumes of contaminated media, identification and technical implementability screening of remedial technology types and process options, and evaluation of process options.
- Section 4.0 provides the alternatives array, including assembly of retained technologies and process options into remedial alternatives, and screening of remedial alternatives based on effectiveness, implementability, and cost.
- Section 5.0 provides the detailed and comparative analysis of alternatives.
- Section 6.0 provides references.

1.2 Mill Description and Background

The background information for the Site provided below is summarized from the approved RI report (CRA, 2013a).

1.2.1 Mill Location and Physical Setting

The Site is located in the southeast ¼ of the northeast ¼ of Section 30, Town 1 North, Range 11 West, in the City of Plainwell, Allegan County, Michigan. The Site address is 200 Allegan Street in Plainwell, Michigan and is currently zoned as Central Business District.

The Site comprises approximately 35.6 acres of land and consists of the former Plainwell, Inc. Mill property and buildings. Current Site features include the former Mill Buildings (Buildings 1, 1A, 2, 3, 4, 4A, 5, 5A, 5B, 6, 6A, 7, 9, 10, 11, 11A, 12, 14/5E, 15, 16, 17, 18 [remodeled] 19, 20, 26, 27, and the Train Shed), the former Specialty Minerals, Inc. Building (only the concrete pad of the former building remains), former Sludge Dewatering Building (remodeled), concrete pads, one 50,000-gallon water tower (one 50,000-gallon water tower was removed in 2012), ancillary support buildings (pump houses, former guard shacks, etc.), wooded areas, and asphalt-paved areas. The Site buildings and structures are presented on Figure 1.2. As part of the on-going property redevelopment activities, portions of the former Mill Buildings were razed between March and December 2013, and underwent renovation for occupancy by the City of Plainwell in June 2014. The former Sludge Dewatering Building was renovated for use by the City of Plainwell Public Safety Department, with occupancy in late 2012.

The former Mill is located on the eastern portion of the Site, adjacent to the Mill Race. The former Mill was comprised of approximately 25 adjacent and conjoined buildings, primarily constructed between 1900 and 1995. The former Specialty Minerals, Inc. Building previously occupied the south central portion of the Site, the former Sludge Dewatering Building (currently the City of Plainwell Public Safety Building) is located to the west/northwest of the former Specialty Minerals, Inc. Building, with the previous Quality Products Building formerly located adjacent to the west of the former Sludge Dewatering Building. The wastewater treatment plant (WWTP) buildings, clarifiers, and former aeration basin were located on the northwestern portion of the Site. The western portion of the Site along the riverbank was historically occupied by the former wastewater settling lagoons. The majority of the lagoons were dredged and backfilled with soil. The remaining residuals from various settling lagoons were consolidated into the four westerly lagoons, which are presently covered with soil and vegetation. The former lagoons were filled to approximately the adjacent grade. A vacant wooded lot is present on the southwestern portion of the Site. A significant portion of the Site is covered with buildings, concrete slabs or asphalt pavement; however, there are areas, primarily along the riverbank, where vegetation is present.

The Site is located in a mixed industrial, commercial, and residential area in the City of Plainwell, Allegan County, Michigan. According to the City of Plainwell 2002 Land Use Plan, existing land use in 2000 consisted of 40 percent Residential, 25 percent Vacant Land, 10 percent Industrial, 10 percent Institutional, 7 percent Commercial/Mixed Use, 6 percent

Railroad Right-of-Way, and 2 percent Open Space/Recreational. The Site is bordered by the following properties:

North: by the Kalamazoo River (to the top of the bank as defined in the Consent Decree) and beyond by residential and commercial properties

East: by the Mill Race (to the top of the bank as defined in the Consent Decree) and beyond by commercial properties and Main Street North

South: by Allegan Street and beyond by residential and commercial properties

West: by residential properties and the City of Plainwell Water Renewal Plant, and beyond by US-131

1.2.2 Present and Past Facility Operations and Disposal Practices

1.2.2.1 Historical Mill Operations

The Site was originally developed in 1896 as part of the Michigan Paper Company. Current buildings on the property were constructed between 1906 and 1995. Historically, each building addition to and around the main complex (Mill Buildings) was assigned a number. The Mill Buildings portion of the Site consists of Commercial Area 4, and portions of Commercial Area 3, Residential Area 4 and Mixed Residential/Commercial Area 2.

The portions of the Site west of the Mill were acquired by various historical Site owners between 1950 and the mid-1980s for the purpose of expanding Mill operations and supporting associated WWTP and manufacturing processes. Throughout the 1900s, the Site underwent numerous improvements including the construction and removal of various buildings within Mill Buildings Area, and construction of WWTP buildings and lagoons and clarifiers (Residential Areas 1 through 4, Waterfront Plaza and Mixed Residential/Commercial Area 2), the former Specialty Minerals, Inc. Building (Mixed Residential/Commercial Area 1), the former Sludge Dewatering Building and the former Quality Products Building (Commercial Area 2). Residential structures occupied portions of the western area of the Site prior to their development for uses associated with Mill operations. The southwestern portion of the Site (Commercial Area 1) has always reportedly been vacant land or utilized for agricultural purposes.

Below is a list of the major structures currently or historically present at the Site. The list below is divided into three categories – historical, non-historical – planned for demolition and non-historical - demolished. The buildings that have been designated as historical will remain in place during redevelopment activities and the non-historical buildings will be or have been demolished during redevelopment activity. A brief description of the historical use(s) within the paper making process for each building and the initial date of construction/known date of remodeling (in parenthesis), is included.

Existing Buildings as of November 13, 2014

Historical (Structures to Remain)

- Building 1 – West Stockhouse (1910)
- Building 2 – Cooker room/paper stock storage (1910)
- Building 3 – Paper stock storage/beater room (1910)
- Building 10 – Manufacturing Area – Machine 2 (1906)
- Building 11 – Maintenance, instrument room, and beater room (1906)
- Building 11A – Maintenance, metal shop (1940)
- Building 12 – Finishing room, sheeting and carton packing operations, engineering offices on 2nd Floor (1940)
- Building 29 – Lab to test stock (1940s)
- Building 15 – Supercalendar room (1940), new floor 1990
- Building 16 – Trimmer and carton storage/finishing room (1906)
- Buildings 17 – East Stockhouse (1906), administration/main office (1975); remodeled as CRA offices (2012)
- Building 18 – Main entrance (1906)
- Building 19 – Storeroom/crib (1906), remodeled as research and development lab, 2nd floor (1975); remodeled as Plainwell City Hall (2014)
- Building 20 – Wheel house (1906)
- Sludge Dewatering Building (1981); remodeled as Public Safety Building (2012)
- Buildings 26 and 27 – Measured room/motor control and access to Machine (1906)

Non-Historical (Planned for Demolition)

- Building 1A – Pulp facility/hydro-pulper (1995)
- Building 4 – Boiler room (1989 – new construction)
- Building 4A – Electrical /turbine Room, Save-all (1940s)
- Building 5 – Boilerhouse (1906 – 1930s)
- Building 5A - Coal hopper (circa 1928)
- Building 5B – Computer controls for calendar #7/turbine room (1979)
- Building 6 – Boilerhouse (connected to Building 5)

- Building 6A – Courtyard area (1930), pumps for boiler water (1979)
- Building 7 – Coating preparation (1915)
- Building 9 – Manufacturing area/Machines 3 & 4 (1910); new roof (1980)
- Building 14 /Building 5E – Raw stock/Bleach Tower (pre-1965)
- Train Shed – (1988)

Demolished Buildings/Structures (as of November 13, 2014)

- Building 3A – Paper stock storage/chest (1979); demolished (2012)
- Building 9A –Warehouse/coater and super calendar (1964); demolished (2012)
- Building 9B – Rewinder/machine supply storage (1964); demolished (2012)
- Building 9C – Coating preparation (1964); demolished (2012)
- Building 9D – Coating preparation/roll wrap building (1964); demolished (2012)
- Building 9E –Finished goods warehouse (1978); demolished (2012)
- Building 9F – Lathe room (1978); demolished (2012)
- Building 23– Roll storage basement and 1st floor, offices 2nd floor (1953); demolished (2012)
- Building 25 – Wet well building (1989); demolished (2013)
- Building 28 – Stock tank (1960)
- Quality Products Building (between 1967 and 1974); demolished (2011)
- Sludge Dewatering Tank (1981); demolished (2011)
- Specialty Minerals Building (1991); demolished (2011)
- Fuel Oil # 6 AST (1967 to 1974); demolished (2012)
- Wastewater Treatment Plant (1967); demolished (2013)

The historical information reviewed indicates that various activities took place at the Site during its operation as a paper mill, including the manufacturing of paper products and recycling of paper materials (which included the process of deinking), on-Site parking, paper sludge dewatering, wastewater treatment, waste storage, raw materials storage, storage of coal, storage of fuel and hydraulic oils, and general manufacturing-related activities. Available historical information indicates that the Mill produced "coated and uncoated book and cover release base and technical specialty paper products." Precipitated calcium carbonate slurry used in the paper making process was developed for the Site and other surrounding paper mills in the former Specialty Minerals, Inc. Building (Mixed Residential and Commercial Area 1).

Process wastewater was treated in the on-Site WWTP and paper waste from Mill operations was treated in the former Sludge Dewatering Building (Commercial Area 2). These operations were located in the central portion of the Site. The former Quality Products Building, and a recreational vehicle and camping supply retail store also operated in the central portion of the Site (Commercial Area 2) west of the former Sludge Dewatering Building.

Production operations ceased on Site in November 2000.

1.2.2.2 Historical Ownership and Operations

Within the Mill Buildings Area, papermaking operations began as early as 1884 and continued until Site closure in 2000. During this time period, ownership of the Site was passed between various entities, including Weyerhaeuser who owned and operated the Site for approximately 9 years (1961 to 1970). The last operating owner, Plainwell, Inc., filed for bankruptcy in 2000 and the City of Plainwell subsequently purchased the property on August 31, 2006 with the objective of redeveloping the Site. A summary of previous owners is provided below.

Dates (approximate)	Property Ownership
(at least) 1884	Lyon Paper Mill
1891 to 1956	Michigan Paper Company
1956 to 1961	Hamilton Paper Company
1961 to 1970	Weyerhaeuser Company
1970 to 1985	Phillip Morris (operated the Nicolet Paper Company)
1985 to 1987	Chesapeake Corporation
1987 to 1996	Simpson Plainwell Paper Company
1996 to 2000	Plainwell, Inc.
2006 to present	City of Plainwell (portion)
2011 to present	CRA 200 Allegan Street LLC (portion)

On July 18, 2011, ownership of the eastern portion of the Site, including Building 17 and Building 18, was transferred to CRA 200 Allegan Street LLC. CRA 200 Allegan Street LLC conducted renovation activities on offices and access ways. In March 2012, CRA moved its Kalamazoo, Michigan office staff into Building 17 and now occupies the top floor of this building.

The City of Plainwell renovated Building 19 for the June 2014 occupation for City Hall operations. Additionally, the City of Plainwell is currently utilizing portions of the Site for storage of various seasonal decorative supplies, fire hose assessments, and ambulance driver testing.

1.2.2.3 Demolition Activities 2011 to 2013

The City of Plainwell has been pursuing redevelopment plans for the Site. The City obtained funding for select decommissioning and demolition activities through the securement of public grants. The following presents a brief summary of the decommissioning and demolition activities conducted by or on behalf of the City of Plainwell between 2011 and 2013.

Prior to initiation of demolition activities on Site, non-intrusive decommissioning assessments were conducted by CRA on behalf of the City of Plainwell. Decommissioning assessment activities included a Site inspection and file review to evaluate potential areas of environmental concern, which included: potential polychlorinated biphenyl (PCB) materials; asbestos containing materials; lead based paint; mercury containing devices; pits, trenches and sumps; refrigerants; electrical systems; battery charging systems; utilities; lighting; air pollution control systems/exhaust stacks; batteries; miscellaneous hydraulic equipment; miscellaneous chemicals; and cathode ray tubes. Based on the decommissioning assessment inspections, initial sampling was conducted, with additional delineation completed for Buildings 3A, 9A, 9B, 9C, 9D, 9E, 9F, 23, and 28, the ASTs and associated areas, and the water tower prior to demolition. Sampling conducted for the structures included the collection of concrete, oil, paint, expansion joint, surface wipe, window caulk, and various other solid samples. The decommissioning and demolition work was conducted under grants obtained by the City of Plainwell for the work.

Demolition of the former Quality Products Building was conducted by the City of Plainwell, in October 2011. Demolition of the former Specialty Minerals Building and a sludge tank associated with the former Sludge Dewatering Building was conducted in December 2011 on behalf of the City of Plainwell. Demolition activities associated with portions of the Mill Buildings were conducted on behalf of the City of Plainwell with oversight from the MDEQ for Buildings 3A, 9A, 9B, 9C, 9D, 9E, 9F, 23 and 28, the former 200,000-gallon fuel oil aboveground storage tank (AST) and associated area, the brine underground storage tanks (USTs), the former clay, starch, and ammonia AST areas, and one of the 50,000-gallon water towers from March to August 2012. The concrete slabs were left in place for Buildings 3A, 9A, 9B, 9D, 9E, 23 and 28. Concrete slabs for Buildings 9A, 9B, 9D, 9E and 23 were cracked and then covered with approximately six to nine feet of crushed concrete and imported backfill to achieve grade. Approximately one to one and a half feet of backfill was placed over the concrete slabs of Buildings 3A and 28. The slabs were also cracked to allow stormwater drainage. Buildings 9F did not have a basement component to the structure; therefore, when the concrete floor was removed it was disposed of off Site. Building 9C had a very small section of basement to the structure; this concrete slab was generally left in place. The concrete slab from the basement portion of Building 9C is covered with approximately nine feet of imported backfill. The brine tanks were cleaned and the concrete bottoms were cracked to allow for stormwater drainage.

The concrete ring that the 200,000-gallon AST was situated upon was left in place after the demolition of the tank. The former Sludge Dewatering Building was renovated for use by the City of Plainwell Public Safety Department, with occupancy in late 2012. Additional demolition activities were conducted on behalf of the City of Plainwell in November and December 2013. The former WWTP buildings and associated clarifiers were demolished along with Building 25. The bottoms of the clarifiers were left in place and cracked to allow for groundwater to seep below the concrete. The concrete slab for Building 25 was left in place; the pit associated with the building was cleaned, cracked to allow drainage and then backfilled with imported material.

The specific timing for demolition of other structures (Buildings 1A, 4, 4A, 5, 5A, 5B, 5E/14, 6, 6A, 7 and the Train Shed) associated with the future redevelopment of the Site has not yet been established. Considering the basement elevations of Buildings 4, 4A, 5, 5A, 5B, 5E/14, 6, 7, the basement areas would require approximately four to six feet of backfill to achieve current grade. Building 6A does not have a concrete floor. Building 1A and the Train Shed are generally at existing grade and; therefore, would not require additional backfill material. The Train Shed does not have a concrete floor. Several buildings (1, 2, 3, 9, 10, 11, 11A, 12, 15, 16, 17, 18, 19 and 20) have been designated as historical structures and are not anticipated to be demolished; however, will be redeveloped/renovated/reused.

1.2.2.4 Wastewater Treatment Operations

According to historical documentation, prior to 1954 wastewater generated during papermaking processes was discharged directly into the Kalamazoo River, without any treatment. Between 1954 and 1967, wastewater treatment was carried out through a primary clarifier that was constructed northwest of the Mill Buildings and a number of wastewater sludge dewatering lagoons on the northwest portion of the Site, as presented on Figure 1.2. After treatment of wastewater in the primary clarifier, the clarifier effluent was discharged into the Kalamazoo River and the clarifier underflow was discharged into the lagoons for further dewatering. The dewatered sludge in each lagoon was excavated and transported off Site to the 12th Street Landfill in Otsego Township, Michigan (RMT, 2006).

In 1967, a 1.85 million gallon plastic lined aeration basin and a secondary clarifier, collectively referred to herein as the secondary clarifier, were constructed at the Site to the east of the lagoons. The primary clarifier's effluent passed through an aeration basin prior to discharge to Kalamazoo River and biosludges from the aeration basins along with the primary clarifier underflow were discharged to the dewatering lagoons. The dewatered sludge continued to be excavated and transported off Site for disposal at the 12th Street Landfill (RMT, 2006).

From 1981 until termination of operations at the Site in 2000, a new wastewater treatment facility, consisting of a new primary clarifier, a mechanical dewatering system, a new secondary

clarifier, and an activated sludge treatment system was constructed. The primary clarifier and wastewater sludge dewatering lagoons were replaced with the new primary clarifier and a mechanical dewatering system, respectively. The new secondary clarifier and the activated sludge treatment system were constructed over several of the eastern lagoons (i.e., Lagoons D, E, and G) and the old primary clarifier was removed. The removal of the paper residuals from the dewatering lagoons continued across the Site and between 1981 and 1983, most of the remainder of the residuals in the lagoons were removed and transported off-Site for disposal or consolidated in western lagoons and covered with soil (RMT, 2006). In 1983, the former aeration system was taken out of service and partially backfilled.

Between October and December 2013, the primary clarifier, secondary clarifier, wastewater activated sludge tank, and associated ancillary buildings were razed on behalf of the City of Plainwell. The area was subsequently backfilled to grade.

1.2.2.5 Hazardous Substances

Based on the existing Site information, several Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulated hazardous substances were used, generated, and/or stored during the paper manufacturing operations.

Coal and Fly Ash

Coal was historically utilized as a fuel for steam generation for papermaking operations. Based on the review of historical aerial photographs and Site drawings, the north central portion of the Site as well as coal tunnel area and at one time the area of Building 12/15 (i.e., Residential Area 4, Mixed Residential Area 2 and Commercial Area 4) were used for exterior coal storage. Fly ash generated as a by-product of the combustion of coal in the boilers was mixed with wastewater sludge in the lagoons, prior to off-Site sludge disposal. Coal products, and waste generated from incineration of coal products, may contain metals and polycyclic aromatic hydrocarbons (PAHs) at various concentrations, depending on the origin of the coal. The resulting fly ash contains organic compounds and metals as noted in historical sample results.

Other Petroleum-Based Products

Several on-Site aboveground and underground storage tanks (ASTs/USTs) that historically contained petroleum products such as No. 6 fuel oil, gasoline, diesel, and kerosene were used at the Site.

Additives for the Papermaking Process

Additives, such as support products from the former Specialty Minerals Inc., were utilized during the papermaking process, along with cleaning products and petroleum products. Several paper machine additives, felt, and wire cleaning products containing volatile organic compounds (VOCs) and semi-volatile organic compound (SVOCs) were used during papermaking process at the Site.

Wastewater Sludge

Wastewater sludge was created during the papermaking processes on-Site. The sludge was removed from the facility and processed through a series of clarifiers before entering the former wastewater lagoons for dewatering. Once the paper sludge was dewatered, the material was then removed from the Site. In the late 1950s and early 1960s, paper that was de-inked and recycled at the Mill may have included carbonless copy paper containing PCBs and inks containing heavy metals. De-inking was discontinued at the Mill in 1963.

Electrical Equipment and Hydraulic Lubricants

Some fluids used in electrical equipment (e.g., transformers and capacitors), as well as hydraulic fluids, commonly contained PCBs during the timeframe the Mill was operational. As documented in the previous reports for the Site, PCBs were historically used in transformers (seven removed), capacitors (41 removed), and in the hydraulic fluids of some of the elevators inside the Mill Buildings (fluids have been removed and disposed off Site). Additionally, a substation operated by Consumers Energy Company was formerly located on the northeastern portion of the Site, north of Building 11A.

1.2.2.6 Waste Storage and Disposal

The potentially regulated waste generated at the Site included used oil, spent solvents (prior to 1994), and wastewater sludge (RMT, 2006). All known disposal activities have been discussed above and landfilling activities associated with these waste streams are not known to have occurred on Site. PCBs that may be present in the paper residuals on Site are discussed in Section 1.2.2.5.

1.2.3 Geology/Hydrology/Hydrogeology

1.2.3.1 Regional and Site Geology

The regional geology consists of unconsolidated glacial materials deposited during the last advance/retreat of the Laurentide Ice Sheet during the Wisconsinan Glacial Stage. These deposits consist of various amounts of gravel, sand, silt, and clay and are approximately

200 feet thick in this region (Lillienthal, 1978). The Site is located within the Kalamazoo River valley, which was likely formed as large amounts of water drained from the ice sheet.

Underlying the glacial deposits, are the consolidated bedrock formations of the Michigan Basin (a bowl-shaped structure with its approximate center located well to the northeast of this region). The immediate bedrock formation underlying the glacial deposits at the Site is the Mississippian Coldwater Shale. The Coldwater consists predominantly of gray to bluish-gray shale and is approximately 800 feet thick in this region (Lillienthal, 1978).

The unconsolidated deposits beneath the Site consist of various amounts of fill material (debris, clay, sand) and native unconsolidated glacial material and recent alluvium (sands, gravels, silts, and clay). To better understand the surficial geology at the Site, eight cross-sections were prepared during the RI, based on observations during subsurface investigation results. The entire Site consists predominantly of poorly graded fill material of fine to coarse grained sand, with fine to coarse grained gravel. Interbedded within the fill material are discontinuous lenses of concrete and brick debris, paper residuals, and sandy clay. Generally, within 10 to 15 feet below ground surface (bgs) across the Site, native materials consist of poorly graded, fine to medium sand with fine to coarse gravel and lenses of poorly graded fine to coarse grained gravel with sand. At one location, the native sand and gravel was found to be underlain by a layer of silt and clay at approximately 32 feet bgs. Previous production supply wells once utilized in the manufacturing process also encountered this silt and clay unit at approximately 30 to 40 feet bgs. No records were found of any borings penetrating this unit at the Site.

1.2.3.2 Regional and Site Hydrology

The Site lies within the lower one-third of the Kalamazoo River drainage basin. This surface water drainage basin drains over 2,000 square miles in southwestern Michigan. The Kalamazoo River drainage basin begins to the southeast in Hillsdale County and discharges into Lake Allegan and ultimately into Lake Michigan near the City of Saugatuck to the northwest of the Site (approximately 162 miles in total river length: Kalamazoo River Watershed Council, 2007).

Locally, the Kalamazoo River controls most surface water drainage from the uplands and flows from the southeast to the northwest along the northern property boundary of the Site. From the earliest development of the property, on which the former Mill is currently located, a man-made drainage way (i.e., Mill Race) was constructed to bring water from the Kalamazoo River (south of the City of Plainwell – upstream) immediately adjacent to the mill property to the east. The City of Plainwell is known as the "Island City" due to the fact that the majority of the city is located between the Kalamazoo River and the Mill Race.

The Mill Race is dammed just prior to its confluence back to the Kalamazoo River. Hydraulically, the Mill Race is approximately 6 feet higher than the Kalamazoo River. A portion of the Mill Race is diverted to run beneath the former Mill prior to the dam. The diverted portion of the Mill Race runs under Building 20 and the difference in hydraulic head was captured by a turbine to generate electricity to power the Mill property during operations prior to rejoining the Kalamazoo River downstream of the confluence of the Mill Race and Kalamazoo River. The divergence of the Mill Race beneath the building prior to the Mill Race entering the Kalamazoo River, and the reintroduction of the flow associated with the divergence after the confluence of the Mill Race and Kalamazoo River may impact the interaction between the associated surface water bodies and groundwater in this portion of the Site, as inferred in Figures 1.5 through 1.8. Additional discussion related to the potential interaction of surface water with groundwater at the Site is presented in Section 1.2.3.3.

With the removal of the Plainwell Impoundment downstream of the project Site, river stage levels would be primarily influenced by precipitation events or drought. There appears to be a direct relationship of the surface water in the Mill Race recharging the groundwater to the east of the Site. This recharge directly influences the direction of groundwater flow and hydraulic gradients across the Site. In addition, a portion of the Kalamazoo River may also be a source of local recharge to the aquifer in the immediate area of the confluence of the Mill Race with the Kalamazoo River. Based on available information to date, groundwater appears to discharge to the Kalamazoo River in the downgradient (westerly) portion of the Site.

There are no other surface water drainage features located within the vicinity that would be expected to affect the hydrology at the Site.

During the implementation of the Phase I RI activities, three staff gauges (SG-1 through SG-3) were installed in the Mill Race (SG-1) and the Kalamazoo River (SG-2 and SG-3). The staff gauges could not be located during the implementation of the Phase II RI activities and were subsequently reinstalled. One additional staff gauge (SG-4) was installed during the Additional RI activities immediately downstream of the confluence of the Mill Race and the Kalamazoo River.

1.2.3.3 Regional and Site Hydrogeology

Regionally, the groundwater flow directions approximate the surface water drainage basin, typically mimicking the topography. The Kalamazoo River is typically the discharge point for groundwater located within this groundwater drainage basin.

Groundwater is encountered in the uppermost, unconfined water bearing zone between 5 and 17 feet bgs across the Site, with elevations ranging from approximately 713 to 714 feet AMSL

(east side of the Site) to 711 to 712 feet AMSL (west side of the Site). Hydraulically, the Mill Race is approximately six feet higher than the Kalamazoo River. As discussed in Section 1.2.3.1, generally, within 10 to 15 feet bgs across the Site, native materials consist of poorly graded, fine to medium sand with fine to coarse gravel and lenses of poorly graded fine to coarse grained gravel with sand. At one location, the native sand and gravel was found to be underlain by a layer of silt and clay at approximately 32 feet bgs. Previous production supply wells once utilized in the manufacturing process also encountered this silt and clay unit at approximately 30 to 40 feet bgs. Therefore, groundwater discussed in this report is limited to the uppermost, unconfined water bearing zone.

Based on information collected to date and presented in the RI Report, the uppermost, unconfined, water table aquifer present on the east side of the Site appears to be recharged by the surface water within the Mill Race as a result of the dam located east of the Site. On the Site-wide scale, groundwater flow within this water table aquifer is predominantly to the west from the Mill Race (flowing sub-parallel to the flow of the Kalamazoo River) across the Site. Review of the groundwater-surface water interaction indicates that the Kalamazoo River acts as a semi-hydraulic barrier at this scale (i.e., the river elevation is higher than the adjacent groundwater elevation along most of the frontage along the Site). The hydraulic gradient along the northwestern portion of the Site, at times of higher groundwater elevations, appears to be discharging to the Kalamazoo River, while the majority of the Site maintains the semi-hydraulic barrier with the surface water primarily at greater elevations than the adjacent groundwater. The actual groundwater-surface water interaction is a more complicated dynamic system at a local scale, with interactions to some degree where surface water and the groundwater are likely mixing. This can be inferred near monitoring well MW-7, where it appears there may be local groundwater discharge to the Kalamazoo River on an intermittent basis. Information regarding groundwater flow is presented in the RI and FS Reports. Groundwater contour maps from the September 2013, December 2013, April 2014, and July 2014 are included as Figures 1.5 to 1.8, respectively.

Vertical hydraulic gradients within the aquifer itself are minimal with a slight upward component at monitoring wells MW-4S/D of 0.007 ft./ft. and at monitoring wells MW-12S/D of 0.001 ft./ft., and a slight downward gradient at monitoring wells MW-21S/D of 0.002 ft./ft.

Based on static water levels measured over all measurement dates, the change in head from east to west across the Site is consistent at approximately 2.5 feet over a span of approximately 2,400 feet horizontally, thereby giving an average hydraulic gradient of 0.001 ft./ft.

1.2.3.4 Current and Past Groundwater Use in the Mill Area

The City of Plainwell provides potable water, which is defined in Michigan's Well Construction Code Administrative Rules (MDEQ, 1994) as "water which is free of contaminants in concentrations that may cause disease or harmful physiological effects and which is safe for human consumption" to the surrounding area via three wells, which draw groundwater from the regional aquifer. Potable water service has been disconnected to all Mill Buildings except for Building Nos. 17, 18 and 19, due to the current operational status of the majority of the Site.

According to information reviewed, industrial well water, which is defined in Michigan's Well Construction Code Administrative Rules (MDEQ, 1994) as "a well that is used to supply water for industrial processes, fire protection, or similar nonpotable uses" for Mill operations was historically supplied by seven on-Site groundwater wells. According to information in the Phase I RI Work Plan (RMT, 2008), this included four process water wells, which pumped approximately 2.8 million gallons per day (MGD) to support paper making operations. Two additional wells supplied water for fire suppression purposes and one well, used for non-sanitary purposes, was present near the wastewater treatment system.

Four wells (identified as 3, 4, 5, and 6) are depicted west of the Mill in historical drawings dated 1969 and reviewed by CRA. Well No. 3 is depicted west of the former engine room and boiler room area and Wells 4, 5, and 6 are depicted in the west yard near the railroad spurs. Based on review of available well records, Well No. 5 was installed in 1964 (rescreened in 1989) and a well in the same location identified on historical drawings as Well No. 6 was installed in 1974. The use of this well was identified as "industrial" on the well record. One fire well (also referred to as Well No. 6 on the well record) was installed south of Mill Building 17 in 1967. A second fire well was installed north of Building 11 and East of Building 11A in 1988. A Type IIa Public well, identified as Well No. 8 on the well record, was installed in 1989.

Based on observations during on-Site activities, Well Nos. 3 and 4 are no longer present. No documentation regarding the abandonment of these wells was available for review by CRA. Well No. 6 (near Scott Street, identified in previous reports as "production well") is periodically utilized by the City of Plainwell for fire hose testing activities. The "fire well" to the northeast of the Mill Building and Well No. 8 are currently present at the Site, but not in use. The current presence of the "fire well" (to the south of Mill Building 17, identified in previous reports as "Well No. 6") could not be confirmed.

1.2.4 Nature and Extent of Contamination

1.2.4.1 Locations and Character of Potential Sources of Contamination

Based on the historical land uses of the property, three specific historical operational areas were evaluated during the RI, as described in Sections 2.0 and 5.0 of the RI Report (CRA, 2013a) and as summarized below.

Former Lagoon and Wastewater Treatment Area (Area 1)

Historical land uses of this area included the treatment and dewatering of wastewater sludge prior to off-Site disposal. The area includes 14 former wastewater sludge dewatering lagoons (i.e., Lagoons A through L), primary clarifier, former secondary clarifier, former wastewater treatment building activated sludge tank, former aeration basin, secondary clarifier, and activated sludge treatment system. This operational area was identified as Area 1 in the Phase II RI Work Plan. Area 1 includes redevelopment areas Residential Areas 1 and 2 and Commercial Area 1, and a portion of Residential Area 3. Figure 1.3 shows the operational areas (i.e., Area 1, etc.).

Plainwell Mill Building Area (Area 2)

This area includes the former primary clarifier, Mill Buildings, and two former and current water towers. The primary clarifier was constructed northwest of the mill buildings and treated wastewater from the mill buildings. Prior to 1967, the effluent of the clarifier discharged to the Kalamazoo River and the underflow discharged to the dewatering lagoons. By introduction of secondary clarifier and aeration basin in 1967, the effluent of former primary clarifier was processed through the aeration basin and then into the secondary clarifier before being discharged to the Kalamazoo River. The underflow of both the former primary and secondary clarifier was discharged into the dewatering lagoons. Suspected areas relating to historical operations within the Mill Buildings are also considered as potential source areas. This operational area was identified as Area 2 in the Phase II RI Work Plan. Area 2 includes redevelopment area Commercial Area 4, and portions of Mixed Residential/Commercial Area 2, Commercial Area 3, and Residential Area 4. Figure 1.2 shows the operational areas (i.e., Area 1, etc.) relative to the redevelopment areas (i.e., Residential Area 1, etc.).

Central Portion of the Site (Area 3)

This area includes the former Quality Products and Sludge Dewatering buildings, the former Specialty Minerals, Inc. building, the former coal pile storage area, the former 200,000-gallon No. 6 fuel oil AST, former Coal Tunnel area, and the remainder of the areas located in central portion of the Site. These operational areas were identified as Areas 3, 3A, 3B, 3C, 3D, and 3E, respectively, in the Phase II RI Work Plan. Area 3 includes portions of redevelopment areas

Waterfront Plaza, Residential Area 4, Mixed Residential/Commercial Area 1, and Commercial Area 3. Area 3A includes portions of redevelopment areas Residential Area 3 and Commercial Area 2. Area 3B includes portions of redevelopment areas Commercial Area 2 and Mixed Residential/Commercial Area 2. Area 3C includes portions of redevelopment areas Residential Area 4 and Waterfront Plaza. Area 3D includes portions of redevelopment areas Residential Area 4 and Mixed Residential/Commercial Area 2. Area 3E includes portions of redevelopment areas Mixed Residential/Commercial Area 2 and Commercial Area 3. Figure 1.3 shows the operational areas (i.e., Area 1, etc.).

1.2.4.2 Nature and Extent of Contamination

As an initial screening, soil samples collected during the pre-RI, RI, and additional RI activities and the analytical results therefrom were evaluated against the following Generic Residential and Non-Residential Cleanup Criteria and Screening Levels established in Part 7 of Administrative Rules, effective December 30, 2013, pursuant to Part 201, Environmental Remediation, 1994 PA 451 as amended (Part 201)(MDEQ, 2013b).

Soil:

- State Default Background (as applicable)(SDBL)
- Drinking Water Protection Criteria (DWPC)
- Groundwater Surface Water Interface Protection Criteria (GSIPC)
- Soil Volatilization to Indoor Air Inhalation Criteria (SVIAC)
- Volatile Soil Inhalation Criteria (VSIC)
- Particulate Soil Inhalation Criteria (PSIC)
- Direct Contact Criteria (DCC)
- Soil Saturation Concentration Screening Levels (C_{sat})

Additionally, in order to perform a conservative evaluation of the nature and extent of contamination at the Site as an initial screening, soil samples collected during the pre-RI, RI, and additional RI activities and the analytical results for PCBs therefrom were evaluated against the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions) of 1 milligram per kilogram (mg/kg) presented in 40 Code of Federal Regulations (CFR) 761.61(a)(4)(i)(A).

As an initial screening, soil Synthetic Precipitation Leaching Procedure (SPLP) samples collected during the pre-RI, RI, and additional RI activities and the analytical results therefrom were evaluated against the following Generic Residential and Non-Residential Cleanup Criteria and

Screening Levels established in Part 7 of Administrative Rules, effective December 30, 2013, pursuant to Part 201, Environmental Remediation, 1994 PA 451 as amended (Part 201)(MDEQ, 2013b).

Soil SPLP:

- Drinking Water Criteria (DWC)
- Groundwater Surface Water Interface Criteria (GSIC)
- Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIAC)
- Flammability and Explosivity Screening Level (FESLs)
- Water Solubility Limits

The nature and extent of the contamination is discussed below, by operational and redevelopment area, consistent with comparison to the above described generic cleanup criteria/levels under Part 201 and 40 CFR 761. Sample locations are presented on Figure 1.9.

Site-Wide Historical Fill Material (Portions of All Redevelopment Areas)

Based on the review of available information regarding development of the Site and observations during the subsurface RI activities, fill materials of various compositions (i.e., various soil types, brick, concrete, coal, fly ash, etc.) have been utilized in numerous areas of the Site. A number of metals have been identified in exceedance of the Part 201 Residential and Non-Residential Cleanup Criteria in soil, which can be potentially attributed to the fill material. Additionally, a number of locations also exceed the Michigan SDBLs, as well as the Allegan County-specific values for a variety of metals provided on the United States Geological Survey (USGS) website. Based on observations during the RI activities, it appears that the majority of the exceedances in soil are located within or immediately below areas of various fill materials.

In general, the majority of the metals exceedances are limited to Part 201 Residential and/or Non-Residential DWPC and GSIPC in soil. Based on the results of the Synthetic Precipitation Leaching Procedure (SPLP) analysis, manganese, mercury, silver, copper, arsenic, selenium, and chromium, were identified to have the potential to leach at concentrations that exceed either the Part 201 DWC and/or GSIC.

Additional exceedances in various locations across the Site to the Part 201 Residential and/or Non-Residential DCC were noted for lead and arsenic in soil, with the predominant metal being arsenic. Arsenic and manganese were identified at one location each above the Part 201

Residential PSIC. Manganese was also identified above the Part 201 Non-Residential PSIC in three locations.

Former Wastewater Treatment Area (Residential Areas 1 through 4, Waterfront Plaza and Mixed Residential/Commercial Area 2)

Various VOCs, SVOCs, metals, and inorganics are present in soil above the Part 201 Residential and/or Non-Residential DWPC. Additionally, various VOCs, SVOCs, metals, and inorganics are present in soil above the Part 201 GSIPC. SPLP results for soil samples indicate that some metals have the potential to leach at concentrations in exceedance of the Part 201 GSIC. Numerous exceedances of the Part 201 Residential DCC for arsenic are present across this area, which appear to be related to historical placement of fill material, as discussed above. This includes both the areas known to have been utilized as historical lagoons, and the surrounding areas to the north (along the Kalamazoo River) and to the east (former aeration basin and secondary clarifier areas) in Residential Areas 1 through 3 and Waterfront Plaza, as well as the former primary clarifier in Residential Area 4 and Mixed Residential/Commercial Area 2.

Based on a correlation of observed paper residuals and various fill materials in this area to the exceedances of VOCs and SVOCs identified in soil above the Part 201 Cleanup Criteria, it appears that the exceedances of the phenolic compounds are associated with noted paper residuals, with the remainder associated with various sandy fill materials. Numerous samples were collected in and around the former lagoons during the RI, with paper residuals or "gray clay" observed in some of the locations. With the exception of the "white clay layer" sample collected by the Michigan Department of Transportation (MDOT) during storm sewer installation in 2012 where PCBs were detected at a reported concentration of 17 milligrams per kilogram (mg/kg), the highest concentration of PCBs detected in samples collected in this area for PCBs was 2.7 mg/kg, with the majority of the detections of PCBs less than 1 mg/kg. A gray (noted to vary between gray, light gray, white, and bluish) clay layer was observed in several borings between approximately 4 and 10 feet below ground surface (bgs). This layer often contained paper residuals or was observed immediately above or below a layer of paper residuals. In general based on analytical results for samples analyzed, little difference was noted in PCB concentrations between samples collected from sand fill and gray clay/paper residuals. A summary of samples and detected concentrations of PCBs collected from within and around the former lagoon area is presented below.

Sample Location	Sample Depth (feet bgs)	Material Description	Detected Concentration of PCBs (mg/kg)
MW-14	0 – 2	Sand and gravel fill; no paper residuals observed	0.049
	8 - 10		Non-Detect

Sample Location	Sample Depth (feet bgs)	Material Description	Detected Concentration of PCBs (mg/kg)
SB-101	0 -1	Sand fill; no paper residuals observed	0.136
	6.8 – 8.8		0.015
	8 – 9.25		Non-Detect
SB-102	0 – 1	8 to 10-foot sample collected from sand fill, gray to black, with paper residuals	Non-Detect
	8 - 10		Non-Detect
SB-103	0 – 1	No paper residuals observed	0.32
	7 - 9		Non-Detect
SB-104	0 – 1	Sand fill with paper residuals observed at 3.5 ft	0.39
	3 - 5		1
	5 – 7		Non-Detect
	8 - 10		Non-Detect
SB-105	0 – 1	Samples collected from sand fill; trace paper residuals observed in sand fill at 0.8 ft bgs only; thin gray clay fill layer observed between 5.5 and 6 feet bgs; no sample collected from thin gray clay	0.227
	1 – 3		1.6
	3 – 5		0.0086/ 0.0095 (Dup.)
	8 – 10		0.56
SB-106	0 – 1	Sandy clay fill, gray with paper residuals between 3.5 and 8 feet bgs	Non-Detect
	3.5 – 5.5		0.46
	8 - 10		Non-Detect/ Non-Detect (Dup.)
SB-107	0 - 1	Paper residuals from 4.5 to 8.5 feet bgs; gray clay fill present above paper residuals, not sampled	0.031
	4.5 – 6.5		0.33
	6.5 – 8.5		0.36
SB-108	0 – 1	Gray to bluish gray clay layer at approximately 4 to5 feet bgs, not sampled; samples collected from sand fill and brown sandy clay fill; no paper residuals observed in boring	0.24
	6.5 – 8.5		0.25
	8 - 10		0.408
SB-109	0 – 2	Sand fill to 5 feet bgs; gray clay fill with paper residuals observed from approximately 5 to 9 feet bgs; paper residuals observed from 9 to 10 feet bgs	Non-Detect
	8 – 10		0.462
SB-110	0 – 1	Sand and brown clay fill; no paper residuals observed	0.022
	8 - 10		0.166/ 0.29 (Dup.)
SB-111	0 - 1	Sand fill to 4 feet bgs; gray clay fill with paper residuals present between 4 and 8.5 feet bgs, with sand fill below	0.022
	7 - 9		0.215
SB-112	0 – 1	Sand fill to 3.5 feet bgs; paper residuals from 5 to 9 feet bgs with light gray clay fill (with paper residuals) present above and below; no samples collected from clay fill layer	Non-Detect/ 0.017 (Dup.)
	6 – 8		Non-Detect
SB-113	0 – 1	Sand fill with some paper residuals at 3.5 feet bgs to 8 feet bgs; clay fill with paper residuals present at 8 to 10 feet bgs	0.039
	8 - 10		0.71
SB-114	0 – 1	Sand fill with no paper residuals to 8.5 feet bgs; gray and white clay fill with paper residuals from 8.5 to 10 feet bgs	0.061
	8 - 10		0.42

Sample Location	Sample Depth (feet bgs)	Material Description	Detected Concentration of PCBs (mg/kg)
SB-115	0 – 1	Sand fill to 4.5 feet bgs with paper residuals at 4 feet bgs; white to gray clay fill with paper residuals from 4.5 to 5 feet bgs; sand fill with concrete debris below	0.011
	3 – 5		0.15
	5 – 7		Non-Detect
	8 – 10		Non-Detect
SB-116	0 – 1	Sand fill with concrete debris; no paper residuals observed	0.64
	7 – 9		0.051
	9.5 - 10		0.011
SB-117	0 – 1	Sand and gravel fill; no paper residuals observed	0.012
	8 - 10		0.043
SB-118	0 – 1	Sand fill; no paper residuals observed	0.25
	7.5 – 9.4		Non-Detect
SB-119	0 – 1	Sand fill; no paper residuals observed	Non-Detect
	8 - 10		0.0091
SB-120	0 -1	Sand fill; no paper residuals observed	Non-Detect
	7.75 – 9.75		Non-Detect
SB-121	0 – 1	Sand fill with paper residuals	0.33
	1 – 3		Non-Detect
	11 - 13		Non-Detect
SB-122	0 – 1	Sand fill and brown clay fill; no paper residuals observed	0.017
	8 - 10		0.026
SB-123	0 – 1	Sand fill; no paper residuals observed	0.077
	7 - 9		0.045
SB-124	0 - 1	Sand fill to 9 feet bgs; gray and white clay fill with paper residuals observed around 9 feet bgs	0.147
	7 - 9		0.52
SB-125	0 - 1	Sand fill with paper residuals and debris	0.16
	3 – 5		0.077/ 0.1 (Dup.)
	8 - 10		Non-Detect
SB-126	0 - 1	Sand fill with dark gray clay fill layer at 8.5 to 9 feet bgs	0.089
	7.5 – 9.5		2.38
SB-127	0 – 1	Sand and gravel fill with paper residuals	0.03
	6.5 – 8.5		0.592
	10.5 – 12.5		0.099
SB-128	0 -1	Sand with trace paper residuals	0.125
	11.5 – 13.5		0.34
SB-129	0 – 1	Thin layer of brown and white clay fill and thin layer of paper residuals from 7 to 7.5 feet bgs	0.025
	6 – 8		0.13
	8 – 10		0.022
SB-130	0 – 1	Sand fill and brown clay fill; no paper residuals observed	0.072
	12.5 – 14.5		Non-Detect
SB-131	0 – 1	Dark gray sandy clay fill with paper residuals from 8.5 to 9.5 feet bgs; not sampled because below the water table	Non-Detect
	6 - 8		0.051
SB-132	0 – 1	Sand fill with coal; thin layer of paper residuals at 9 feet bgs	1.19
	8 - 10		Non-Detect

Sample Location	Sample Depth (feet bgs)	Material Description	Detected Concentration of PCBs (mg/kg)
SB-133	0 – 1	Sand fill with a thin layer of brown and gray clay fill with paper residuals between 8.5 and 9 feet bgs.	1.02
	7 - 9		2.6/ 2.7 (Dup.)
VA-1	0 – 2	Sand fill to 6.5 feet bgs; clay fill, white, blue, and gray present between 6.5 and 8.5 feet bgs; paper residuals, white, gray, and blue from 8.5 to 10 feet bgs	Non-Detect
	8 - 10		0.91

Former Substation/Area North of Mill Building (Commercial Area 4)

A former substation, that was owned and operated by Consumers Energy, was historically present (1956 or earlier through 2007) to the north of Buildings 11 and 11A. Additionally, review of historical drawings identified that an "open shed" (Building 22) was present to the northwest of Building 11a and west of the former substation. Subsequent to the off-Site Environmental Risk Assessment (ERA) and evidence of impacts to the north of the former substation, an investigation was conducted as part of the RI to evaluate potential issues in this area. Oily soils were observed in this area during the installation of test pits, with detections of Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO) as high as 3,300 parts per million (ppm) (there is no Part 201 Cleanup Criteria for TPH).

Various PAHs, tetrachloroethene, methylene chloride, trichloroethene, and 1,1,1-trichloroethane have been detected in soil samples in this area, along with various metals, at concentrations above the Part 201 Residential and/or Non-Residential DWPC, GSIPC, and Residential DCC. PCBs were detected at a concentration above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions) in soil samples collected from three locations. Historical information indicates that Building 11 was constructed in 1906 and was used for storage and maintenance activities, and Building 11A was constructed in 1940 and was used for maintenance activities, which may have included the use and storage of solvents and/or petroleum products utilized during routine maintenance activities.

Non-Specific Historical Operational Impacts (Residential Area 3, Waterfront Plaza, Mixed Residential/Commercial Areas 1 and 2, and Commercial Areas 2, 3, and 4)

The non-specific historical operational impacts include the MW-16 area, the Mill Buildings (except Buildings 11 and 11A, as discussed above), one former water tower, one current water tower (Mixed Residential/Commercial Area 2 and Commercial Areas 3 and 4), the former

Sludge Dewatering and former Quality Products Buildings (Residential Area 3, Waterfront Plaza, and Commercial Area 2), and former Specialty Minerals Building (Mixed Residential/ Commercial Area 1 and Commercial Area 2). Suspected areas relating to general historical operations within the aforementioned structures were also considered as potential source areas. Specifically related to the Mill Buildings in Mixed Residential/Commercial Area 2 and Commercial Areas 3 and 4, additional potential areas where multiple sample locations indicated exceedances of similar organic constituents included the Train Shed, Building 6A, the parking lot east of Buildings 9F and 9E, Building 7, Former Buildings 3A and 28, and Former Buildings 9C and 9A. Additionally, during redevelopment activities conducted at the former Sludge Dewatering Building, two small below grade structures in series were encountered.

During the 2010 RI field activities, PCBs were identified in a soil sample from MW-16 (within Commercial Area 4) above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions). Based on the identified detection and redevelopment activities that were proposed in this area, further evaluation was completed in 2012 to delineate the extent of PCB impacts in soil in the vicinity of MW-16. Additional soil samples within the vicinity of MW-16 were reported with PCBs above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions). Two other locations in Building 2 and Building 6A were identified as having detected concentrations of PCBs above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Various PAHs, benzene, ethylbenzene, toluene, tetrachloroethene, methylene chloride, trichloroethene, and 1,1,1-trichloroethane have been detected in soil samples in these areas, along with various metals, at concentrations above the Part 201 Residential and/or Non-Residential DWPC, GSIPC, and DCC.

Non-Specific Support Operational **Area Impacts (Residential Area 4, Mixed Residential/Commercial Area 1, Waterfront Plaza, and** Commercial **Area 3)**

The non-specific support operations include the areas defined by Residential Area 4, Waterfront Plaza, a portion of Mixed Residential/Commercial Area 1, and a portion of Commercial Area 3, which are primarily located on the northern portion of this area, along the Kalamazoo River, and may be related to historical filling activities in this area.

Various PAHs, benzene, ethylbenzene, toluene, methylene chloride, and xylenes, have been detected in soil samples in these areas, along with various metals, at concentrations above the Part 201 Residential and/or Non-Residential DWPC and GSIPC. Additionally, PAHs were detected in soil above the Residential DCC and PCBs were detected in soil above the TSCA

Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Former Coal Storage Pile Area (Residential Area 4 and Waterfront Plaza)

The impacts to soil in this area include exceedances of the Part 201 Generic Cleanup Criteria for the listed constituents, which include inorganics discussed above as being associated with fill materials. However, several of these inorganics could also be the result of storage and handling practices associated with coal in this area, in conjunction with impacts from other fill materials in this area; although, insufficient data is available to differentiate the source of the impacts.

Various PAHs, benzene, ethylbenzene, toluene, and xylenes, have been detected in soil samples in these areas, along with various metals, at concentrations above the Part 201 Residential and/or Non-Residential DWPC and GSIPC. Additionally, arsenic and lead were detected in soil above the Residential DCC, and lead was detected above the Non-Residential DCC. PCBs were detected above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions) in two locations. Benzene was detected above the Part 201 Residential SVIAC in one location.

Former No. 6 Fuel Oil AST Area
(Mixed Residential/Commercial Area 2 and Residential Area 4)

This area includes the former 200,000-gallon No. 6 fuel oil AST and a portion of the below grade process piping distribution system. Historical fuel oil releases to the ground surface in this area have been documented. The historical operation of railroad tracks and below grade product delivery systems also occurred in this area. During redevelopment activities, product was observed in the below grade piping from the former No. 6 fuel oil AST area to the former power house area. Product observed in the lines was containerized at the point where the piping formerly entered the AST area structures, and was characterized and disposed of off Site during the redevelopment activities. No below grade evaluation of the piping line was completed during the redevelopment activities.

Various PAHs, tetrachloroethene, methylene chloride, benzene, and ethylbenzene, have been detected in soil samples in these areas, along with various metals, at concentrations above the Part 201 Residential and/or Non-Residential DWPC and GSIPC. Additionally, arsenic, benzo(a)pyrene and dibenzo(a,h)anthracene were detected in soil above the Residential DCC.

Coal Tunnel Area (Mixed Residential/Commercial Area 2)

Various VOCs, SVOCs, and metals are present in soil above Part 201 DWPC and/or GSIPC in the area of the coal tunnel. Review of SPLP data for cobalt, manganese, mercury, selenium, and/or silver did not indicate an exceedance of the Part 201 GSIC for the leachate from soil samples collected. It should be noted that SPLP analysis was not conducted on all constituents that exceeded the Part 201 GSIPC. Benzo(a)pyrene, benzo(a)anthracene, dibenzo(a,h)anthracene, and arsenic are present in soil above Part 201 DCC. The benzo(a)pyrene, benzo(a)anthracene, and dibenzo(a,h)anthracene exceedances are associated with the soil sample from CTP-4, along the piping run for the former No. 6 fuel oil AST, to the east of the coal tunnel, adjacent to the coal hopper/Building 5E. The arsenic exceedances are associated with soil samples from multiple locations.

Based on the results for the samples in the vicinity of the coal tunnel, it appears that soils have been impacted by historical operations conducted at the Site, which were not specifically related to the operation of the coal tunnel. Impacts have been identified associated with the former Fuel Oil No. 6 product delivery piping that traversed the coal tunnel in the direction of the boiler room and in areas historically known to have been used for the exterior storage of coal and fly ash. Visual observations of the accessible portions of the coal tunnel noted the presence of approximately 12 to 18 inches of liquid, described as a "heavy fuel oil with a layer of water over the top," was observed covering the bottom of the concrete floor of the tunnel. The thickness of the water was identified as approximately 1 to 2 inches, with the balance being the "heavy fuel oil." Due to the presence of the liquid, a visual evaluation of the condition of floor of the coal tunnel could not be conducted. Impacts to the soil immediately underlying the coal tunnel could not be determined; however, groundwater in the downgradient direction of the coal tunnel did not exhibit impacts from petroleum products and no free product was observed in the monitoring well (MW-2). Based on the January and February 2010 groundwater contours, the positions of MW-2 and MW-19 are not located immediately downgradient of the coal tunnel. Subsequently, an additional monitoring well (MW-22) was installed in August 2012 to further evaluate groundwater in this area. Observations and analytical results for groundwater samples collected in August 2012 were consistent with those for MW-2 and MW-19.

Based on the above discussion regarding the nature and extent of the contamination by former operational area, the following exceedances of the Part 201 Residential and/or Non-Residential Cleanup Criteria or TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions) were identified by redevelopment area relative to soil impacts. For the purposes of the below tables, Residential is abbreviated as "R" and Non-Residential is abbreviated as "NR". It should be noted that where the Part 201 SDBL is

higher than the generic cleanup criteria, the SDBL replaces the generic cleanup criteria, as applicable and consistent with Part 201.

Soil

Residential Area 1

Exceedances of constituents in soil samples are present at various locations as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
Lagoon J-3A	4.5 – 5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9
Lagoon M-1B	4 – 4.5	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7
SB-2	9 – 10	GSIPC	Selenium	0.41	0.49
SB-3	2 – 2.5	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.3
		GSIPC	Chromium	3.3	19
		GSIPC	Mercury	0.13	0.22
	4 – 5	GSIPC	Mercury	0.13	0.16
SB-4	9 – 10	GSIPC	Selenium	0.41	1.1
SS-100	0 – 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	733
MW-14	0 – 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	838
	8 – 10	RDWPC and NRDWPC	Iron	12,000	15,600,000
		RDWPC NRDWPC	Magnesium	8,000 22,000	23,600/ 35,100 (Dup.)
		RDWPC and NRDWPC GSIPC RDCC	Arsenic	5.8 7.6 5.8	11.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-101	0 –1	GSIPC	Cyanide (total)	0.39	0.9
		RDWPC and NRDWPC	Aluminum	6,900	7,280
		RDWPC and NRDWPC	Iron	12,000	14,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	654
		RDWPC	Magnesium	8,000	12,500
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.3
	6.8 – 8.8	RDWPC and NRDWPC	Aluminum	6,900	9,660
		RDWPC and NRDWPC	Iron	12,000	24,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	897
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15
		GSIPC	Selenium	0.41	0.6
		GSIPC	Cyanide (total)	0.39	2.6
SB-102	0 – 1	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.2
		GSIPC	Selenium	0.41	0.7
SB-103	0 – 1	RDWPC and NRDWPC	Aluminum	6,900	7,010
		RDWPC and NRDWPC	Iron	12,000	16,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	469
		GSIPC	Mercury	0.13	0.17
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.6
	7 – 9	RDWPC and NRDWPC	Iron	12,000	16,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	972
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.7
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-104	0 - 1	GSIPC	Cyanide (total)	0.39	0.9
		RDWPC	Magnesium	8,000	16,000
		GSIPC	Mercury	0.13	0.24
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.5
		GSIPC	Selenium	0.41	0.5
	3 – 5	GSIPC	Cyanide (total)	0.39	1.9
		RDWPC and NRDWPC	Iron	12,000	12,600
		GSIPC	Mercury	0.13	0.34
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.21
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	25.3
		GSIPC	Selenium	0.41	0.8
	5 – 7	GSIPC	Cyanide (total)	0.39	2.7
		RDWPC and NRDWPC	Iron	12,000	32,400
		RDWPC and NRDWPC	Antimony	4.3	16
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	92
		GSIPC	Selenium	0.41	2.2
	8 – 10	GSIPC	Cyanide (total)	0.39	2.8
		RDWPC and NRDWPC	Iron	12,000	12,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	461
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	29
		GSIPC	Selenium	0.41	1.3

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-106	0 – 1	RDWPC	Magnesium	8,000	12,000
	3.5 – 5.5	RDWPC and NRDWPC	Aluminum	6,900	9,600
		GSIPC	Chromium	3.3	20
		GSIPC	Mercury	0.13	0.24
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.3
		GSIPC	Selenium	0.41	0.8
	8 – 10	RDWPC NRDWPC	Magnesium	8,000 22,000	22,300/ 34,200 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.3/ 11.7 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	14,600/ 17,500 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	622/ 614 (Dup.)
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.6 (Dup.)
		GSIPC	Selenium	0.41	0.5 (Dup.)
SB-107	0 – 1	RDWPC and NRDWPC	Iron	12,000	12,800
		RDWPC	Magnesium	8,000	17,700
		GSIPC	Selenium	0.41	0.6
	4.5 – 6.5	RDWPC and NRDWPC	Aluminum	6,900	13,300
		GSIPC	Selenium	0.41	1.1
	6.5 – 8.5	RDWPC and NRDWPC	Aluminum	6,900	7,760
		GSIPC	Mercury	0.13	0.21
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.42
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.1
		GSIPC	Selenium	0.41	0.9
SB-108	0 – 1	RDWPC	Magnesium	8,000	13,000
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6
		GSIPC	Selenium	0.41	1.2
	6.5 – 8.5	RDWPC and NRDWPC	Iron	12,000	14,800
		GSIPC	Mercury	0.13	0.14
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4
		GSIPC	Selenium	0.41	0.9

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-109	0 – 2	RDWPC	Magnesium	8,000	22,000
	8 – 10	RDWPC and NRDWPC	Aluminum	6,900	14,500
		GSIPC	Chromium	3.3	22
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.7
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	14
		GSIPC	Selenium	0.41	2.6
		GSIPC	4-Methylphenol	1	2.8
SB-110	0 – 1	RDWPC	Magnesium	8,000	14,600
	8 – 10	RDWPC and NRDWPC	Methylene chloride	0.1	0.11
		RDWPC and NRDWPC	Iron	12,000	12,200
		RDWPC	Magnesium	8,000	18,400/ 14,000 (Dup.)
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC GSIPC	Manganese	440 440	562
SB-111	0 – 1	RDWPC	Magnesium	8,000	12,200
	7 – 9	RDWPC and NRDWPC	Aluminum	6,900	8,630
		GSIPC	Chromium	3.3	19
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8
		GSIPC	Selenium	0.41	0.8
SB-112	0 – 1	RDWPC and NRDWPC	Iron	12,000	18,500
		RDWPC NRDWPC	Magnesium	8,000 22,000	18,200/ 23,800 (Dup.)
	6 – 8	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.21
		RDWPC and NRDWPC	Aluminum	6,900	12,300
		GSIPC	4-Methylphenol	1	2.2
		GSIPC	Naphthalene	0.73	1.5
SB-113	0 – 1	RDWPC	Magnesium	8,000	11,000
		GSIPC	Selenium	0.41	0.5
	8 – 10	RDWPC and NRDWPC	Aluminum	6,900	11,800
		RDWPC and NRDWPC	Iron	12,000	19,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	452
		GSIPC	Chromium	3.3	22
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.2
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.5
		GSIPC	Selenium	0.41	1.7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-114	0 – 1	RDWPC and NRDWPC	Aluminum	6,900	7,420
		RDWPC and NRDWPC GSIPC	Manganese	440 440	992
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.1
		GSIPC	Selenium	0.41	0.6
	8 – 10	RDWPC and NRDWPC	Aluminum	6,900	12,800
		GSIPC	Selenium	0.41	1
SB-115	0 – 1	RDWPC	Magnesium	8,000	12,300
	3 – 5	RDWPC and NRDWPC	Aluminum	6,900	7,730
		GSIPC	Mercury	0.13	0.45
		GSIPC	Selenium	0.41	0.5
	8 – 10	RDWPC and NRDWPC GSIPC	Manganese	440 440	527
		RDWPC NRDWPC	Magnesium	8,000 22,000	32,600
SB-116	0 – 1	RDWPC and NRDWPC	Iron	12,000	19,600
		RDWPC	Magnesium	8,000	14,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	548
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7
	9.5 – 10	GSIPC	Selenium	0.41	0.5
		RDWPC and NRDWPC	Aluminum	6,900	8,320
		RDWPC and NRDWPC	Iron	12,000	16,200
		GSIPC	Chromium	3.3	24
SB-117	0 – 1	RDWPC NRDWPC	Magnesium	8,000 22,000	23,800
	8 – 10	RDWPC and NRDWPC	Iron	12,000	13,200
		RDWPC	Magnesium	8,000	20,000
SB-118	0 – 1	GSIPC	Selenium	0.41	0.7
		GSIPC	Mercury	0.13	0.26
		GSIPC	Xylenes (total)	0.82	1.39
	7.5 – 9.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21
		GSIPC	Selenium	0.41	1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-119	0 – 1	RDWPC	Magnesium	8,000	11,000
		GSIPC	Phenanthrene	2.1	2.6
	8 – 10	RDWPC and NRDWPC	Iron	12,000	16,300
		RDWPC NRDWPC	Magnesium	8,000 22,000	26,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	572
		GSIPC	Chromium	3.3	22
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.5
SB-120	0 – 1	RDWPC	Magnesium	8,000	16,700/ 21,300 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	14/ 11 (Dup.)
		GSIPC	Selenium	0.41	1.6
	7.75 – 9.75	RDWPC NRDWPC	Magnesium	8,000 22,000	33,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11
SB-121	0 – 1	GSIPC	Mercury	0.13	0.3
	1 – 3	RDWPC	Magnesium	8,000	17,100
	11 – 13	RDWPC	Magnesium	8,000	14,700
SB-122	0 – 1	RDWPC	Magnesium	8,000	10,600
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
SB-123	0 – 1	RDWPC	Magnesium	8,000	19,800

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria /Level (mg/kg)	Detected Concentration (mg/kg)
SB-132	0 – 1	RDWPC and NRDWPC	Iron	12,000	23,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	641
		GSIPC	Mercury	0.13	0.33
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.4
		GSIPC	Selenium	0.41	0.8
		TSCA High Occupancy	Total PCBs	1.0	1.19
	8 – 10	RDWPC and NRDWPC	Iron	12,000	20,900
		RDWPC NRDWPC	Magnesium	8,000 22,000	63,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	638
		GSIPC	Mercury	0.13	0.15
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.7
		GSIPC	Selenium	0.41	0.6
SB-143	0 – 1	RDWPC and NRDWPC GSIPC	Manganese	440440	485
	8 – 10	RDWPC NRDWPC	Magnesium	8,000 22,000	23,000
		RDWPC and NRDWPC	Iron	12,000	13,800
VA-1	0 – 2	RDWPC	Magnesium	8,000	17,200
	8 – 10	GSIPC	Ethylbenzene	0.36	0.43
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.43
		RDWPC and NRDWPC	Aluminum	6,900	16,300
		GSIPC	Chromium	3.3	21
		GSIPC	Selenium	0.41	1
		GSIPC	4-Methylphenol	1	2.6
		GSIPC	4-Chloro-3-methylphenol	0.28	0.38
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.91
		GSIPC	2,4,6-Trichlorophenol	0.33	0.36
SPL-11	10 – 10.5	TSCA High Occupancy	Total PCBs	1.0	1.6

No other parameters were detected in soil samples analyzed in Residential Area 1 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Residential Area 2

Exceedances of constituents in soil samples are present at various locations in Residential Area 1 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-1	12.5 - 13	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.5
		GSIPC	Chromium	3.3	20
SB-105	0 - 1	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.6
		RDWPC and NRDWPC	Aluminum	6,900	8,800
		RDWPC and NRDWPC	Iron	12,000	12,500
	1 – 3	RDWPC and NRDWPC	Benzene	0.1	0.21
		GSIPC	Mercury	0.13	0.16
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.5
		TSCA High Occupancy	Total PCBs	1.0	1.6
	3 – 5	RDWPC and NRDWPC	Iron	12,000	12,600/ 14,800 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.3/ 7.9 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	467
	8 - 10	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8
		RDWPC and NRDWPC	Iron	12,000	12,500

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-124	0 - 1	RDWPC and NRDWPC	Iron	12,000	14,100
		RDWPC	Magnesium	8,000	9,660
		RDWPC and NRDWPC GSIPC	Manganese	440 440	697
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.4
		GSIPC	Selenium	0.41	0.6
	7 - 9	RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC	Magnesium	8,000	20,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	447
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.21
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.9
SB-125	0 - 1	RDWPC	Magnesium	8,000	11,000
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.5
		GSIPC	Selenium	0.41	0.5
	3 - 5	RDWPC and NRDWPC	Iron	12,000	12,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6
	9.25 - 10	RDWPC NRDWPC	Magnesium	8,000 22,000	53,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	578
SB-126	0 - 1	RDWPC and NRDWPC	Iron	12,000	15,100
		RDWPC	Magnesium	8,000	12,100
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.9
	7.5 - 9.5	RDWPC and NRDWPC	Iron	12,000	12,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	456
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	33
		GSIPC	Mercury	0.13	0.54
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.4
		TSCA High Occupancy	Total PCBs	1.0	2.38

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-127	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	486
		GSIPC	Selenium	0.41	0.8
	6.5 - 8.5	RDWPC and NRDWPC	Iron	12,000	15,800
		RDWPC	Magnesium	8,000	13,200
		GSIPC	Chromium	3.3	26
		GSIPC	Copper	135	184
		GSIPC	Zinc	303	415
		GSIPC	Mercury	0.13	0.72
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
	10.5 - 12.5	RDWPC NRDWPC	Magnesium	8,000 22,000	81,100
		GSIPC	Copper	135	170
		GSIPC	Mercury	0.13	0.14
SB-128	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	37,900
	11.5 - 13.5	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
SB-129	0 - 1	RDWPC	Magnesium	8,000	21,600
	6 - 8	RDWPC and NRDWPC	Iron	12,000	26,200
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	729
		GSIPC	Mercury	0.13	0.14
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.5
		GSIPC	Selenium	0.41	0.6
	8 - 10	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2
		RDWPC	Magnesium	8,000	15,100
SB-130	0 - 1	GSIPC	Chromium	3.3	24
		GSIPC	Selenium	0.41	0.5
	12.5 - 14.5	RDWPC	Magnesium	8,000	15,200/ 13,300 (Dup.)
SB-131	0 - 1	RDWPC	Magnesium	8,000	19,700
	6 - 8	RDWPC	Magnesium	8,000	18,200
SPL-4	12 – 14	TSCA High Occupancy	Total PCBs	1.0	1.5

No other parameters were detected in soil samples analyzed in Residential Area 2 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Residential Area 3

Exceedances of constituents in soil samples are present at various locations in Residential Area 3 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
MW-15	0 - 2	RDWPC and NRDWPC	Aluminum	6,900	7,260
		RDWPC and NRDWPC GSIPC	Manganese	440 440	543
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	19.9
		GSIPC	Selenium	0.41	0.8
	4 – 6	RDWPC	Magnesium	8,000	10,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	606
		GSIPC	Phenanthrene	2.1	2.6
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.9
		GSIPC	Selenium	0.41	0.6
SB-134	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	476
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	5.9
	1.5 - 3.5	RDWPC and NRDWPC	Aluminum	6,900	8,550
		RDWPC and NRDWPC	Iron	12,000	33,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,440
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	60
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.6
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	20.3
		GSIPC	Selenium	0.41	0.8
SB-135	0 - 1	GSIPC	Cyanide (total)	0.39	1
		RDWPC and NRDWPC GSIPC	Manganese	440 440	489
		GSIPC	Mercury	0.13	0.21
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
	8 - 10	GSIPC	Cyanide (total)	0.39	2.3
		RDWPC	Magnesium	8,000	12,700

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-136	0 - 1	RDWPC	Magnesium	8,000	20,800/ 17,100 (Dup.)
		GSIPC	Selenium	0.41	1
		RDWPC and NRDWPC	Iron	12,000	13,500 (Dup.)
	8 - 10	RDWPC and NRDWPC	Methylene chloride	0.1	0.18
		RDWPC and NRDWPC	Iron	12,000	33,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	491
		GSIPC	Copper	135	139
		GSIPC	Zinc	303	455
		GSIPC	Mercury	0.13	0.98
		RDWPC and NRDWPC	Antimony	4.3	9.4
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.1
		GSIPC	Selenium	0.41	0.9
SB-137	0 - 1	RDWPC	Magnesium	8,000	11,400
		GSIPC	Mercury	0.13	0.67
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.7
		GSIPC	Selenium	0.41	1.1
	8 - 10	RDWPC and NRDWPC	Iron	12,000	22,300
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	26.4
		GSIPC	Selenium	0.41	0.6
SB-138	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	698
		GSIPC	Mercury	0.13	0.29
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
		GSIPC	Selenium	0.41	0.5
	8 - 10	RDWPC	Magnesium	8,000	14,500

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-139	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,520
		RDWPC and NRDWPC	Iron	12,000	15,100
		RDWPC	Magnesium	8,000	12,900
		RDWPC and NRDWPC GSIPC	Manganese	440 440	637
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	36
		GSIPC	Mercury	0.13	0.42
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.5
		GSIPC	Selenium	0.41	0.5
	6 - 8	RDWPC and NRDWPC GSIPC	Manganese	440 440	508
		RDWPC and NRDWPC	Iron	12,000	17,300
		RDWPC NRDWPC	Magnesium	8,000 22,000	30,100
SB-140	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	9,010
		RDWPC and NRDWPC	Iron	12,000	25,800
		RDWPC	Magnesium	8,000	10,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	568
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	11
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.1
		GSIPC	Selenium	0.41	0.8
	8 - 10	RDWPC	Magnesium	8,000	14,800 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	19/ 15 (Dup.)
		GSIPC	Selenium	0.41	2/ 1.9 (Dup.)
SB-141	0 - 1	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.5
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	2.19
		GSIPC	Selenium	0.41	1
	9 - 11	RDWPC	Magnesium	8,000	26,900
TP-319	0 - 1	RDWPC	Magnesium	8,000	11,800
		GSIPC	Selenium	0.41	0.6
	6 - 8	RDWPC	Magnesium	8,000	8,400
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-320	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	689
	6 - 8	RDWPC	Magnesium	8,000	15,700

No other parameters were detected in soil samples analyzed in Residential Area 3 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Residential Area 4

Exceedances of constituents in soil samples are present at various locations in Residential Area 4 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
DG-3	0 – 1.5	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.8
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	5.6
		RDCC	Benzo(a)pyrene	2	4.9
		GSIPC	Phenanthrene	2.1	3.6
DG-4	0 – 1.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16
		GSIPC	Chromium	3.3	28
		GSIPC	Copper	135	220
		RDWPC and NRDWPC RDCC NRDCC	Lead	700 400 900	990
		GSIPC	Mercury	0.13	1.1
		GSIPC	Zinc	303	450
		RDCC	Dibenzo(a,h)anthracene	2	6.4
SB-7	0 – 0.5	GSIPC	Mercury	0.13	0.28
		GSIPC	Selenium	0.41	0.5
	7 – 7.5	GSIPC	Chromium	3.3	30
		GSIPC	Copper	135	350
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	6.3
		GSIPC	Zinc	303	620

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SCSB-2A	0 – 2	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.5
SB-5	2.5 – 3.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12
		GSIPC	Mercury	0.13	0.27
		GSIPC	Copper	135	240
		GSIPC	Selenium	0.41	1.4
SB-301	0 - 1	RDWPC and NRDWPC	Iron	12,000	13,100
		RDWPC	Magnesium	8,000	18,700
		GSIPC	Mercury	0.13	0.22
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.6
		GSIPC	Xylenes (total)	0.82	2.19
		GSIPC	Selenium	0.41	1.1
	5.5 - 7.5	TSCA High Occupancy	Total PCBs	1.0	13.8 6.29 (Dup.)
		RDWPC	Magnesium	8,000	17,000/ 8,350 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	748/ 676 (Dup.)
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	75/ 64 (Dup.)
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	14.4/ 10.2 (Dup.)
		GSIPC	Copper	135	671/ 560 (Dup.)
		GSIPC	Zinc	303	1,020/ 737 (Dup.)
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.12
		RDWPC and NRDWPC	Antimony	4.3	8/ 7.8 (Dup.)
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	55.8/ 14.2 (Dup.)
		RDCC	Lead	400	647/ 542 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	150,000/ 83,600 (Dup.)
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	4.8/ 6.5 (Dup.)
		RDWPC and NRDWPC	Aluminum	6,900	7,890 (Dup.)
		GSIPC	Selenium	0.41	1.1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-302	0 - 1	RDWPC and NRDWPC GSIPC	Ethylbenzene	1.5 0.36	2.6
		RDWPC and NRDWPC	Benzene	0.1	1.3
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	18.4
		RDWPC and NRDWPC GSIPC	Toluene	16 5.4	22
		RDWPC and NRDWPC RDCC GSIPC	Cyanide (total)	4 12 0.39	0.5
		GSIPC	Mercury	0.13	0.16
		GSIPC	Naphthalene	0.73	1.5
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.9
		GSIPC	Selenium	0.41	1.8
	6.8 - 8.8	GSIPC	Cyanide (total)	0.39	1.9
		RDWPC and NRDWPC	Aluminum	6,900	9,290
		RDWPC and NRDWPC	Iron	12,000	44,000
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	35
		GSIPC	Copper	135	246
		GSIPC	Zinc	303	439
		RDWPC and NRDWPC	Antimony	4.3	44.7
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.1
		GSIPC	Selenium	0.41	0.7
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	15.5
	8.8 - 9.8	RDWPC and NRDWPC	Aluminum	6,900	12,800
		GSIPC	Silver	0.1	1.4
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	96
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.4
		GSIPC	Copper	135	205
		GSIPC	Zinc	303	333
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.7
		GSIPC	Selenium	0.41	1.2
		RDCC	Lead	400	667
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	4

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-321	0 - 1	GSIPC	Cyanide (total)	0.39	1.7/ 1.8 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	541/ 518 (Dup.)
		GSIPC	Mercury	0.13	0.18
		RDWPC and NRDWPC	Aluminum	6,900	6,960 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	12,200 (Dup.)
		RDWPC	Magnesium	8,000	9,360 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.2/ 8.1 (Dup.)
		GSIPC	Selenium	0.41	0.7/ 0.6 (Dup.)
	7 - 9	RDWPC	Magnesium	8,000	11,000
TP-302	0.5 - 1.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.1
		RDCC	Benzo(a)pyrene	2	3.6
		GSIPC	Carbazole	1.1	3.2
		GSIPC	Fluoranthene	5.5	24
		GSIPC	Phenanthrene	2.1	19
	4 - 6	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.5
		GSIPC	Selenium	0.41	1
		RDWPC and NRDWPC RDCC NRDCC	Lead	700 400 900	1,620
		RDWPC and NRDWPC	Iron	12,000	14,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,270
		GSIPC	Chromium	3.3	24
		GSIPC	Mercury	0.13	0.23
	10 - 11	RDWPC NRDWPC	Magnesium	8,000 22,000	41,200
		GSIPC	Chromium	3.3	24

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-308	0 - 1	RDWPC and NRDWPC GSIPC	Ethylbenzene	1.5 0.36	4.3/ 3.5 (Dup.)
		RDWPC and NRDWPC RSVIAC	Benzene	0.1 1.6	3.4/ 1.2 (Dup.)
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	29/ 23.9 (Dup.)
		RDWPC and NRDWPC GSIPC	Toluene	16 5.4	25/ 19 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	5.9
		GSIPC	Selenium	0.41	3.6/ 3.6 (Dup.)
		GSIPC	Naphthalene	0.73	2.3/ 2 (Dup.)
	4 - 6	GSIPC	Cyanide (total)	0.39	0.8
TP-309	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	585
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	1
	6 - 8	RDWPC NRDWPC	Magnesium	8,000 22,000	73,000
TP-310	1 - 2	GSIPC	Selenium	0.41	1.6
	8 - 10	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.4
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC	Iron	12,000	12,400
		RDWPC	Magnesium	8,000	15,600

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-311	0 - 1	RDWPC and NRDWPC	Iron	12,000	18,700
		GSIPC	Phenanthrene	2.1	2.7
		GSIPC	Xylenes (total)	0.82	1.37
		GSIPC	Naphthalene	0.73	0.84
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.9
		GSIPC	Selenium	0.41	2.6
	4 - 6	RDWPC NRDWPC	Magnesium	8,000 22,000	33,900
		GSIPC	Selenium	0.41	0.8
TP-312	0 - 1	GSIPC	Ethylbenzene	0.36	1.1
		GSIPC	Toluene	5.4	6.6
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	8.9
		RDWPC and NRDWPC	Benzene	0.1	0.36
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7
		GSIPC	Mercury	0.13	0.14
		GSIPC	Phenanthrene	2.1	2.4
		GSIPC	Naphthalene	0.73	2.7
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.7
		RDWPC and NRDWPC GSIPC	Selenium	0.41	4.5
	5 - 7	GSIPC	Cyanide (total)	0.39	1.8
		RDWPC NRDWPC	Magnesium	8,000 22,000	12,200/ 26,900 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-313	2 - 4	RDWPC and NRDWPC	Aluminum	6,900	7,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,020
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	14.2
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12
		GSIPC	Selenium	0.41	2
	4 - 6	RDWPC and NRDWPC	Aluminum	6,900	16,500 17,900 (Dup.)
		GSIPC	Silver	0.1	3.4/ 3.3 (Dup.)
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	101 102
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.4/ 7.5 (Dup.)
		GSIPC	Zinc	303	742/ 846 (Dup.)
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	2.78/ 1.78 (Dup.)
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.26/ 0.34 (Dup)
		TSCA High Occupancy	Total PCBs	1.0	37.9/ 31 (Dup.)
		RDCC	Lead	400	502/ 461 (Dup.)
		GSIPC	Selenium	0.41	0.9/ 1 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 7.6 5.8	6.7 (Dup.)
		RDWPC NRDWPC	Phosphorus	1,300 4,800	5,890/ 6,580 (Dup.)
	8 - 9	GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-314	0 - 1	GSIPC	Ethylbenzene	0.36	1.2
		GSIPC	Toluene	5.4	6.2
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	9.5
		RDWPC and NRDWPC	Benzene	0.1	0.56
		GSIPC	Phenanthrene	2.1	2.4
		GSIPC	Naphthalene	0.73	2.5
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.1
		RDWPC and NRDWPC GSIPC	Selenium	0.41	4.1
	6 - 8	GSIPC	Cyanide (total)	0.39	2
		RDWPC and NRDWPC	Aluminum	6,900	16,300
		RDWPC and NRDWPC	Iron	12,000	60,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	668
		GSIPC	Silver	0.1	2.5
		GSIPC	Barium	950	1,030
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	88
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	10.1
		GSIPC	Copper	135	870
		GSIPC	Zinc	303	1,710
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	2.78
		RDWPC and NRDWPC	Antimony	4.3	47.2
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	25
		RDWPC and NRDWPC RDCC NRDCC	Lead	700 400 900	2,050
		GSIPC	Selenium	0.41	2
	10 - 11	RDWPC NRDWPC	Magnesium	8,000 22,000	38,700
		GSIPC	Selenium	0.41	1.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-315	0 - 1	GSIPC	Cyanide (total)	0.39	1.8
		RDWPC and NRDWPC GSIPC	Manganese	440 440	695
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
		GSIPC	Selenium	0.41	0.7
	4 - 6	GSIPC	Cyanide (total)	0.39	1
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4

No other parameters were detected in soil samples analyzed in Residential Area 4 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Waterfront Plaza

Exceedances of constituents in soil samples are present at one location in the Waterfront Plaza as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-301	6 - 8	RDWPC NRDWPC	Magnesium	8,000 22,000	37,400
	8 - 10	RDWPC	Magnesium	8,000	14,600
		GSIPC	Chromium	3,300	23
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6

No other parameters were detected in soil samples analyzed in Waterfront Plaza above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Mixed Residential/Commercial Area 1

Exceedances of constituents in soil samples are present at various locations in Mixed Residential/Commercial Area 1 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-334	0 - 1	GSIPC	Cyanide (total)	0.39	0.76
		RDWPC	Magnesium	8,000	12,000
	8 - 10	RDWPC and NRDWPC	Aluminum	6,900	7,980
		RDWPC and NRDWPC	Iron	12,000	20,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	571
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	44
		RDWPC	Magnesium	8,000	11,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.7
		GSIPC	Selenium	0.41	0.9
SB-335	0 - 1	RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	29.6
SB-336	8 - 10	RDWPC and NRDWPC	Iron	12,000	16,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	492
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.3
		GSIPC	Selenium	0.41	0.6
SB-337	0 - 1	RDWPC	Magnesium	8,000	15,400
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
		GSIPC	Selenium	0.41	0.5
	10.5 - 12.5	RDWPC	Magnesium	8,000	19,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.0
SB-338	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	24,000
	8 - 10	RDWPC	Magnesium	8,000	8,240
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.6
		GSIPC	Selenium	0.41	2.1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-339	2.75 - 3.75	GSIPC	Mercury	0.13	1.04
		RDWPC	Magnesium	8,000	8,560
		GSIPC	Selenium	0.41	0.5
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.14
	8 - 10	RDWPC and NRDWPC	Iron	12,000	31,800/ 38,800 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	857/ 1,120 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.2
		GSIPC	Selenium	0.41	0.6
		RDWPC NRDWPC	Magnesium	8,000 22,000	18,900/ 23,700 (Dup.)
SB-341	0 - 1	RDWPC	Magnesium	8,000	15,000
	8 - 10	RDWPC	Magnesium	8,000	20,700
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.7
TP-303	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,220
		RDWPC and NRDWPC GSIPC	Manganese	440 440	985
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
	6 - 8	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15
		RDWPC NRDWPC	Magnesium	8,000 22,000	100,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	705
TP-306	0.5 - 1.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	20
		RDWPC and NRDWPC GSIPC	Manganese	440 440	508
	6 - 7	RDWPC	Magnesium	8,000	18,400 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	20 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-333	0 - 1	RDWPC	Magnesium	8,000	17,400
		GSIPC	Selenium	0.41	0.6
	6 - 8	RDWPC NRDWPC	Magnesium	8,000 22,000	27,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.9
		GSIPC	Selenium	0.41	0.5
TP-334	0 - 1	RDWPC and NRDWPC NRPSIC GSIPC	Manganese	440 1,500 440	1,880
		GSIPC	Mercury	0.13	0.16
		GSIPC	Selenium	0.41	0.6
	7 - 9	RDWPC NRDWPC	Magnesium	8,000 22,000	23,500
TP-335	0 - 1	RDWPC	Magnesium	8,000	12,600
		GSIPC	Selenium	0.41	0.6
	3 - 5	RDWC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.5
		GSIPC	Selenium	0.41	1.1
		RDWPC and NRDWPC GSIPC	Manganese	440 440	666
		GSIPC	Mercury	0.13	0.16
TP-336	0 - 1	GSIPC	Cyanide (total)	0.39	1.2
		RDWPC	Magnesium	8,000	15,800
	8 - 10	RDWPC	Magnesium	8,000	17,400

No other parameters were detected in soil samples analyzed in Mixed Residential/Commercial Area 1 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Mixed Residential/Commercial Area 2

Exceedances of constituents in soil samples are present at various locations in Mixed Residential/Commercial Area 2 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
Sample #2	0.7 – 1.7	GSIPC	Phenanthrene	2.1	5.6
		GSIPC	Naphthalene	0.73	7.6
		RDWPC and NRDWPC	Benzene	0.1	0.12
		GSIPC	Xylenes (total)	0.82	2.8
		GSIPC	1,2,4-Trimethylbenzene	0.57	0.68
Sample #3	0.7 – 1.7	GSIPC	Phenanthrene	2.1	2.5
		GSIPC	Xylenes (total)	0.82	0.86
		GSIPC	Naphthalene	0.73	2.3
SB-6	0 – 1	GSIPC	Naphthalene	0.73	1
		GSIPC	Xylenes (total)	0.82	1.64
SBA-1A	0 – 2	GSIPC	Phenanthrene	2.1	2.3
SBA-2A	0 – 2	RDCC	Benzo(a)pyrene	2	4.8
		RDCC	Dibenzo(a,h)anthracene	2	4.4
		GSIPC	Phenanthrene	2.1	15
		GSIPC	2-Methylnaphthalene	4.2	7.4
SBA-3A	0 – 2	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.52
SB-2010	0 - 1	RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	2.21
		RDWPC	Magnesium	8,000	13,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.5
		GSIPC	Selenium	0.41	1.1
	7 - 9	RDWPC and NRDWPC	Aluminum	6,900	7,600
		RDWPC and NRDWPC	Iron	12,000	12,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	522
		GSIPC	Mercury	0.13	0.28
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.5
		GSIPC	Selenium	0.41	1.1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-2011	0 - 1	GSIPC	Mercury	0.13	0.21
	3.4 - 4.75	GSIPC	Cyanide (total)	0.39	0.8
		RDWPC and NRDWPC	Iron	12,000	23,900
		GSPIC	Mercury	0.13	0.18
		GSIPC	Carbazole	1.1	1.5
		GSIPC	Naphthalene	0.73	1.1
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.7
		GSIPC	Selenium	0.41	1.6
		GSIPC	Fluoranthene	5.5	5.6
		GSIPC	Phenanthrene	2.1	6.6
	12.5 - 14.5	GSIPC	Cyanide (total)	0.39	1.4
		RDWPC and NRDWPC	Iron	12,000	12,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	571
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.6
		GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-2013	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	8,510
		RDWPC and NRDWPC	Iron	12,000	26,700
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	32
		GSIPC	Mercury	0.13	0.47
		RDWPC	Magnesium	8,000	14,000
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	31.4
		GSIPC	Selenium	0.41	1.4
		RDWPC and NRDWPC RDCC NRDCC	Lead	700 400 900	2,330
	3 - 5	RDWPC and NRDWPC	Aluminum	6,900	7,380
		RDWPC and NRDWPC	Iron	12,000	17,200
		GSIPC	Chromium	3.3	21/ 20.2 (Dup.)
		GSIPC	Mercury	0.13	0.61/ 0.44 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9 7.5 (Dup.)
		GSIPC	Selenium	0.41	0.8/ 0.7 (Dup.)
		RDWPC	Magnesium	8,000	8,020 (Dup.)
SB-205	0 - 1	RDWPC	Magnesium	8,000	12,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
		GSIPC	Selenium	0.41	0.5
		RDWPC and NRDWPC GSIPC	Manganese	440 440	526
	2.5 - 4.5	RDWPC	Magnesium	8,000	15,300/ 11,700 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.3/ 7.0 (Dup.)
		GSIPC	Selenium	0.41	0.8/ 0.6 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	754/ 536 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-206	0.5 – 1.5	RDWPC	Magnesium	8,000	12,800
	2.5 - 4.5	RDWPC and NRDWPC	Aluminum	6,900	7,400
		RDWPC and NRDWPC	Iron	12,000	20,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	735
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8
SB-207	0 - 1	RDWPC	Magnesium	8,000	9,860
	3 - 5	RDWPC	Magnesium	8,000	9,810
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.9
		GSIPC	Selenium	0.41	0.6
SB-208	0 - 1	RDWPC and NRDWPC	Benzene	0.1	0.26
		GSIPC	Xylenes (total)	0.82	2.6
		RDWPC and NRDWPC	Aluminum	6,900	7,140
		RDWPC and NRDWPC	Iron	12,000	26,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	504
		GSIPC	Zinc	303	414
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	30.8
		GSIPC	Selenium	0.41	1
	4 - 6	RDWPC and NRDWPC	Aluminum	6,900	8,220
		RDWPC and NRDWPC	Iron	12,000	20,500
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.3
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.5
		GSIPC	Selenium	0.41	1.1
		GSIPC	Xylenes (total)	0.82	4.7
		GSIPC	Ethylbenzene	0.36	0.38

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-209	0 - 1	RDWPC and NRDWPC	Nitrate (as N)	200	253
		GSIPC	Toluene	5.4	7.5
		RDWPC and NRDWPC	Benzene	0.1	0.11
		GSIPC	Xylenes (total)	0.82	3.1
		RDWPC and NRDWPC	Aluminum	6,900	13,600
		RDWPC and NRDWPC	Iron	12,000	23,500
		GSIPC	Chromium	3.3	19
		GSIPC	Mercury	0.13	0.25
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.9
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	10.8
		GSIPC	Selenium	0.41	1
	6 - 8	RDWPC	Magnesium	8,000	12,200
		GSIPC	Selenium	0.41	0.6
SB-210	0.5 - 1.5	GSIPC	Naphthalene	0.73	1.9
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.9
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.5
		GSIPC	Selenium	0.41	0.6
		GSIPC	Ethylbenzene	0.36	0.65
		RDWPC and NRDWPC	Benzene	0.1	0.23
		GSIPC	Xylenes (total)	0.82	5.6
	3 - 5	RDWPC and NRDWPC	Iron	12,000	13,200
		GSIPC	Naphthalene	0.73	0.77
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.8
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.1
		GSIPC	Selenium	0.41	1.1
		GSIPC	Xylenes (total)	0.82	4.9
		GSIPC	Ethylbenzene	0.36	0.4
		RDWPC and NRDWPC	Benzene	0.1	0.19
SB-211	4 - 6	RDWPC and NRDWPC	Iron	12,000	13,300
		RDWPC NRDWPC	Magnesium	8,000 22,000	28,000
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6
		GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-212	0 - 1	GSIPC	Cyanide (total)	0.39	1.1
		GSIPC	Selenium	0.41	0.5
	4 - 6	RDWPC and NRDWPC	Iron	12,000	13,500
		RDWPC NRDWPC	Magnesium	8,000 22,000	16,900/ 26,100(Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.9/ 8.6 (Dup.)
		GSIPC	Selenium	0.41	0.6
SB-213	0 - 1	GSIPC	Selenium	0.41	0.5
	4 - 6	RDWPC NRDWPC	Magnesium	8,000 22,000	26,000
SB-214	0 - 1	GSIPC	Selenium	0.41	0.5
	3.5 - 5.5	RDWPC and NRDWPC	Iron	12,000	18,700
		RDWPC NRDWPC	Magnesium	8,000 22,000	26,400
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.0
SB-215	0 - 1	RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	10.9
	4 - 6	RDWPC and NRDWPC	Iron	12,000	14,200
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.3
		RDWPC NRDWPC	Magnesium	8,000 22,000	26,900/ 17,200 (Dup.)
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.7/ 22.6 (Dup.)
		GSIPC	Selenium	0.41	0.5/0.5 (Dup.)
SB-216	0 - 4	GSIPC	Mercury	0.13	0.98
		RDWPC	Magnesium	8,000	8,920
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	19
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	18.4
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-217	0 - 1	RDWPC and NRDWPC	Iron	12,000	15,000
		GSIPC	Mercury	0.13	0.21
		RDWPC	Magnesium	8,000	10,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
		GSIPC	Selenium	0.41	0.5
		TSCA High Occupancy	Total PCBs	1.0	1.1
	3 - 5	GSIPC	Chromium	3.3	19
		RDWPC NRDWPC	Magnesium	8,000 22,000	26,000
		GSIPC	Selenium	0.41	0.5
SB-218	0 - 1	RDWPC and NRDWPC	Iron	12,000	13,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	516
		RDWPC	Magnesium	8,000	9,910
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
		GSIPC	Selenium	0.41	0.5
	2.5 - 4.5	RDWPC and NRDWPC	Iron	12,000	14,800
		GSIPC	Chromium	3.3	19
		RDWPC NRDWPC	Magnesium	8,000 22,000	25,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.1
		RDWPC and NRDWPC GSIPC	Selenium	4 0.41	8.4
SB-219	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	8,210
		RDWPC and NRDWPC	Iron	12,000	16,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	676
		GSIPC	Mercury	0.13	0.44
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-220	0 - 1	RDWPC and NRDWPC	Iron	12,000	22,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	640
		GSIPC	Zinc	303	376
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	1.96
		RDWPC and NRDWPC	Antimony	4.3	54.5
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.3
		GSIPC	Selenium	0.41	0.6
		GSIPC	Copper	135	318
		RDWPC and NRDWPC RDCC NRDCC	Lead	700 400 900	1,050
		GSIPC	Fluoranthene	5.5	5.6
		GSIPC	Phenanthrene	2.1	3.1
SB-221	2 - 4	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.6/ 6.1 (Dup.)
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC GSIPC	Manganese	440 440	444 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-222	1.5 - 3.5	RDWPC and NRDWPC	Aluminum	6,900	9,600
		RDWPC and NRDWPC	Iron	12,000	24,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	463
		GSIPC	Chromium	3.3	21
		GSIPC	Zinc	303	413
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	2.87
		GSIPC	Silver	1	1.8
		RDWPC and NRDWPC	Antimony	4.3	10.9
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.7
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	6.9
		GSIPC	Selenium	0.41	1.2
		RDWPC and NRDWPC RDCC	Lead	700 400	782
		GSIPC	Copper	135	911
		RDCC	Indeno(1,2,3-cd)pyrene	20	22
		RDCC	Benzo(b)fluoranthene	20	39
		GSIPC	Fluoranthene	5.5	87
		RDCC	Benzo(a)anthracene	20	43
		RDWPC GSIPC	Phenanthrene	56 2.1	68
		GSIPC	Dibenzofuran	1.7	4.3
		RDCC	Dibenzo(a,h)anthracene	2	6.1
		GSIPC	Fluorene	5.3	7.3
		GSIPC	Carbazole	1.1	9.2
		GSIPC	Naphthalene	0.73	1.8
		RDCC NRDCC	Benzo(a)pyrene	2 8	33
SB-223	1 - 4	RDWPC and NRDWPC	Methylene chloride	0.1	0.14
		RDWPC and NRDWPC	Aluminum	6,900	7,000
		RDWPC and NRDWPC	Iron	12,000	14,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	590
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	1.85
		RDWPC	Magnesium	8,000	13,200
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.7
		GSIPC	Selenium	0.41	0.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-224	1 - 2	RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC	Magnesium	8,000	12,200
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	0.5
		GSIPC	Mercury	0.13	0.8
	2 - 4	RDWPC	Magnesium	8,000	14,500
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.1
		GSIPC	Mercury	0.13	0.53
SB-225	1 - 4	GSIPC	Selenium	0.41	0.6
SB-226	1 - 4	RDWPC and NRDWPC	Aluminum	6,900	9,110
		GSIPC	Chromium	3.3	22
		GSIPC	Mercury	0.13	0.64
		RDWPC	Magnesium	8,000	13,200
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	0.5
SB-227	0.4 – 1.4	RDWPC	Magnesium	8,000	13,200
	1.5 – 3.5	GSIPC	Mercury	0.13	0.15
		RDWPC	Magnesium	8,000	9,490
SB-229	0 - 1	GSIPC	Mercury	0.13	0.36
		RDWPC	Magnesium	8,000	16,500
	0.5 - 1.5	RDWPC	Magnesium	8,000	11,200
		GSIPC	Selenium	0.41	0.6
SB-230	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,290
		RDWPC and NRDWPC	Iron	12,000	18,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	524
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	24.3
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.5
		GSIPC	Selenium	0.41	1
	3 - 5	RDWPC	Magnesium	8,000	19,000
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	0.7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-231	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	26,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.6
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	38.1
		GSIPC	Selenium	0.41	1.1
		GSIPC	Copper	135	752
		RDWPC and NRDWPC	Iron	12,000	62,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	667
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	66
		RDWPC GSIPC	Zinc	2,400 303	4,600
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	4
		GSIPC	Fluoranthene	5.5	14
		GSIPC	Phenanthrene	2.1	6.8
		RDWPC	Phosphorus	1,300	1,380

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-232	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	9,000
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	37
		GSIPC	Mercury	0.13	0.56
		RDWPC	Magnesium	8,000	13,800
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	49.6
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.9
		GSIPC	Selenium	0.41	2.6
	6 - 8	RDWPC	Phosphorus	1,300	1,920
		RDWPC and NRDWPC	Aluminum	6,900	16,700
		RDWPC and NRDWPC	Iron	12,000	63,200
		GSIPC	Chromium	3.3	29
		GSIPC	Mercury	0.13	0.74
		RDWPC and NRDWPC GSIPC	Thallium	2.3 4.2	8.1
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	12.8
		RDWPC and NRDWPC GSIPC	Selenium	4 0.41	33.3
		RDWPC and NRDWPC RPSIC RDCC NRDCC GSIPC	Arsenic	5.8 720 7.6 37 5.8	804

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-233	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,340
		RDWPC and NRDWPC	Iron	12,000	21,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	581
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	36
		GSIPC	Mercury	0.13	0.15
		RDWPC	Magnesium	8,000	20,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.5
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	17.8
		GSIPC	Selenium	0.41	0.7
		GSIPC	Xylenes (total)	0.82	1.66
	2.5 - 4.5	RDWPC NRDWPC	Magnesium	8,000 22,000	22,400
SB-234	0 - 1	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.9
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	14.9
		GSIPC	Selenium	0.41	1
		RDWPC and NRDWPC	Iron	12,000	23,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	546
	4 - 6	GSIPC	Cyanide (total)	0.39	2.1
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,600/ 14,400 (Dup.)
SB-235	0.5 - 1.5	RDWPC and NRDWPC	Aluminum	6,900	9,160
		RDWPC and NRDWPC	Iron	12,000	17,500
		RDWPC	Magnesium	8,000	10,400
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.1
		GSIPC	Selenium	0.41	0.8
	3 - 5	RDWPC and NRDWPC	Aluminum	6,900	8,160
		RDWPC and NRDWPC	Iron	12,000	21,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	28.8
		GSIPC	Selenium	0.41	1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-236	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	6,960
		RDWPC and NRDWPC	Iron	12,000	23,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	496
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	31.8
		GSIPC	Mercury	0.13	1.18
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.2
		GSIPC	Selenium	0.41	1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-237	0 - 1	RDWPC and NRDWPC	Trichloroethene	0.1	0.23
		RDWPC and NRDWPC	Aluminum	6,900	8650
		RDWPC and NRDWPC	Iron	12,000	17800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	759
		GSIPC	Mercury	0.13	0.7
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.11
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	39.6
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.2
		GSIPC	Selenium	0.41	2.7
		GSIPC	Fluoranthene	5.5	22
		GSIPC	Phenanthrene	2.1	19
		RDCC	Benzo(a)pyrene	2	4.9
		GSIPC	Carbazole	1.1	2.7
	2 - 4	RDWPC and NRDWPC	Aluminum	6,900	8,000
		RDWPC and NRDWPC	Iron	12,000	19,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	495
		GSIPC	Mercury	0.13	0.74
		GSIPC	Carbazole	1.1	2.1
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.42
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	57.9
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.4
		GSIPC	Selenium	0.41	4
		RDCC	Benzo(a)pyrene	2	4.3
		GSIPC	Phenanthrene	2.1	12
		GSIPC	Fluoranthene	5.5	16

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-238	0 - 1	GSIPC	Cyanide (total)	0.39	2.3
		RDWPC and NRDWPC	Aluminum	6,900	7,700
		RDWPC and NRDWPC	Iron	12,000	19,700
		GSIPC	Zinc	303	1,560
		GSIPC	Mercury	0.13	0.59
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	39.3
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.5
		GSIPC	Selenium	0.41	3
		GSIPC	Fluoranthene	5.5	6.6
		GSIPC	Phenanthrene	2.1	5
		TSCA High Occupancy	Total PCBs	1.0	1.1
	2 - 4	RDWPC and NRDWPC	Nitrate (as N)	200	349/318 (Dup.)
		RDWPC and NRDWPC	Aluminum	6,900	8,020
		RDWPC and NRDWPC	Iron	12,000	16,200
		GSIPC	Mercury	0.13	0.74/0.65 (Dup.)
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.27
		GSIPC	Fluoranthene	5.5	5.6
		GSIPC	Phenanthrene	2.1	3.8/3.1 (Dup.)
		RDWPC	Magnesium	8,000	10,100 (Dup.)
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	49.7/ 46.7 (Dup.)
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.7/ 6.9 (Dup.)
		RDWPC and NRDWPC GSIPC	Selenium	4 0.41	4.6 4.3 (Dup.)
		RDCC	Lead	400	480 (Dup.)
		GSIPC	Xylenes (total)	0.82	1.17
		TSCA High Occupancy	Total PCBs	1.0	1.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-240	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,100
		RDWPC and NRDWPC	Iron	12,000	16,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	458
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.6
		GSIPC	Selenium	0.41	0.5
	4 - 6	RDWPC NRDWPC	Magnesium	8,000 22,000	25,300
SB-241	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	8,080
		RDWPC and NRDWPC	Iron	12,000	20,500
		RDWPC	Magnesium	8,000	11,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.6
		GSIPC	Selenium	0.41	0.7
	4 - 6	RDWPC	Magnesium	8,000	17,900
SB-242	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	623
		RDWPC	Magnesium	8,000	18,800
	4 - 6	RDWPC and NRDWPC	Iron	12,000	19,700
		RDWPC NRDWPC	Magnesium	8,000 22,000	23,900/ 20,000 (Dup.)
SB-243	0 - 1	GSIPC	Cyanide (total)	0.39	2.5
		RDWPC and NRDWPC	Aluminum	6,900	9,190
		RDWPC and NRDWPC	Iron	12,000	15,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	633
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.9
		GSIPC	Selenium	0.41	0.6
		RDCC	Lead	400	428
	4 - 6	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.4
		GSIPC	Selenium	0.41	0.7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-244	0 - 1	RDWPC and NRDWPC	Iron	12,000	12,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.6
		GSIPC	Selenium	0.41	0.5
	4 - 6	RDWPC and NRDWPC	Iron	12,000	12,400
		RDWPC	Magnesium	8,000	16,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	18.4
		GSIPC	Selenium	0.41	0.7
SB-246	0 - 1	GSIPC	Cyanide (total)	0.39	0.5
		GSIPC	Selenium	0.41	0.8
	3 - 4	RDWPC and NRDWPC	Iron	12,000	23,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.8
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.8
		GSIPC	Selenium	0.41	2.6
		GSIPC	Xylenes (total)	0.82	2.58
		GSIPC	Phenanthrene	2.1	2.7
		RDWPC and NRDWPC	Trichloroethene	0.1	0.43
	4 - 6	RDWPC and NRDWPC GSIPC	Manganese	440 440	640/ 629 (Dup.)
		GSIPC	Selenium	0.41	0.6/0.7 (Dup.)
SB-254	0 - 4	RDWPC and NRDWPC	Aluminum	6,900	11,000
		RDWPC and NRDWPC	Iron	12,000	18,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	608
		RDWPC	Magnesium	8,000	12,500
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.1
		GSIPC	Selenium	0.41	1.4
		GSIPC	Cyanide (total)	0.39	2
		GSIPC	Mercury	0.13	0.42

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-255	1 - 2	GSIPC	Mercury	0.13	0.20
		RDWPC and NRDWPC	Aluminum	6,900	7,070
		RDWPC and NRDWPC	Iron	12,000	14,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	496
		RDWPC	Magnesium	8,000	12,100
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.3
		GSIPC	Selenium	0.41	0.6
	2 - 4	RDWPC NRDWPC	Magnesium	8,000 22,000	25,700
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2
		GSIPC	Selenium	0.41	0.5
SB-256B	0 - 1	GSIPC	Mercury	0.13	0.23
		RDWPC	Magnesium	8,000	19,000
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.1
		GSIPC	Selenium	0.41	0.5
	2.5 - 4.5	GSIPC	Cyanide (total)	0.39	0.7
		RDWPC	Magnesium	8,000	17,500
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
SB-257	2 - 4	RDWPC	Magnesium	8,000	21,200
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	33.5
SB-258	0.8 - 3	RDWPC and NRDWPC	Aluminum	6,900	8,270
		RDWPC and NRDWPC	Iron	12,000	22,900
		RDWPC and NRDWPC GSIPC	Manganese	440 440	812
		GSIPC	Chromium	3.3	20.8
		GSIPC	Zinc	303	2,240
		GSIPC	Silver	1	1.04
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.6
		GSIPC	Selenium	0.41	0.6
		GSIPC	Copper	135	2,350
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	4.2
		RDWPC and NRDWPC RDCC NRDCC	Lead	700 400 900	1,720

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-259	1 - 4	RDWPC NRDWPC	Magnesium	8,000 22,000	25,400
		GSIPC	Selenium	0.41	1.7
SB-262	1 - 2	RDWPC and NRDWPC	Iron	12,000	12,300
		RDWPC	Magnesium	8,000	13,000
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.7
		GSIPC	Selenium	0.41	0.5
	2.5 - 4.5	RDWPC	Magnesium	8,000	16,300
SB-303	0 - 2	RDWPC and NRDWPC	Iron	12,000	13,100
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.3
		GSIPC	Mercury	0.13	0.18
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.8
		GSIPC	Selenium	0.41	1.3
	3.5 - 5.5	RDWPC and NRDWPC	Aluminum	6,900	7,250
		RDWPC and NRDWPC GSIPC	Manganese	440 440	716
	5.5 - 7.5	RDWPC	Magnesium	8,000	20,600
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2
	8 - 10	RDWPC NRDWPC	Magnesium	8,000 22,000	23,500/ 33,800 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-304	0 - 2	RDWPC and NRDWPC	Iron	12,000	15,200
		RDWPC	Magnesium	8,000	10,600
		GSIPC	Mercury	0.13	0.43
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.1
		GSIPC	Selenium	0.41	0.8
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.12
		GSIPC	Xylenes (total)	0.82	1.67
		RDWPC and NRDWPC	Benzene	0.1	0.17
	4 - 6	RDWPC and NRDWPC	Iron	12,000	12,300
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.8
	6 - 8	RDWPC NRDWPC	Magnesium	8,000 22,000	27,700
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.6
	8 - 10	RDWPC	Magnesium	8,000	18,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	487
SB-305	0 - 2	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.38
		RDWPC and NRDWPC	Methylene chloride	0.1	0.21
		RDWPC and NRDWPC GSIPC	Manganese	440 440	661
		GSIPC	Xylenes (total)	0.82	1.5
		GSIPC	Mercury	0.13	0.17
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.5
		GSIPC	Selenium	0.41	0.7
	8 - 10	RDWPC and NRDWPC	Iron	12,000	12,300

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-306	0 - 1	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.12
		RDWPC and NRDWPC	Iron	12,000	12,500
		RDWPC	Magnesium	8,000	8,640
		RDWPC and NRDWPC GSIPC	Manganese	440 440	467
		GSIPC	Xylenes (total)	0.82	1.79
		GSIPC	Mercury	0.13	1.67
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.25
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.4
		GSIPC	Selenium	0.41	0.9
	7.5 - 9.5	GSIPC	Chromium	3.3	19 (Dup.)
	9.5 - 11	RDWPC NRDWPC	Magnesium	8,000 22,000	17,300
SB-307	0 - 1	GSIPC	Ethylbenzene	0.36	0.88
		RDWPC and NRDWPC	Benzene	0.1	0.24
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	8.1
		GSIPC	Mercury	0.13	0.39
		GSIPC	Naphthalene	0.73	0.91
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.6
		GSIPC	Selenium	0.41	1.1
	6 - 8	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4 7.4 (Dup.)
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC	Iron	12,000	14,000 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	548 (Dup.)
	8 - 10	RDWPC NRDWPC	Magnesium	8,000 22,000	26,000
CTP-4	4	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	14.8
		GSIPC	Selenium	0.41	1.5
		RDCC NRDCC	Benzo(a)pyrene	2 8	24
		RDCC	Dibenzo(a,h)anthracene	2	4.9
		RDCC	Benzo(a)anthracene	20	26
		GSIPC	Phenanthrene	2.1	6.1
		GSIPC	2-Methylnaphthalene	4.2	5.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-308	0 - 2	RDWPC	Magnesium	8,000	20,300
	3 - 5	RDWPC and NRDWPC	Aluminum	6,900	7,660
		RDWPC and NRDWPC	Iron	12,000	16,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	516
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	3.12
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.3
		GSIPC	Selenium	0.41	1
	7.5 - 9.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.1
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC	Iron	12,000	21,700
		RDWPC	Magnesium	8,000	8,810
		RDWPC and NRDWPC GSIPC	Manganese	440 440	778
SB-309	0 - 1	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.83/0.96 (Dup.)
		GSIPC	Xylenes (total)	0.82	1.89/2.08 (Dup.)
		GSIPC	Mercury	0.13	0.99/1 (Dup.)
		GSIPC	Naphthalene	0.73	0.98/1.1 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8 9.2 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	14,900 (Dup.)
		GSIPC	Selenium	0.41	1.1/0.9 (Dup.)
	12.5 - 14.5	RDWPC NRDWPC	Magnesium	8,000 22,000	47,700
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-310	0 - 1	RDWPC and NRDWPC GSIPC	Ethylbenzene	1.5 0.36	3.1
		GSIPC	Toluene	5.4	13
		RDWPC and NRDWPC	Benzene	0.1	0.72
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	27
		GSIPC	Phenanthrene	2.1	2.2
		GSIPC	Naphthalene	0.73	2.1
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.3
		GSIPC	Selenium	0.41	2.8
	12 - 14	RDWPC NRDWPC	Magnesium	8,000 22,000	40,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.1
		GSIPC	Selenium	0.41	3.7
SB-311	0 - 1	RDWPC	Magnesium	8,000	8,370
		GSIPC	Mercury	0.13	0.55
		GSIPC	Naphthalene	0.73	1.3
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.6
		GSIPC	Xylenes (total)	0.82	1.77
		GSIPC	Selenium	0.41	1.1
		GSIPC	Fluoranthene	5.5	28
		GSIPC	Phenanthrene	2.1	39
		GSIPC	Dibenzofuran	1.7	4.4
		GSIPC	Fluorene	5.3	10
		GSIPC	Carbazole	1.1	7
	13 - 15	RDWPC NRDWPC	Magnesium	8,000 22,000	57,600
SB-312	0 - 1	RDWPC and NRDWPC	Iron	12,000	32,000
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	27
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	95.4
		GSIPC	Selenium	0.41	1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-339	0 - 1	GSIPC	Ethylbenzene	0.36	0.57
		RDWPC and NRDWPC	Benzene	0.1	0.24
		RDWPC and NRDWPC GSIPC	Xylenes (total)	5.6 0.82	6.1
		GSIPC	Cyanide (total)	0.39	0.8
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9
		GSIPC	Selenium	0.41	1.2
TP-340	0 - 1	RDWPC and NRDWPC	Iron	12,000	12,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	584
		RDWPC	Magnesium	8,000	9,560
		GSIPC	Selenium	0.41	1
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	18.7
	3 - 4	RDWPC and NRDWPC	Iron	12,000	14,100
		GSIPC	Phenanthrene	2.1	2.4
		RDWPC	Magnesium	8,000	18,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	18.1
		GSIPC	Selenium	0.41	0.9
		GSIPC	Copper	135	178

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-342	0 - 1	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.41
		RDWPC and NRDWPC	Iron	12,000	19,300
		GSIPC	Zinc	303	465
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.16
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,300
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	11.4
		GSIPC	Selenium	0.41	2
		GSIPC	Copper	135	2,550
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	102
		GSIPC	Fluoranthene	5.5	6.8
		GSIPC	Phenanthrene	2.1	4.1
	3.5 - 4	RDWPC and NRDWPC	Iron	12,000	23,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	492
		RDWPC	Magnesium	8,000	19,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.7
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-343	0 - 1	RDWPC and NRDWPC	Iron	12,000	13,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	493
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.14
		RDWPC	Magnesium	8,000	10,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	25.3
		GSIPC	Selenium	0.41	1.3
	3 - 4	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.31
		RDWPC and NRDWPC	Aluminum	6,900	7,830
		RDWPC and NRDWPC	Iron	12,000	16,200
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	19.6
		GSIPC	Selenium	0.41	1.4
TP-344	0 - 1	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6/ 6.5 (Dup.)
		GSIPC	Selenium	0.41	1.2/0.6 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,100
	1 - 3	RDWPC and NRDWPC	Aluminum	6,900	7,200
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.27
		RDWPC	Magnesium	8,000	9,610
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.6
		GSIPC	Selenium	0.41	1
	4 - 6	RDWPC and NRDWPC	Aluminum	6,900	12,200
		RDWPC and NRDWPC	Iron	12,000	34,200
		RDWPC	Vanadium	72	72.1
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	28.3
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.6
		GSIPC	Selenium	0.41	1.2
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.24

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
MW-19	0 - 2	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	18
		GSIPC	Xylenes (total)	0.82	1.5
		GSIPC	Selenium	0.41	1.6
		RDWPC and NRDWPC	Aluminum	6,900	7,370
		RDWPC and NRDWPC	Iron	12,000	14,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	602
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.5
		GSIPC	Mercury	0.13	0.61
	8 - 10	RDWPC	Magnesium	8,000	15,700
SPI-1	3 – 3.5	TSCA High Occupancy	Total PCBs	1.0	1.4
TP-8	5	TSCA High Occupancy	Total PCBs	1.0	1.4

No other parameters were detected in soil samples analyzed in Mixed Residential/Commercial Area 2 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Commercial Area 1

Exceedances of constituents in soil samples are present at various locations in Commercial Area 1 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SS-101	0 - 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	687
		GSIPC	Selenium	0.41	0.6
SS-102	0 – 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	735

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SS-103	0 - 2	RDWPC and NRDWPC	Aluminum	6,900	8,200
		RDWPC and NRDWPC	Iron	12,000	14,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,260
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.6
		GSIPC	Selenium	0.41	0.6
SS-104	0 - 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	731
		GSIPC	Selenium	0.41	0.5
SS-105	0 - 2	RDWPC and NRDWPC	Aluminum	6,900	8,460
		RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC and NRDWPC NRPSIC GSIPC	Manganese	440 1,500 440	1,510
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.7
		GSIPC	Selenium	0.41	0.6
SS-106	0 – 2	RDWPC and NRDWPC	Aluminum	6,900	8,250/ 7,870 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	12,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,120/ 1,220 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.8/ 8.9 (Dup.)
		GSIPC	Selenium	0.41	0.8
SS-107	0 – 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	582
		GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-133	0 - 1	RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	449
		GSIPC	Mercury	0.13	0.24
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10
		GSIPC	Selenium	0.41	1
		TSCA High Occupancy	Total PCBs	1.0	1.02
	7 - 9	RDWPC	Magnesium	8,000	11,900/ 14,400 (Dup.)
		GSIPC	Zinc	303	789 (Dup.)
		GSIPC	Mercury	0.13	0.15 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	6.9/ 8.4 (Dup.)
		GSIPC	Selenium	0.41	0.8/ 1.2 (Dup.)
		GSIPC	Xylenes (total)	0.82	1.22 (Dup.)
		TSCA High Occupancy	Total PCBs	1.0	2.7/ 2.6 (Dup.)
SB-142	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	832
	8.5 - 10.5	RDWPC	Magnesium	8,000	21,700
SB-144	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	936
	7 - 9	RDWPC and NRDWPC	Iron	12,000	14,900
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,900/ 13,600 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.6
		GSIPC	Chromium	3.3	22 (Dup.)
SB-145	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	594
	7.5 - 9.5	RDWPC and NRDWPC	Iron	12,000	13,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	590
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4

No other parameters were detected in soil samples analyzed in Commercial Area 1 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup

Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Commercial Area 2

Exceedances of constituents in soil samples are present at various locations in Commercial Area 2 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-323	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	739
		GSIPC	Mercury	0.13	0.19
		GSIPC	Selenium	0.41	0.7
	8 - 10	RDWPC and NRDWPC	Iron	12,000	15,700/ 15,900 (Dup.)
		RDWPC	Magnesium	8,000	13,100/ 13,000 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2/ 7.2 (Dup.)
		GSIPC	Selenium	0.41	0.8/ 0.7 (Dup.)
SB-325	0 - 1	GSIPC	Cyanide (total)	0.39	2.3
		RDWPC and NRDWPC GSIPC	Manganese	440 440	484
	8 - 10	RDWPC	Magnesium	8,000	21,400
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.5
SB-326	8 - 10	RDWPC NRDWPC	Magnesium	8,000 22,000	19,900/ 24,600 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.5
SB-327	0 - 1	RDWPC and NRDWPC	Methylene chloride	0.1	0.11
		RDWPC	Magnesium	8,000	8,710
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.4

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-327B	8 - 10	RDWPC and NRDWPC	Aluminum	6,900	7,160
		RDWPC and NRDWPC	Iron	12,000	13,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	584
		GSIPC	Chromium	3.3	19
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.7
		GSIPC	Selenium	0.41	0.8
SB-328	0 - 1	GSIPC	Cyanide (total)	0.39	2.4
		RDWPC and NRDWPC GSIPC	Manganese	440 440	543
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
		GSIPC	Selenium	0.41	1.2
	8 - 10	RDWPC and NRDWPC	Aluminum	6,900	7,740
		RDWPC and NRDWPC	Iron	12,000	18,600
		GSIPC	Chromium	3.3	20
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.7
		GSIPC	Selenium	0.41	0.7
SB-329	0 - 1	RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	0.7
	8 - 10	RDWPC NRDWPC	Magnesium	8,000 22,000	23,400
SB-330	0 - 1	RDWPC	Magnesium	8,000	11,000
		GSIPC	Selenium	0.41	0.6
	8 - 10	RDWPC and NRDWPC	Aluminum	6,900	6,980
		RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	441
		RDWPC	Magnesium	8,000	14,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.3
		GSIPC	Selenium	0.41	0.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-331	8 - 10	RDWPC and NRDWPC	Aluminum	6,900	8,770
		RDWPC and NRDWPC	Iron	12,000	29,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,310
		GSIPC	Chromium	3.3	19
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	46.9
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.2
		GSIPC	Selenium	0.41	1.4
SB-340	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	639/ 616 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.3
		GSIPC	Selenium	0.41	0.6/ 0.5 (Dup.)
SB-342	0 - 1	GSIPC	Cyanide (total)	0.39	1
	8 - 10	GSIPC	Selenium	0.41	0.6
SB-343	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	547
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6
		GSIPC	Selenium	0.41	0.7
TP-316	0 - 1	RDWPC and NRDWPC	Iron	12,000	12,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.4
		GSIPC	Selenium	0.41	0.5
	6 - 8	RDWPC	Magnesium	8,000	12,000
		GSIPC	Selenium	0.41	0.5
TP-317	0 - 1	RDWPC	Magnesium	8,000	8,210
	4 - 6	RDWPC NRDWPC	Magnesium	8,000 22,000	43,100
TP-318	6 - 8	GSIPC	Selenium	0.41	0.5
TP-321	0 - 1	RDWPC and NRDWPC	Methylene chloride	0.1	0.21
		RDWPC and NRDWPC	Iron	12,000	13,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	34.7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-322	6 - 8	GSIPC	Cyanide (total)	0.39	1.3
		GSIPC	Selenium	0.41	0.5
TP-323	0 - 1	GSIPC	Selenium	0.41	0.5
TP-324	0 - 1	GSIPC	Selenium	0.41	0.5
	9 - 10	RDWPC and NRDWPC	Aluminum	6,900	7,010 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	17,100/ 22,000 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.8/ 16.5 (Dup.)
		GSIPC	Selenium	0.41	0.5/ 0.7 (Dup.)
		RDWPC	Magnesium	8,000	16,400
TP-325	0 - 1	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.9
	8 - 10	RDWPC and NRDWPC	Iron	12,000	13,800
		RDWPC	Magnesium	8,000	11,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.4
		GSIPC	Selenium	0.41	0.9
TP-326	6 - 8	RDWPC and NRDWPC	Iron	12,000	13,400
		RDWPC	Magnesium	8,000	10,700
		GSIPC	Selenium	0.41	0.5
TP-327	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	9,340
		RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	912
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
		GSIPC	Selenium	0.41	0.7
	7 - 9	RDWPC and NRDWPC GSIPC	Manganese	440 440	496
		RDWPC	Magnesium	8,000	18,200
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6
		GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-328	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	675
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4
	6 - 8	RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC	Magnesium	8,000	20,400/ 20,500 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2

No other parameters were detected in soil samples analyzed in Commercial Area 2 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Commercial Area 3

Exceedances of constituents in soil samples are present at various locations in Commercial Area 3 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
MW-18	0 - 2	RDWPC and NRDWPC	Aluminum	6,900	6,960
		RDWPC and NRDWPC GSIPC	Manganese	440 440	740
		GSIPC	Selenium	0.41	0.6
	8 - 10	RDWPC and NRDWPC	Iron	12,000	15,800
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	580
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-248	0 - 1	GSIPC	Cyanide (total)	0.39	2.2
		RDWPC and NRDWPC	Iron	12,000	12,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	600
		GSIPC	Mercury	0.13	0.26
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.5
		GSIPC	Selenium	0.41	1
	4 - 6	RDWPC and NRDWPC	Iron	12,000	12,900
		RDWPC and NRDWPC GSIPC	Manganese	440 440	485
		GSIPC	Chromium	3.3	25
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8
		GSIPC	Selenium	0.41	0.7
	0.5 - 1.5	RDWPC and NRDWPC	Aluminum	6,900	8,460
		RDWPC and NRDWPC	Iron	12,000	14,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	613
		GSIPC	Mercury	0.13	0.25
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.4
		GSIPC	Selenium	0.41	0.8
TP-304	0.5 - 1.5	RDWPC and NRDWPC	Methylene chloride	0.1	0.23
		RDWPC and NRDWPC GSIPC	Mercury	0.13 1.7	4.69
	5 - 7	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.1
		RDWPC and NRDWPC	Iron	12,000	16,600
		RDWPC	Magnesium	8,000	18,900
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	9.4

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-305	0.5 - 1.5	RDWPC and NRDWPC	Methylene chloride	0.1	0.20
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16
		GSIPC	Selenium	0.41	2.6
	2 - 4	RDWPC and NRDWPC	Aluminum	6,900	7,140
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,200
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	9.7
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
	6 - 8	RDWPC	Magnesium	8,000	8,220
TP-307	0.5 - 1.5	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16/ 18 (Dup.)
	2 - 3	RDWPC and NRDWPC	Methylene chloride	0.1	0.21
		GSIPC	Mercury	0.13	0.33
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13
		GSIPC	Selenium	0.41	1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-337	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	26,700
		GSIPC	Selenium	0.41	0.5
	2 - 4	GSIPC	Cyanide (total)	0.39	0.6
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.3
		GSIPC	Selenium	0.41	1.3
	8 - 10	GSIPC	Cyanide (total)	0.39	1.3
		RDWPC	Magnesium	8,000	11,000
		GSIPC	Selenium	0.41	0.5
TP-338	0 - 1	GSIPC	Selenium	0.41	0.6/ 0.7 (Dup.)
		GSIPC	Xylenes (total)	0.82	2.62/ 1.45 (Dup.)
		RDWPC and NRDWPC	Benzene	0.1	0.13
	8 - 10	RDWPC and NRDWPC	Aluminum	6,900	7,020
		RDWPC and NRDWPC	Iron	12,000	18,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	519
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.6
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.0
		GSIPC	Selenium	0.41	0.7

No other parameters were detected in soil samples analyzed in Commercial Area 3 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Commercial Area 4

Exceedances of constituents in soil samples are present at various locations in Commercial Area 4 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
BK-5	2.5 – 3	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11
		GSIPC	Mercury	0.13	0.34
MW-16	0 - 2	RDWPC and NRDWPC	Aluminum	6,900	8,070
		RDWPC and NRDWPC	Iron	12,000	13,500
		RDWPC	Magnesium	8,000	22,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	547
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	39
		GSIPC	Mercury	0.13	0.43
		TSCA High Occupancy	Total PCBs	1.0	11
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.9
		GSIPC	Selenium	0.41	0.6
	3 - 5	RDWPC	Magnesium	8,000	18,000
		TSCA High Occupancy	Total PCBs	1.0	1.109
	8 - 10	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.6
		GSIPC	Selenium	0.41	1.4
		RDWPC and NRDWPC	Aluminum	6,900	8,320
		RDWPC and NRDWPC	Iron	12,000	16,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	841
		GSIPC	Chromium	3.3	19
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	2.22

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
MW-17	0 - 2	RDWPC and NRDWPC GSIPC	Manganese	440 440	795/ 590 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8/ 8.6 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	12,100
	8 - 10	RDWPC and NRDWPC	Iron	12,000	33,800
		RDWPC	Magnesium	8,000	8,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,120
		GSIPC	Chromium	3.3	23
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.3
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	29.6
		GSIPC	Selenium	0.41	1.2
SB-201	0 - 1	GSIPC	Cyanide (total)	0.39	1.5
		RDWPC and NRDWPC	Iron	12,000	14,200
		GSIPC	Copper	135	194
		GSIPC	Zinc	303	668
		GSIPC	Mercury	0.13	0.42
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.1
		GSIPC	Selenium	0.41	0.6
	2 - 4	RDWPC and NRDWPC	Iron	12,000	42,100
		RDWPC	Magnesium	8,000	8,800
		GSIPC	Copper	135	349
		GSIPC	Zinc	303	1,210
		GSIPC	Mercury	0.13	0.72
		RDWPC and NRDWPC	Antimony	4.3	8.4
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.3
		GSIPC	Selenium	0.41	1.1
		RDWPC and NRDWPC RDCC	Lead	700 400	771

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-202	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,320
		RDWPC and NRDWPC	Iron	12,000	14,700
		RDWPC	Magnesium	8,000	11,800
		GSIPC	Chromium	3.3	19
		GSIPC	Copper	135	194
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.8
		GSIPC	Selenium	0.41	1
	2 - 4	RDWPC and NRDWPC	Tetrachloroethene	0.1	1.1
		RDWPC and NRDWPC	Aluminum	6,900	7,190
		RDWPC and NRDWPC	Iron	12,000	12,400
		RDWPC	Magnesium	8,000	17,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	677
		GSIPC	Chromium	3.3	19
		GSIPC	Copper	135	926
		GSIPC	Zinc	303	470
		GSIPC	Mercury	0.13	0.32
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	20.0
		GSIPC	Selenium	0.41	0.9

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-203	0 - 1	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.53
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.8
		GSIPC	Selenium	0.41	0.8
		RDWPC and NRDWPC	Iron	12,000	17,300
		RDWPC	Magnesium	8,000	14,200
		GSIPC	Mercury	0.13	0.35
	2 - 4	RDWPC and NRDWPC	Aluminum	6,900	7,070/ 7,110(Dup.)
		RDWPC and NRDWPC	Iron	12,000	16,200/ 25,500 (Dup.)
		RDWPC	Magnesium	8,000	9,600/ 8,900(Dup.)
		GSIPC	Chromium	3.3	23 (Dup.)
		GSIPC	Zinc	303	1,130/ 843(Dup.)
		GSIPC	Mercury	0.13	0.68/ 0.67(Dup.)
		RDWPC and NRDWPC	Antimony	4.3	8.2/ 13.7 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.6/ 13.0 (Dup.)
		GSIPC	Selenium	0.41	0.7/ 0.6 (Dup.)
		RDWPC and NRDWPC RDCC	Lead	700 400	723 (Dup.)
		RDWPC GSIPC	Silver	4.5 1	10.9
		GSIPC	Phenanthrene	2.1	2.4
		RDWPC and NRDWPC GSIPC	Copper	5,800 135	20,000/ 3,590 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-204	0 - 1	RDWPC and NRDWPC	Iron	12,000	23,000
		RDWPC	Magnesium	8,000	11,400
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.9
		GSIPC	Selenium	0.41	1
	2 - 4	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.21
		RDWPC and NRDWPC	Iron	12,000	19,500
		RDWPC NRDWPC	Magnesium	8,000 22,000	43,800
		GSIPC	Copper	135	290
		GSIPC	Zinc	303	849
		GSIPC	Mercury	0.13	0.48
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.5
		GSIPC	Selenium	0.41	0.7
SB-245	0 - 1	RDWPC and NRDWPC	Iron	12,000	19,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	590
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.4
		GSIPC	Selenium	0.41	1
	5 - 7	RDWPC NRDWPC	Magnesium	8,000 22,000	23,500
SB-249	0 - 1	RDWPC and NRDWPC	Iron	12,000	13,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	690
		GSIPC	Mercury	0.13	0.32
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.9
		GSIPC	Selenium	0.41	0.7
	12 - 14	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.52
		RDWPC and NRDWPC	Aluminum	6,900	10,300
		RDWPC and NRDWPC	Iron	12,000	15,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	580
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.8
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	6.9
		GSIPC	Selenium	0.41	0.7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-250	0 - 1	RDWPC and NRDWPC	Iron	12,000	12,400
		GSIPC	Selenium	0.41	0.5
	3 - 5	RDWPC	Magnesium	8,000	17,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
		GSIPC	Selenium	0.41	0.5
SB-253	2.5 - 4.5	RDWPC NRDWPC	Magnesium	8,000 22,000	28,400
SB-263	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,170
		RDWPC and NRDWPC	Iron	12,000	13,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	480
		GSIPC	Mercury	0.13	0.26
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.6
		GSIPC	Selenium	0.41	0.6
	3 - 5	RDWPC and NRDWPC GSIPC	Tetrachloroethene	0.1 1.2	3
		RDWPC and NRDWPC GSIPC	1,1,1-Trichloroethane	4 1.8	4.1
		RDWPC and NRDWPC	Aluminum	6,900	7,440
		RDWPC and NRDWPC	Iron	12,000	16,600
		GSIPC	Mercury	0.13	0.27
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.4
		GSIPC	Selenium	0.41	1.3

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-264	0 - 1	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.96
		RDWPC and NRDWPC	Benzene	0.1	0.35
		RDWPC and NRDWPC	Trichloroethene	0.1	0.37
		RDWPC and NRDWPC	Iron	12,000	14,800
		GSIPC	Mercury	0.13	0.8
		GSIPC	Naphthalene	0.73	1.6
		RDWPC and NRDWPC	Antimony	4.3	6.7
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.8
		GSIPC	Selenium	0.41	1.4
		GSIPC	Copper	135	302
		GSIPC	Fluoranthene	5.5	7.2
		GSIPC	Phenanthrene	2.1	5.8
		GSIPC	Xylenes (total)	0.82	1.53
	2.5 - 4.5	GSIPC	Cyanide (total)	0.39	1.8
		RDWPC NRDWPC	Magnesium	8,000 22,000	28,400
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.9
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-265	0 - 1	RDWPC and NRDWPC	Iron	12,000	23,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	632
		GSIPC	Naphthalene	0.73	0.99
		RDWPC and NRDWPC	Antimony	4.3	8.7
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	31.6
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	9
		GSIPC	Selenium	0.41	1.5
		GSIPC	Phenanthrene	2.1	4.1
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.23
		RDWPC and NRDWPC	Benzene	0.1	0.14
		GSIPC	Mercury	0.13	0.47
		GSIPC	Xylenes (total)	0.82	0.85
	2 - 4	RDWPC and NRDWPC	Aluminum	6,900	7,040
		RDWPC and NRDWPC	Iron	12,000	34,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,150
		RDWPC	Magnesium	8,000	13,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.9
		GSIPC	Selenium	0.41	2
		RDWPC and NRDWPC	Methylene chloride	0.1	0.19
SB-266	1.4 - 2.4	RDWPC and NRDWPC	Iron	12,000	13,300
		RDWPC	Magnesium	8,000	14,700
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.5
		GSIPC	Selenium	0.41	1
	2.5 - 4.5	RDWPC NRDWPC	Magnesium	8,000 22,000	22,800/ 30,300 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.5
		GSIPC	Selenium	0.41	0.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-267	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,200
		RDWPC and NRDWPC	Iron	12,000	12,200
		GSIPC	Chromium	3.3	26
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,100
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.3
		GSIPC	Selenium	0.41	0.9
	2.5 - 4.5	RDWPC and NRDWPC	Iron	12,000	13,100
		RDWPC NRDWPC	Magnesium	8,000 22,000	28,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4
		GSIPC	Selenium	0.41	1
SB-268	0 - 1	RDWPC and NRDWPC	Iron	12,000	12,400
		RDWPC	Magnesium	8,000	8,140
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7
		GSIPC	Selenium	0.41	0.8
	5 - 7	RDWPC NRDWPC	Magnesium	8,000 22,000	33,300
SB-269	0 - 1	RDWPC	Magnesium	8,000	9,750
	2.5 - 4.5	RDWPC and NRDWPC	Iron	12,000	14,100
		RDWPC NRDWPC	Magnesium	8,000 22,000	33,000
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
SB-270	0 - 1	GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC GSIPC	Manganese	440 440	521
SB-270B	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,440
		GSIPC	Mercury	0.13	0.28
		RDWPC	Magnesium	8,000	17,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.8
		GSIPC	Selenium	0.41	0.5
	3 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	27,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.9
		RDWPC and NRDWPC	Aluminum	6,900	9,130
		RDWPC and NRDWPC	Iron	12,000	22,800
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.25

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-271	1.5 - 4	RDWPC and NRDWPC	Aluminum	6,900	7,060
		RDWPC and NRDWPC	Iron	12,000	14,700
		GSIPC	Selenium	0.41	0.6
SB-272	1 - 3	RDWPC and NRDWPC	Aluminum	6,900	8,350
		GSIPC	Chromium	3.3	26
		RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	3.01
		RDWPC	Magnesium	8,000	15,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.1
		GSIPC	Selenium	0.41	0.9
SB-273	1 - 3	RDWPC and NRDWPC	Aluminum	6,900	9,650
		RDWPC and NRDWPC	Iron	12,000	21,100
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	32
		RDWPC	Magnesium	8,000	8,030
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	12.8
		GSIPC	Selenium	0.41	0.8
SB-274	0 - 1	RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	42.3
		GSIPC	Selenium	0.41	1.3
		RDWPC and NRDWPC	Iron	12,000	85,200
		RDWPC and NRDWPC RPSIC NRPSIC GSIPC	Manganese	440 3,300 1,500 440	3,900
	2.5 - 4.5	RDWPC and NRDWPC	Iron	12,000	17,700
		RDWPC and NRDWPC GSIPC	Manganese	440 440	673
		RDWPC	Magnesium	8,000	19,100
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.5
		GSIPC	Selenium	0.41	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-275	0 - 1	RDWPC and NRDWPC	Iron	12,000	20,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	608
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	14.6
		GSIPC	Selenium	0.41	0.8
	2.5 - 4.5	RDWPC NRDWPC	Magnesium	8,000 22,000	22,700
		GSIPC	Selenium	0.41	0.5
SB-276	0 - 1	RDWPC	Magnesium	8,000	16,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.1
		GSIPC	Selenium	0.41	0.6
	4 - 6	RDWPC	Magnesium	8,000	18,200
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6
		GSIPC	Selenium	0.41	0.6
SB-277	0 - 1	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.34
		RDWPC and NRDWPC	Iron	12,000	12,500
		GSIPC	Mercury	0.13	0.2
		RDWPC	Magnesium	8,000	14,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2
		GSIPC	Selenium	0.41	0.6
	3 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	24,400
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-278	0 - 1	RDWPC and NRDWPC	Iron	12,000	19,800
		RDWPC and NRDWPC GSIPC	Manganese	440 440	650
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	14.2
		GSIPC	Selenium	0.41	1.4
	3 - 5	RDWPC and NRDWPC	Iron	12,000	12,800
		RDWPC NRDWPC	Magnesium	8,000 22,000	28,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.6
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.3
SB-279	0 - 1	GSIPC	Cyanide (total)	0.39	2.4
		RDWPC and NRDWPC	Iron	12,000	18,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	506
		RDWPC	Magnesium	8,000	19,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.8
		GSIPC	Selenium	0.41	0.9
	3 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	26,000/ 26,600 (Dup.)
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.8 (Dup.)
		GSIPC	Cyanide (total)	0.39	0.6

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-280	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	11,500
		RDWPC and NRDWPC	Iron	12,000	47,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	786
		GSIPC	Chromium	3.3	26
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	75.4
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	10.6
		GSIPC	Selenium	0.41	1.5
	3 - 5	RDWPC and NRDWPC	Aluminum	6,900	10,400
		RDWPC and NRDWPC	Iron	12,000	19,900
		RDWPC and NRDWPC GSIPC	Manganese	440 440	512
		GSIPC	Chromium	3.3	19
		RDWPC	Magnesium	8,000	10,100
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.5
		GSIPC	Selenium	0.41	0.8

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-281	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	13,400
		RDWPC and NRDWPC	Iron	12,000	34,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	765
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	33
		RDWPC	Magnesium	8,000	9,740
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.2
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	9.3
		GSIPC	Selenium	0.41	1.4
	3 - 5	RDWPC and NRDWPC	Aluminum	6,900	13,100
		RDWPC and NRDWPC	Iron	12,000	44,400
		RDWPC and NRDWPC GSIPC	Manganese	440 440	656
		RDWPC	Magnesium	8,000	17,700
		RDWPC	Sodium	4,600	3,270
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	23.8
		GSIPC	Selenium	0.41	1.8
		RDWPC	Phosphorus	1,300	3,860

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-282	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	9,960
		RDWPC and NRDWPC	Iron	12,000	21,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	491
		RDWPC	Magnesium	8,000	16,200
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.1
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.6
		GSIPC	Selenium	0.41	1.1
	3 - 5	RDWPC and NRDWPC	Aluminum	6,900	7,410
		RDWPC and NRDWPC	Iron	12,000	15,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	460
		GSIPC	Chromium	3.3	20
		RDWPC NRDWPC	Magnesium	8,000 22,000	25,400
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.2
		GSIPC	Selenium	0.41	0.7
SB-283	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	8,730
		RDWPC and NRDWPC	Iron	12,000	17,900
		RDWPC and NRDWPC GSIPC	Manganese	440 440	662
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.4
		GSIPC	Selenium	0.41	0.8
	3 - 5	RDWPC and NRDWPC	Iron	12,000	12,700
		RDWPC	Magnesium	8,000	19,300
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2
		GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-284	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	10,800
		RDWPC and NRDWPC	Iron	12,000	24,300
		RDWPC and NRDWPC GSIPC	Manganese	440 440	464
		GSIPC	Chromium	3.3	22
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.4
		GSIPC	Selenium	0.41	0.9
	2.5 - 4.5	RDWPC and NRDWPC	Methylene chloride	0.1	0.23
		RDWPC and NRDWPC	Aluminum	6,900	8,310
		RDWPC and NRDWPC	Iron	12,000	21,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	496
		GSIPC	Chromium	3.3	22
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.6
		GSIPC	Selenium	0.41	0.9
SB-285	0 - 1	RDWPC and NRDWPC	Iron	12,000	16,000
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,500
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	14.2
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	6.9
		GSIPC	Selenium	0.41	0.5
	4 - 6	RDWPC NRDWPC	Magnesium	8,000 22,000	24,600
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7
		GSIPC	Selenium	0.41	0.7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-286	0 - 1	RDWPC and NRDWPC GSIPC	Tetrachloroethene	0.1 1.2	4.3
		GSIPC	Selenium	0.41	0.9
		GSIPC	Phenanthrene	2.1	3.6
		GSIPC	Naphthalene	0.73	1.7
		GSIPC	Xylenes (total)	0.82	1.44
	4 - 6	RDWPC NRDWPC	Magnesium	8,000 22,000	24,700
		GSIPC	Selenium	0.41	0.5
SB-287	0 - 1	RDWPC	Magnesium	8,000	19,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8
		GSIPC	Selenium	0.41	0.5
	3 - 5	RDWPC	Magnesium	8,000	22,000
		GSIPC	Selenium	0.41	0.6
SB-288	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	25,300
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.1
		GSIPC	Selenium	0.41	0.8
	5 - 7	RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.8 (Dup.)
		GSIPC	Selenium	0.41	0.7/ 0.7 (Dup.)
		RDWPC and NRDWPC	Aluminum	6,900	7,360
		RDWPC and NRDWPC	Iron	12,000	14,500
		RDWPC NRDWPC	Magnesium	8,000 22,000	29,500/ 21,500 (Dup.)
SB-289	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	8,020
		RDWPC and NRDWPC	Iron	12,000	22,500
		RDWPC and NRDWPC GSIPC	Manganese	440 440	628
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	21.6
		GSIPC	Selenium	0.41	0.8
	5 - 7	RDWPC NRDWPC	Magnesium	8,000 22,000	29,100

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-290	0 - 1	RDWPC and NRDWPC	Iron	12,000	27,000
		RDWPC and NRDWPC GSIPC	Manganese	440 440	545
		RDWPC	Magnesium	8,000	14,500
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	36.0
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 5.8	7.6
		GSIPC	Selenium	0.41	0.9
	5 - 7	RDWPC and NRDWPC	Aluminum	6,900	15,100
		RDWPC and NRDWPC	Iron	12,000	23,700
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	37
		RDWPC	Magnesium	8,000	21,300
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	20
		GSIPC	Selenium	0.41	0.9
		GSIPC	Copper	135	378
SB-291	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	29,200
		GSIPC	Selenium	0.41	0.6
	3 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	27,600/ 27,500 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	6/ 8 (Dup.)
		GSIPC	Selenium	0.41	0.6/ 0.6 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-292	0 - 1	RDWPC	Magnesium	8,000	12,500
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
		GSIPC	Selenium	0.41	0.5
	3 - 5	RDWPC and NRDWPC	Iron	12,000	16,800/ 14,700 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	1,020
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.4/ 7.7 (Dup.)
		RDWPC	Magnesium	8,000	11,800 (Dup.)
		GSIPC	Selenium	0.41	0.8/ 0.9 (Dup.)
SB-293	0 - 1	RDWPC	Magnesium	8,000	11,200
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.3
		GSIPC	Selenium	0.41	0.7
	2.5 - 4.5	RDWPC and NRDWPC	Aluminum	6,900	7,200
		RDWPC and NRDWPC	Iron	12,000	15,600
		RDWPC	Magnesium	8,000	18,500
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.7
SB-294	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	8,160
		RDWPC and NRDWPC	Iron	12,000	15,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	591
		RDWPC	Magnesium	8,000	9,440
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	20.5
		GSIPC	Selenium	0.41	1.2
	3 - 5	RDWPC	Magnesium	8,000	18,500
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.7
		GSIPC	Selenium	0.41	0.6
		RDWPC and NRDWPC	Iron	12,000	13,100

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-295	0 - 1	RDWPC and NRDWPC	Aluminum	6,900	7,760
		RDWPC and NRDWPC	Iron	12,000	16,000
		GSIPC	Chromium	3.3	24
		RDWPC	Magnesium	8,000	9,250
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	7.7
		GSIPC	Selenium	0.41	0.8
	3 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	23,800
		GSIPC	Selenium	0.41	0.5
SB-296	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	23,200
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.4
	2.5 - 4.5	RDWPC	Magnesium	8,000	20,300
		GSIPC	Selenium	0.41	0.6
SB-297	0 - 1	RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.7
		GSIPC	Selenium	0.41	0.5
	1 - 2	GSIPC	Cyanide (total)	0.39	0.7
		RDWPC and NRDWPC	Iron	12,000	17,600
		GSIPC	Mercury	0.13	0.19
		RDWPC	Magnesium	8,000	8,050
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.7
		GSIPC	Xylenes (total)	0.82	1.37
		GSIPC	Selenium	0.41	1
	14 - 16	RDWPC and NRDWPC	Iron	12,000	15,600
		RDWPC and NRDWPC GSIPC	Manganese	440 440	478
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,200
		GSIPC	Selenium	0.41	0.5
SB-298	0 - 1	RDWPC	Magnesium	8,000	15,600
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.4
		GSIPC	Selenium	0.41	0.8
	3.5 - 4.5	RDWPC	Magnesium	8,000	18,300
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-299	0 - 1	RDWPC	Magnesium	8,000	16,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.0
		GSIPC	Selenium	0.41	0.7
	4 - 5	RDWPC and NRDWPC	Iron	12,000	15,100
		RDWPC NRDWPC	Magnesium	8,000 22,000	22,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	15.8
		GSIPC	Selenium	0.41	0.5
SB-2001	0 - 1	RDWPC and NRDWPC GSIPC	Manganese	440 440	464
		RDWPC	Magnesium	8,000	16,100
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.3
		GSIPC	Selenium	0.41	0.6
	2.75 - 4.75	RDWPC and NRDWPC	Iron	12,000	13,600
		RDWPC	Magnesium	8,000	18,300
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
		GSIPC	Selenium	0.41	0.7
SB-2002	0 - 1	RDWPC	Phosphorus	1,300	2,030
		RDWPC and NRDWPC	Iron	12,000	15,100
		RDWPC	Magnesium	8,000	12,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	12.2
		GSIPC	Selenium	0.41	0.8
	2.5 - 4.5	RDWPC NRDWPC	Magnesium	8,000 22,000	24,800
		GSIPC	Selenium	0.41	0.6
SB-2003	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	26,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6
		GSIPC	Selenium	0.41	0.6
	1.5 - 3.5	RDWPC NRDWPC	Magnesium	8,000 22,000	23,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-2004	0 - 1	RDWPC and NRDWPC	Iron	12,000	23,500
		RDWPC	Magnesium	8,000	14,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.6
		GSIPC	Selenium	0.41	0.9
	2 - 4	RDWPC	Magnesium	8,000	18,400
SB-2005	0 - 1	RDWPC	Magnesium	8,000	18,800
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9
		GSIPC	Selenium	0.41	0.5
	2.5 - 4.5	RDWPC and NRDWPC GSIPC	Manganese	440 440	509
		GSIPC	Mercury	0.13	0.14
		RDWPC	Magnesium	8,000	9,200
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9
		GSIPC	Selenium	0.41	0.7
SB-2006	2 - 5	RDWPC	Magnesium	8,000	17,900
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.4
		GSIPC	Selenium	0.41	0.8
SB-2007	0 - 1	RDWPC NRDWPC	Magnesium	8,000 22,000	23,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	5.9
		GSIPC	Selenium	0.41	0.6
	2.5 - 4.5	GSIPC	Selenium	0.41	0.6/ 0.5 (Dup.)
		RDWPC NRDWPC	Magnesium	8,000 22,000	62,400/ 31,200 (Dup.)
		RDWPC and NRDWPC	Iron	12,000	17,400 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	471 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.6 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-2008	0 - 1	RDWPC	Phosphorus	1,300	2,040
		RDWPC and NRDWPC	Iron	12,000	18,900
		RDWPC and NRDWPC GSIPC	Manganese	440 440	566
		RDWPC	Magnesium	8,000	21,000
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.4
		GSIPC	Selenium	0.41	0.8
	3 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	29,300
		GSIPC	Selenium	0.41	0.8
SB-2009	1 - 2	RDWPC and NRDWPC	Tetrachloroethene	0.1	0.18
		RDWPC and NRDWPC	Aluminum	6,900	9,770
		RDWPC and NRDWPC	Iron	12,000	21,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	633
		GSIPC	Chromium	3.3	21
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	17.4
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	8.4
		GSIPC	Selenium	0.41	1
	5 - 7	RDWPC	Magnesium	8,000	19,500
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.6
		GSIPC	Selenium	0.41	0.6
SB-2012	0 - 1	RDWPC	Magnesium	8,000	13,700
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.5
		TSCA High Occupancy	Total PCBs	1.0	1.44
	3 - 5	RDWPC and NRDWPC	Iron	12,000	14,000
		RDWPC	Magnesium	8,000	10,200
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7.2
		GSIPC	Selenium	0.41	0.5

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-2014	0.5 – 1.5	RDWPC	Magnesium	8,000	20,100/ 14,100 (Dup.)
		RDWPC and NRDWPC GSIPC	Manganese	440 440	776 (Dup.)
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 7.6 5.8	6.22 (Dup.)
		GSIPC	Cyanide (total)	0.41	1.02 (Dup.)
	12.5 – 13.5	RDWPC NRDWPC	Magnesium	8,000 22,000	26,000
SB-2015	0.5 – 1.5	RDWPC NRDWPC	Magnesium	8,000 22,000	32,700
	12.5 – 13.5	RDWPC	Magnesium	8,000	20,100
SB-2016	2 – 4	TSCA High Occupancy	Total PCBs	1.0	1.6
	4 – 6	TSCA High Occupancy	Total PCBs	1.0	17
	6 – 8	TSCA High Occupancy	Total PCBs	1.0	53
	8 – 10	TSCA High Occupancy	Total PCBs	1.0	2.4
SB-2017	2 – 4	TSCA High Occupancy	Total PCBs	1.0	14.5
	4 – 6	TSCA High Occupancy	Total PCBs	1.0	28
	6 – 8	TSCA High Occupancy	Total PCBs	1.0	35/ 29 (Dup.)
SB-2021	4 – 6	TSCA High Occupancy	Total PCBs	1.0	25
SB-2022	2 – 4	TSCA High Occupancy	Total PCBs	1.0	4.7
	4 – 6	TSCA High Occupancy	Total PCBs	1.0	17
	6 – 8	TSCA High Occupancy	Total PCBs	1.0	47
	8 – 10	TSCA High Occupancy	Total PCBs	1.0	16/ 3.3 (Dup.)
SB-2023	2 – 4	TSCA High Occupancy	Total PCBs	1.0	7.1/ 2.7 (Dup.)
	4 – 6	TSCA High Occupancy	Total PCBs	1.0	2.3

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SB-2027	6 – 8	TSCA High Occupancy	Total PCBs	1.0	7.4/ 3.4 (Dup.)
SB-2028	4 – 6	TSCA High Occupancy	Total PCBs	1.0	17
	6 – 8	TSCA High Occupancy	Total PCBs	1.0	17
	8 – 10	TSCA High Occupancy	Total PCBs	1.0	36
SB-2029	2 – 4	TSCA High Occupancy	Total PCBs	1.0	3.6
	4 – 6	TSCA High Occupancy	Total PCBs	1.0	13
SB-2030	2 – 4	TSCA High Occupancy	Total PCBs	1.0	11
	6 – 8	TSCA High Occupancy	Total PCBs	1.0	14
	8 - 10	TSCA High Occupancy	Total PCBs	1.0	9
SB-2040	1.5 – 2.5	RDWPC and NRDWPC	Iron	12,000	29,000
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	52.8
		GSIPC	Selenium	0.41	1.7
		GSIPC	Naphthalene	0.73	0.97
SB-2041	1 – 2	RDWPC and NRDWPC	Iron	12,000	30,400
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	69.4
		GSIPC	Selenium	0.41	1.5
		GSIPC	Mercury	0.13	0.133
SB-2042	2 – 5	RDWPC and NRDWPC	Aluminum	6,900	14,900
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8.42
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	6.92
		GSIPC	Selenium	0.41	2.4
		GSIPC	Naphthalene	0.73	1.1
SB-2043	2.5 – 2.7	RDWPC and NRDWPC	Iron	12,000	14,100
		RDWPC and NRDWPC GSIPC	Manganese	440 440	509
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	13.3
		GSIPC	Selenium	0.41	0.8
		GSIPC	Mercury	0.13	0.203
TP-5	5.5	GSIPC	Mercury	0.13	1.2
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	75
		GSIPC	Selenium	0.41	1.9
		RDCC	Benzo(a)pyrene	2	2.4
		TSCA High Occupancy	Total PCBs	1.0	1.1

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-17	7	GSIPC	Mercury	0.13	0.5
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	10.1
		GSIPC	Selenium	0.41	0.6
TP-18	8	GSIPC	Mercury	0.13	0.9
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	9.7
		RDWPC and NRDWPC GSIPC	Cadmium	6 6.15	6.5
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	37
		GSIPC	Selenium	0.41	0.9
		GSIPC	Fluoranthene	5.5	7.7
		RDCC	Benzo(a)pyrene	2	3.1
		GSIPC	Phenanthrene	2.1	3.2
TP-19	8	GSIPC	Mercury	0.13	0.9
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	8
		GSIPC	Selenium	0.41	0.8
TP-20	6	GSIPC	Mercury	0.13	0.6
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.2
	8.5	RDWPC and NRDWPC GSIPC	Mercury	1.7 0.13	3.3
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.7
		GSIPC	Selenium	0.41	2.4
TP-201	1 - 2	RDWPC and NRDWPC	Iron	12,000	25,200
		RDWPC	Magnesium	8,000	8,430
		RDWPC and NRDWPC	Pentachlorophenol	0.022	0.36
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.7
		GSIPC	Selenium	0.41	1.3
		RDWPC and NRDWPC	Tetrachloroethene	0.1	0.25
	8 - 10	RDWPC and NRDWPC GSIPC	Manganese	440 440	549
		GSIPC	Fluoranthene	5.5	7

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
TP-202	0.5 - 1.5	RDWPC and NRDWPC GSIPC	Manganese	440 440	514/ 516 (Dup.)
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	16.2/ 11.2 (Dup.)
		GSIPC	Selenium	0.41	0.6
	8 - 10	RDWPC NRDWPC	Magnesium	8,000 22,000	33,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	11.7
TP-203	8 - 10	RDWPC	Magnesium	8,000	13,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	5.9
TP-341	0.5 - 1.5	RDWPC and NRDWPC	Aluminum	6,900	9,670
		RDWPC and NRDWPC	Iron	12,000	22,200
		RDWPC and NRDWPC GSIPC	Chromium	30 3.3	40
		GSIPC	Zinc	303	764
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	20.1
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	7.7
		GSIPC	Selenium	0.41	1.5
		RDCC	Lead	400	555
		GSIPC	Copper	135	308
		GSIPC	Fluoranthene	5.5	7.7
		GSIPC	Phenanthrene	2.1	5.3
		RDWPC and NRDWPC GSIPC	Tetrachloroethene	0.1 1.2	2
	3.5 - 5	RDWPC NRDWPC	Magnesium	8,000 22,000	30,800
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	7
NW Sidewall	1.5	RDWPC and NRDWPC	Iron	12,000	32,100
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	60.8
		GSIPC	Selenium	0.41	2.1
		GSIPC	Mercury	0.13	0.141
		GSIPC	Naphthalene	0.73	2.4

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria or TSCA High Occupancy Exceedance	Constituent	Cleanup Criteria/ Level (mg/kg)	Detected Concentration (mg/kg)
SE Floor	3	RDWPC and NRDWPC GSIPC	Manganese	440 440	590
		GSIPC	Selenium	0.41	0.5
NW Floor	3	RDWPC and NRDWPC	Iron	12,000	12,200
		RDWPC and NRDWPC GSIPC	Manganese	440 440	859
		RDWPC and NRDWPC GSIPC	Arsenic	5.8 5.8	6.42
NE Sidewall	2	RDWPC and NRDWPC	Iron	12,000	44,800/ 33,400 (Dup.)
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	65.6/ 49.4 (Dup.)
		RDWPC and NRDWPC GSIPC	Cobalt	6.8 6.8	9.860/ 7.540 (Dup.)
		GSIPC	Selenium	0.41	1.7/ 2 (Dup.)
		GSIPC	Naphthalene	0.73	1.8/ 1.7 (Dup.)
SE Sidewall	1.5	RDWPC and NRDWPC	Iron	12,000	23,900
		RDWPC NRDWPC	Magnesium	8,000 22,000	25,200
		RDWPC and NRDWPC RDCC NRDCC GSIPC	Arsenic	5.8 7.6 37 5.8	50.7
		GSIPC	Selenium	0.41	1.0
		GSIPC	Naphthalene	0.73	1.2
SW Sidewall	2	RDWPC and NRDWPC	Iron	12,000	26,300
		RDWPC and NRDWPC RDCC GSIPC	Arsenic	5.8 7.6 5.8	31.5
		GSIPC	Selenium	0.41	1.7
		GSIPC	Naphthalene	0.73	1.9

No other parameters were detected in soil samples analyzed in Commercial Area 4 above the laboratory method detection limits, or if detected were below the Part 201 Residential Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions).

Soil SPLP

Based on exceedances of the GSIPC in soil samples collected during the RI, additional analysis was conducted utilizing SPLP for comparison to the Part 201 Generic Residential and Non-Residential Cleanup Criteria for groundwater.

Based on the above discussion regarding the nature and extent of the contamination by former operational area, the following exceedances were identified by redevelopment area relative to SPLP in soil potential impacts.

Residential Area 1

Exceedances are present at various locations in Residential Area 1 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-103	7 – 9	RDWC and NRDWC	Manganese	0.05	0.056
SB-104	5 – 7	RDWC and NRDWC	Manganese	0.05	0.141
	8 - 10	RDWC and NRDWC	Manganese	0.05	0.149
SB-111	0 – 1	RDWC and NRDWC	Manganese	0.05	0.057
SB-114	0 – 1	RDWC and NRDWC	Manganese	0.05	0.107
SB-116	9.5 – 10	RDWC and NRDWC	Manganese	0.05	0.187
SB-118	7.5 – 9.5	RDWC and NRDWC	Manganese	0.05	0.052
SB-123	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0598
SB-143	0 – 1	RDWC and NRDWC	Manganese	0.05	0.153
SS-100	0 – 2	RDWC and NRDWC	Manganese	0.05	0.132

Residential Area 2

An exceedance is present at one location in Residential Area 2 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-105	1 – 3	RDWC and NRDWC	Manganese	0.05	0.055

Residential Area 3

Exceedances are present at various locations in Residential Area 3 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-135	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0543
SB-136	8 – 10	GSIC	Copper	0.023	0.0354
		GSIC	Mercury	0.0000013	0.0001
SB-139	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0508
SB-141	0 – 1	GSIC	Mercury	0.0000013	0.0006
TP-320	0 – 1	RDWC and NRDWC	Manganese	0.05	0.133

Residential Area 4

Exceedances are present at various locations in Residential Area 4 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-301	5.5 – 7.5	GSIC	Copper	0.023	0.0320 (Dup.)
		GSIC	Mercury	0.0000013	0.0002 (Dup.)
SB-302	6.8 – 8.8	GSIC	Chromium	0.011	0.0413
		GSIC	Copper	0.023	0.0430
		GSIC	Mercury	0.0000013	0.0001
	8.8 – 9.8	GSIC	Copper	0.023	0.0234
		GSIC	Mercury	0.0000013	0.0002
TP-309	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0710
	3 - 4	RDWC and NRDWC	Manganese	0.05	0.0742
TP-313	4 – 6	GSIC	Silver	0.0002	0.0003/ 0.0003(Dup.)
		GSIC	Mercury	0.0000013	0.0001
TP-314	6 – 8	GSIC	Chromium	0.011	0.0145

Waterfront Plaza

No soil samples were collected from Waterfront Plaza during the RI; therefore, no exceedances of the GSIPC were identified and no additional analysis was conducted utilizing SPLP for comparison to the Part 201 Generic Residential and Non-Residential Cleanup Criteria for groundwater.

Mixed Residential/Commercial Area 1

Exceedances are present at various locations in Mixed Residential/Commercial Area 1 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-339	2.75 – 3.75	GSIC	Mercury	0.0000013	0.0005
TP-303	0 – 1	RDWC and NRDWC	Manganese	0.05	0.200
TP-306	0.5 – 1.5	RDWC and NRDWC	Manganese	0.05	0.057
TP-334	0 – 1	RDWC and NRDWC	Manganese	0.05	0.108
TP-335	3 – 5	RDWC and NRDWC	Manganese	0.05	0.0547

Mixed Residential/Commercial Area 2

Exceedances are present at various locations in Mixed Residential/Commercial Area 2 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-211	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0656
SB-216	0 – 4	GSIC	Mercury	0.0000013	0.0002
SB-224	1 – 2	GSIC	Copper	0.023	0.0237
SB-220	0 – 1	GSIC	Mercury	0.0000013	0.0001
SB-221	1 – 2	RDWC and NRDWC	Lead	0.004	0.0084
		RDWC and NRDWC	Manganese	0.05	0.0534
	2 – 4	RDWC and NRDWC	Manganese	0.05	0.0519/ 0.0519 (Dup.)
SB-222	1.5 – 3.5	GSIC	Copper	0.023	0.0466
		GSIC	Mercury	0.0000013	0.0002
SB-232	0 - 1	GSIC	Mercury	0.0000013	0.0001
	6 – 8	RDWC and NRDWC GSIC	Arsenic	0.1 0.1	0.307
		GSIC	Mercury	0.0000013	0.0001
		GSIC	Selenium	0.005	0.009
SB-236	0 – 1	GSIC	Chromium	0.011	0.0132
		RDWC and NRDWC	Manganese	0.05	0.0526
		GSIC	Mercury	0.0000013	0.0004
SB-235	0.5 – 1.5	RDWC and NRDWC	Manganese	0.05	0.0628
SB-237	0 – 1	GSIC	Selenium	0.005	0.0078
	2 – 4	GSIC	Selenium	0.005	0.0085
SB-238	0 – 1	GSIC	Selenium	0.005	0.0079
	2 - 4	GSIC	Selenium	0.005	0.0106/ 0.0113 (Dup.)

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-246	4 – 6	RDWC and NRDWC	Manganese	0.05	0.0671/ 0.0744 (Dup.)
SB-258	0.8 - 3	GSIC	Copper	0.023	0.0368
		GSIC	Mercury	0.0000013	0.0002
SB-2010	0 - 1	GSIC	Mercury	0.0000013	0.0004
SB-2013	0 – 1	RDWC and NRDWC GSIC	Chromium	0.1 0.011	0.158
		GSIC	Mercury	0.0000013	0.0002
	3 – 5	GSIC	Mercury	0.0000013	0.0001
SB-305	8 – 10	RDWC and NRDWC	Manganese	0.05	0.1
SB-306	7.5 – 9.5	RDWC and NRDWC	Manganese	0.05	0.102/ 0.106 (Dup.)
SB-307	6 – 8	RDWC and NRDWC	Manganese	0.05	0.07/ 0.053 (Dup.)
TP-342	0 – 1	RDWC and NRDWC GSIC	Arsenic	0.1 0.1	0.0169
TP-343	3 – 4	RDWC and NRDWC	Manganese	0.05	0.0549
TP-344	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0755/ 0.0608 (Dup.)

Commercial Area 1

Exceedances are present at various locations in Commercial Area 1 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-142	0 – 1	RDWC and NRDWC	Manganese	0.05	0.216
SB-144	0 – 1	RDWC and NRDWC	Manganese	0.05	0.125
SB-145	0 – 1	RDWC and NRDWC	Manganese	0.05	0.164
	7.5 – 9.5	RDWC and NRDWC	Manganese	0.05	0.178
SS-101	0 – 2	RDWC and NRDWC	Manganese	0.05	0.0822
SS-102	0 – 2	RDWC and NRDWC	Manganese	0.05	0.136
SS-103	0 – 2	RDWC and NRDWC	Manganese	0.05	0.144
SS-104	0 – 2	RDWC and NRDWC	Manganese	0.05	0.150
SS-105	0 – 2	RDWC and NRDWC	Manganese	0.05	0.175
SS-106	0 – 2	RDWC and NRDWC	Manganese	0.05	0.114/ 0.0977 (Dup.)
SS-107	0 – 2	RDWC and NRDWC	Manganese	0.05	0.0590

Commercial Area 2

Exceedances are present at various locations in Commercial Area 2 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-323	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0669
SB-343	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0598
TP-316	0 – 1	RDWC and NRDWC	Manganese	0.05	0.104
	6 – 8	RDWC and NRDWC	Manganese	0.05	0.0712
TP-321	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0773
	6 – 8	RDWC and NRDWC	Manganese	0.05	0.0928
TP-323	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0593
TP-324	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0934
TP-326	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0732
TP-327	0 – 1	RDWC and NRDWC	Manganese	0.05	0.104
TP-328	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0644

Commercial Area 3

Exceedances are present at various locations in Commercial Area 3 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
MW-18	0 – 2	RDWC and NRDWC	Manganese	0.05	0.052
TP-304	0.5 – 1.5	GSIC	Mercury	0.0000013	0.0016
	2 – 4	RDWC and NRDWC	Manganese	0.05	0.176
TP-305	2 - 4	RDWC and NRDWC	Manganese	0.05	0.108
TP-307	2 – 3	GSIC	Mercury	0.0000013	0.0001
TP-338	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0515
	8 – 10	RDWC and NRDWC	Manganese	0.05	0.0767

Commercial Area 4

Exceedances are present at various locations in Commercial Area 4 as summarized below.

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-203	2 – 4	GSIC	Copper	0.023	0.0306/ 0.0244 (Dup.)
SB-265	0 – 1	RDWC and NRDWC	Lead	0.004	0.0074
SB-272	1 – 3	GSIC	Mercury	0.0000013	0.0001
SB-283	0 – 1	RDWC and NRDWC	Manganese	0.05	0.0546

Sample Location	Sample Depth (feet bgs)	Part 201 Cleanup Criteria Exceedance	Constituent	Part 201 Cleanup Criteria (mg/L)	Detected Concentration (mg/L)
SB-284	0 – 1	RDWC and NRDWC	Manganese	0.05	0.181
	2.5 – 4.5	RDWC and NRDWC	Manganese	0.05	0.0848
TP-201	8 – 10	RDWC and NRDWC	Manganese	0.05	0.158
TP-202	0.5 – 1.5	RDWC and NRDWC	Manganese	0.05	0.09/ 0.076 (Dup.)
TP-203	0.5 – 1.5	RDWC and NRDWC GSIC	Arsenic	0.1 0.1	0.0405
	2 - 4	RDWC and NRDWC	Manganese	0.05	0.056
TP-341	0.5 – 1.5	GSIC	Copper	0.023	0.0388
		GSIC	Chromium	0.011	0.0696
TP-5	6	RDWC and NRDWC GSIC	Lead	0.004 0.05	0.6

Based on the comparison to the Part 201 Generic Residential and Non-Residential Cleanup Criteria, VOCs [benzene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, 1,2,4-trimethylbenzene, and xylenes (total)], SVOCs[benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, 4-chloro-3-methylphenol, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd) pyrene, 2-methylnaphthalene, 4-methylphenol, naphthalene, pentachlorophenol, phenanthrene, 2,4,6-trichlorophenol], metals (aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, selenium, silver, sodium, thallium, vanadium, and zinc), cyanide (total), nitrate, and phosphorus were identified as chemicals of concern in soil at the Site.

Based on the comparison to the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions), PCBs were identified as a chemical of concern in soil at the Site.

In addition, a Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (SLERA) were performed on the dataset and presented in the RI Report, as summarized below in Sections 1.2.6 and 1.2.7, respectively.

1.2.4.3 Previous Response Actions

In 2007 and 2008, the Plainwell Impoundment Time Critical Removal Action (TCRA) was undertaken in accordance with the Administrative Settlement Agreement and Order on Consent for Removal Action, Docket No. V-W-07-C-863, with members of the Kalamazoo River Study Group. TCRA activities were designed and conducted in targeted areas along the

Kalamazoo River, but did not include any response actions associated with the banks adjacent to the Site.

At the request of the City of Plainwell, emergency response actions for the southern banks of the Kalamazoo River adjacent to the Site were initiated by RMT on behalf of Weyerhaeuser in 2007. Response actions were planned concurrently with TCRA activities. An Emergency Response Action (ERA) approach was authorized by the U.S. EPA, in accordance with the emergency action provisions of the Consent Decree, in correspondence dated June 29, 2007. ERA activities for the adjacent Plainwell Mill Banks were designed and implemented consistent with applicable provisions of the Administrative Settlement Agreement and the Plainwell Impoundment TCRA Design Report prepared by Arcadis BBL in 2007 (Arcadis BBL, 2007). Details of the ERA are discussed in the Emergency Response Plan Documentation Report prepared by RMT and dated January 2009 (RMT, 2009).

According to the Emergency Response Plan, the emergency action was driven by three objectives:

- *"Remove or contain visible paper residuals and address previously identified areas of reported polychlorinated biphenyls (PCBs) concentrations of greater than 50 mg/kg in soils/sediments along the former Plainwell Mill banks to a target concentration of either 4 mg/kg or 1 mg/kg*
- *Reconstruct the river bank, as needed, to minimize future release of PCBs*
- *Reconfigure banks to limit upland cutbacks into former Plainwell Mill property and place erosion controls to provide comparable stability to pre-excavation conditions*"

The ERA activities associated with the adjacent Plainwell Mill Banks were conducted in the following phased approach between 2007 and 2009.

Excavation activities were conducted in four stages (Zone A through Zone D), each stage addressing a separate section of the adjacent Plainwell Mill Banks, which were selected based on similar bank and/or river conditions. Removal activities began with Zone A, a 600-foot length of river bank adjacent to the west end of the Site and then moved upstream to Zone B, a 700-foot length of river bank east of Zone A, followed by Zone D, a 650-foot length of river bank adjacent to the east end of the Site, and finally Zone C, a 650-foot length of river bank area situated between Zones B and D. A summary of the removal actions, by Zone, is presented below. Figures identifying the extent of excavation areas and sample locations are presented in the Emergency Response Plan Documentation Report (RMT 2009). These figures have not been reproduced herein. As discussed in Section 1.0, Figure 1.4 presents the 11 redevelopment areas of the Site. The redevelopment areas bordering the Kalamazoo River and the Mill Race

are defined to include the areas to the top of the bank along these waterways for the purposes of the FS Report and are depicted as such in Figure 1.4. Based on the descriptions presented in the Emergency Response Plan Documentation Report (RMT 2009), activities performed during the ERA included both areas to the south of the top of bank on the Site and beyond the top of bank on the north side of the Site along the Kalamazoo River.

Zone A

Approximately 2,500 cubic yards of sediment and floodplain soil were removed from Zone A and placed in the containment area. Initially, 13 verification soil and sediment samples were collected and analyzed for PCBs. PCB concentrations were below the target level of 1 milligram per kilogram (mg/kg) in all but 2 of the samples (PM-SD-003 and PM-SD-013). Additional material was removed and two additional verification samples were collected (PM-SD-003R and PM-SD-013R) in these areas. PCB concentrations detected in the samples were below 1 mg/kg.

Zone B

Approximately 400 cubic yards of near shore sediment was removed from Zone B and placed in the containment area. The banks in Zone B were characterized as heavily wooded and steep with no observable floodplain areas. A total of 21 verification sediment samples were collected from the underlying sediment and analyzed for PCBs. PCB concentrations were below the target level of 1 mg/kg in all but 2 samples (PM-SD-029 and PM-SD-032). An additional 3.5 to 4 cubic yards of sediment were removed and these areas were re-sampled. PCB concentrations were below 1 mg/kg in PM-SD-029R and PM-SD-032R.

Zone C

Seven pre-excavation samples were collected from Zone C. Excavation activities were conducted in three sections beginning with the 300-foot eastern section of Zone C. Visible residuals were removed and placed in the containment area and seven verification samples were collected for PCB analysis. PCBs were below the target level of 1 mg/kg in all but two samples (PM-SD-048 and PM-SD-051). Additional material was excavated in the area of these samples until the natural river bed was encountered. Verification samples PM-SD-48R and PM-SD-51R were collected and according to laboratory results, PCB concentrations in the samples still exceeded 1 mg/kg. In accordance with the approved methods, no further removal was conducted and the banks were reconfigured and stabilized with rip-rap.

Removal activities continued in the central portion of Zone C and four verification samples were collected for PCB analysis. PCBs exceeded the action level of 1 mg/kg in three of the four samples (PM-SD-55, PM-SD-56, and PM-SD-57) and also exceeded 50 mg/kg in one sample (PM-SD-57). Therefore, a portion of the material was segregated into a roll-off container for

disposal. Based on the results of the verification sampling, additional sediment was removed until the original river bottom was encountered. Additional verification samples were collected and PCBs were again detected above 1 mg/kg in PM-SD-55R and PM-SD-57R; however, in accordance with the approved methods, no further removal was conducted and the banks were stabilized with geotextile fabric and rip-rap.

Based on previous visual reconnaissance of the 180-foot western portion of Zone C, it was not anticipated that paper residuals were present in this section of the Plainwell Mill Banks. Therefore, six test pits were conducted prior to commencing removal activities. No residual material was observed in the test pits and one sample was collected from each test pit for PCB analysis. Based on the locations presented on the figures included with RMT's Emergency Response Plan Documentation Report, these results are included in the Pre-RI sample results for Residential Area 3 and were all below 1 mg/kg. Additional hand auger samples were also collected in this area and were analyzed for PCBs. According to RMT's report, PCB concentrations ranged from 0.092 mg/kg to 5.6 mg/kg. Based on the presence of steep banks and high velocity flow conditions associated with this section of the river, Weyerhaeuser requested U.S. EPA approval to cover the area with geotextile fabric and erosion control stone, without completion of excavation activities. This approach was approved by the U.S. EPA on March 28, 2008.

Zone D

Zone D was characterized as having lower banks with little observable floodplain area. While excavating near shore sediments in the eastern half of Zone D, RMT encountered concrete debris and when the debris was penetrated an oily sheen appeared on the water surface. A clay layer was immediately placed over the concrete debris to limit further contact with surface water. Seven verification samples were collected during excavation activities in the eastern half of Zone D and analyzed for PCBs. PCB concentrations exceeded the action level in all of the samples and were as high as 513 mg/kg in one sample (PM-SD-041). To prevent further exacerbation and limit potential for further release to surface water, the entire 300-foot eastern section of Zone D was capped with 1 to 1.5 feet of clay and stabilized with rip-rap without further excavation.

Based on the PCB concentrations detected in sediments from the eastern half of Zone D, RMT began collecting pre-excavation samples from the remaining removal areas. A total of seven pre-excavation samples were collected from the western half of Zone D and analyzed for PCBs. PCB concentrations were below the target level in all but two of the samples. Elevated PCB concentrations were detected in PEX-1 and PEX-2; therefore, no excavation activities were conducted in the vicinity of these two samples as to minimize potential for a release. Instead, the area was covered with a clay barrier and stabilized with rip-rap. Approval for this interim

measure was granted by U.S. EPA on February 19, 2008. Excavation activities continued in the remainder of the western portion of Zone D and five verification samples were collected for PCB analysis. Some questions were raised by U.S. EPA and MDEQ as to whether an appropriate sampling method was used to collect the verification samples in Zone D; therefore, five additional verification samples were collected using an approved method. No PCBs were detected above the target level of 1 mg/kg in any of the ten verification samples collected in the western portion of Zone D.

A total of 300 cubic yards of sediment and floodplain soil were removed from Zone D. Twenty-five cubic yards of this total were removed from the eastern portion of Zone D in the area of elevated PCB concentrations (above 50 mg/kg) and were therefore segregated into lined roll off containers for characterization and disposal.

Zone A through D removal information is provided in the Emergency Response Plan Documentation Report prepared by RMT and dated January 2009 (RMT, 2009).

According to the Emergency Response Plan prepared by RMT, excavation on shore was considered complete when visible residuals were removed and PCB concentrations in composite verification samples collected from underlying soils were less than 4 mg/kg. Excavation of floodplain and near shore sediments was considered complete when the original river bottom was encountered or when residuals were no longer visible in soil and sediment samples and PCB concentrations in verification samples collected from the underlying material were less than 1 mg/kg. Areas where PCB concentrations exceeding target levels remained in place were covered with geotextile fabric and 6 inches of clean soil or stone.

A residuals containment area was constructed in the area of the former aeration basin. The containment area was constructed using a sand covered low density polyethylene liner and was surrounded by an earthen containment berm. The containment area was graded to allow water to drain to a collection area where it could be transferred to an on-Site holding tank for treatment. A wastewater treatment system was installed adjacent to the containment area, which consisted of a 20,000-gallon holding tank, multi-media filters and carbon absorption columns. A total of 185,000 gallons of treated water was discharged to the Kalamazoo River under a National Pollutant Discharge Elimination System (NPDES) permit.

Subsequent to completion of activities, the temporary access road was scraped and material disposed of off Site with the excavated materials. Additionally, the sand and liner system from the containment pad were removed and disposed of off Site after sampling and waste characterization.

Excavated areas were backfilled with clean fill material, graded, and stabilized with rip-rap in accordance with the approved design report.

1.2.5 Contaminant Fate and Transport

Contaminant fate and transport is discussed in Section 3.0, Section 8.1.3.2, and Section 9.1.4 of the RI Report (CRA, 2013a), including potential routes of migration, contaminant persistence, and contaminant migration. Figure 1.6 presents the Human Health Conceptual Site Model (CSM). Figure 1.7 presents the SLERA CSM.

Many factors control the partitioning of a chemical in the environment. An understanding of the general fate and transport characteristics of the constituents identified in media is important when predicting future theoretical exposure, linking sources with currently contaminated media, and identifying potentially complete pathways to Site media. Based on the historical analytical data collected for the environmental media of concern at the Site, comparison of the results to the Part 201 Cleanup Criteria and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions), and current and anticipated future Site conditions, the following potential contaminant transport mechanisms at the Site are:

- Movement with wind
- Movement with surface water
- Movement during future Site re-use construction disturbance
- Movement of constituents leached from soil
- Movement of VOCs (from soil) within subsurface gas

The exposure of soil at the surface may result in the transport of dust and VOCs by wind. Cover material is present, but limited in some areas of the Site. The existing cover likely does not totally prevent upward migration of chemicals within vapors. The existing cover has also been found to contain detectable concentrations of chemicals. The presence of chemicals within the existing cover may contribute to chemical migration of VOCs or fugitive dust. VOCs in the air will be subject to dispersion by the wind and photolysis due to exposure to sunlight, thereby limiting their concentrations.

The exposure of soil at the surface may also result in the transport of dissolved or suspended contaminants along surface water drainage pathways. The potential for this to occur is limited because of the topography of the Site. Organic chemicals dissolved in surface water may be

subject to adsorption, hydrolysis, or photolysis. VOCs may also volatilize during transport in surface water.

Construction activities may also result in disturbance of contaminants in the various media. Contaminants attached to soil particulates may become suspended in the air column and transported by wind. Additionally, contaminants may be moved from the subsurface to the ground surface during excavation and/or earthwork.

Movement of leached constituents is another potential contaminant transport mechanism. Leached constituents can be produced through infiltration of precipitation into impacted surface soils. Once leached constituents have been produced, the following migration pathways are possible:

1. Leached constituents can be transferred to subsurface soil from percolation away from the surface soils. This transfer may occur through the process of mechanical filtration, precipitation, and/or sorption.
2. Leached constituents can percolate through the soil underlying and impact the underlying aquifer(s).
3. VOCs in leached material can migrate through the vadose zone via diffusion to ambient and/or indoor air.

1.2.6 Baseline Human Health Risk Assessment

A Baseline HHRA was performed during the RI, which complied with the requirements of the SOW. The HHRA presented an evaluation of potential human exposure under both the current and planned future Site uses. Consistent with U.S. EPA guidance, the basis of the evaluation in the RI Report was worst case and assumed that no remediation ever occurs at the Site. The HHRA is presented in Section 8.0 of the RI Report (CRA, 2013a).

As discussed in the approved RI Report (Revision 2) Section 8.1.6.1 Sampling Procedure Bias, all development areas of the Site had a sufficient number of soil samples (minimum sample size between eight and 10 soil samples as identified by U.S. EPA), with the exception of Waterfront Plaza and Commercial Area 3. Based on the conceptual redevelopment plan, there was one surface soil sample and three surface and subsurface soils samples available for the Waterfront Plaza. Therefore, four surface soil samples and nine surface and subsurface soil samples collected adjacent to Waterfront Plaza and within Residential Areas 3 and 4 were combined to form the Waterfront Plaza soil dataset to permit evaluation of soil exposure within this development area. Based on the conceptual redevelopment plan, there were six surface soil samples and 15 surface and subsurface soil samples available for Commercial Area 3. The

number of surface soil samples for both Waterfront Plaza and Commercial Area 3 are less than the U.S. EPA recommended minimum sample size of eight to 10 samples; however, given that the potentially contaminating activities within these development areas were very limited and investigated and that the HHRA also included evaluation of all receptors to the combined surface and subsurface soils, which has a sufficient sample size, it is expected that the low sample size for surface soil at Waterfront Plaza and Commercial Area 3 would not be identified as a significant uncertainty in the datasets for these areas.

Based on the above discussion regarding the nature and extent of the contamination by former operational area and the HHRA complete as part of the RI Report (Revision 2), the following conclusions were identified by redevelopment area relative to soil impacts and summarized in Table 1.1.

Residential Area 1

The HHRA target risk and hazard level exceedances for Residential Area 1 soil are summarized as follows:

- The calculated cancer risks and hazards for the trespasser, recreational user, resident, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic and pentachlorophenol were the major contributors), and below the target hazard of 1.

Residential Area 2

The HHRA target risk and hazard level exceedances for Residential Area 2 soil are summarized as follows:

- The calculated cancer risks and hazards for the recreational user, resident, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard of 1.
- The calculated cancer risk and hazard for the resident inhalation of indoor air (from soil) was above the target risk levels of 1×10^{-4} and 1×10^{-6}, and above the target hazard of 1, with benzene the major contributor to cumulative risk and hazard.
- The calculated cancer risk and hazard for the commercial worker inhalation of indoor air (from soil) was below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (benzene was the major contributor), and below the target hazard of 1.

Residential Area 3

The HHRA target risk and hazard level exceedances for Residential Area 3 soil are summarized as follows:

- The calculated cancer risks and hazards for the trespasser, recreational user, resident, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard of 1.

Residential Area 4

The HHRA target risk and hazard level exceedances for Residential Area 4 soil are summarized as follows:

- The calculated cancer risks for the trespasser, recreational user, resident, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4} and at or above the target risk level of 1×10^{-6} (benzo(a)pyrene, dibenzo(a,h)anthracene, arsenic, and total PCBs were the major contributors). In addition, the calculated hazard for the recreational user and resident direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil was above the target hazard of 1, with total PCBs the major contributor to cumulative hazard.
- The calculated cancer risk and hazard for the resident inhalation of indoor air (from soil) was above the target risk levels of 1×10^{-4} (benzene was the major contributor) and 1×10^{-6} (benzene and ethylbenzene were the major contributors), and above the target hazard of 1 (benzene, xylene, mercury were the major contributors).
- The calculated cancer risk and hazard for the commercial worker inhalation of indoor air (from soil) was below the target risk levels of 1×10^{-4} (benzene was the major contributor), at or above the target risk level of 1×10^{-6} (benzene and ethylbenzene were the major contributors), and above the target hazard of 1 (mercury was the major contributor).

Waterfront Plaza

The HHRA target risk and hazard level exceedances for Waterfront Plaza soil are summarized as follows:

- The calculated cancer risks and hazards for the trespasser, recreational user, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard of 1.

Mixed Residential/Commercial Area 1

The HHRA target risk and hazard level exceedances for Mixed Residential/Commercial Area 1 soil are summarized as follows:

- The calculated cancer risks and hazards for the recreational user, resident, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard of 1.
- The calculated cancer risk and hazard for the resident inhalation of indoor air (from soil) was below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (tetrachloroethene was the major contributor), and below the target hazard of 1.

Mixed Residential/Commercial Area 2

The HHRA target risk and hazard level exceedances for Mixed Residential/Commercial Area 2 soil are summarized as follows:

- The calculated cancer risks and hazards for the trespasser, recreational user, resident, commercial worker, utility worker, and construction worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were above the target risk level of 1×10^{-4} (resident only; arsenic was the major contributor), at or above the target risk level of 1×10^{-6} (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and arsenic were the major contributors), and above the target hazard level of 1 (resident only; arsenic and thallium were the major contributors).
- The calculated cancer risk and hazard for the resident inhalation of indoor air (from soil) was below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6}

(benzene, ethylbenzene, and tetrachloroethene were the major contributors), and above the target hazard of 1 (mercury was the major contributor).

- The calculated cancer risk and hazard for the commercial worker inhalation of indoor air (from soil) was below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (benzene and ethylbenzene were the major contributors), and below the target hazard of 1.

Commercial Area 1

The HHRA target risk and hazard level exceedances for Commercial Area 1 soil are summarized as follows:

- The calculated cancer risks for the commercial worker and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard level of 1.

Commercial Area 2

The HHRA target risk and hazard level exceedances for Commercial Area 2 soil are summarized as follows:

- The calculated cancer risks for the trespasser, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard level of 1.

Commercial Area 3

The HHRA target risk and hazard level exceedances for Commercial Area 3 soil are summarized as follows:

- The calculated cancer risks and hazards for the commercial worker and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic was the major contributor), and below the target hazard level of 1.
- The calculated cancer risk and hazard for the commercial worker inhalation of indoor air (from soil) was below the target risk levels of 1×10^{-4}, at or above the target risk level of

1×10^{-6} (benzene was the major contributor), and above the target hazard of 1 (mercury was the major contributor).

Commercial Area 4

The HHRA target risk and hazard level exceedances for Commercial Area 4 soil are summarized as follows:

- The calculated cancer risks and hazards for the trespasser, recreational user, commercial worker, and utility worker direct contact (incidental ingestion, dermal contact, and ambient air inhalation) with soil were below the target risk level of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (arsenic and total PCBs were the major contributors), and below the target hazard level of 1.
- The calculated cancer risk and hazard for the commercial worker inhalation of indoor air (from soil) was below the target risk levels of 1×10^{-4}, at or above the target risk level of 1×10^{-6} (benzene and tetrachloroethene were the major contributors), and below the target hazard of 1.

1.2.7 Screening-Level Ecological Risk Assessment

A SLERA was performed during the RI, which complied with the requirements of the SOW. The SLERA supplemented the approved Final (Revised) Baseline Ecological Risk Assessment (BERA)(CDM, 2003) completed for the Kalamazoo River and adjacent aquatic habitats and evaluated the potential risk to ecological receptors in the terrestrial habitats adjacent to the Kalamazoo River. As identified in Section 1.0, the Site includes areas up to the top of the Kalamazoo River bank. Areas associated with the Kalamazoo River (i.e., beyond the top of the riverbank and Mill Race) were not included in the scope of the SLERA. The SLERA consisted of Step 1 (screening level problem formulation) and Step 2 (screening level exposure estimation and risk calculation). The SLERA is presented in Section 9.0 of the RI Report (CRA, 2013a). Additionally, a memorandum summarizing Toxicity Reference Values (TRVs) was submitted to U.S. EPA concurrent with the RI Report on October 19, 2012.

Based on the above discussion regarding the nature and extent of the contamination by former operational area and the reasonably anticipated future land re-use of the Site as identified by the City of Plainwell, the following conclusions were identified by redevelopment area relative to soil impacts.

Residential Area 1

Twenty-one constituents or constituent groups (e.g., PAHs, PCBs) were identified as Constituent of Potential Ecological Concern (COPECs). One SVOC [bis(2-ethylhexyl)phthalate], High Molecular Weight (HMW) PAHs, total PCBs, and nine metals (cadmium, copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc) were identified as COPECs based on Screening Quotients (SQs) greater than unity. One VOC (isopropylbenzene) and two SVOCs (carbazole and dibenzofuran) were identified as COPECs because they were detected, but do not have an Ecological Screening Value (ESV). One VOC (1,2-dibromo-3-chloropropane) and four SVOCs (2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the Limit of Detection (LOD) for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC because it is a Bioaccumulative Chemical of Concern (BCOC) and the ESV does not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. The portion of this area adjacent to the Kalamazoo River was anticipated to continue to provide habitat under the current redevelopment plan.

Residential Area 2

Sixteen constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. HMW PAHs, total PCBs, and seven metals (copper, iron, lead, manganese, selenium, vanadium, and zinc) were identified as COPECs based on SQs greater than unity. One VOC (1,2-dibromo-3-chloropropane and four SVOCs (2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Mercury and nickel were identified as COPECs because they are BCOCs and their ESVs do not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. The portion of this area adjacent to the Kalamazoo River was anticipated to continue to provide habitat under the current redevelopment plan.

Residential Area 3

Twenty-one constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. HMW PAHs, total PCBs, and 11 metals (antimony, arsenic, chromium, copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc) were identified as COPECs based on SQs greater than unity. Two SVOCs (carbazole and dibenzofuran) were identified as COPECs because they were detected, but do not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and four SVOCs (2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC

because it is a BCOC and the ESV does not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. The portion of this area adjacent to the Kalamazoo River was anticipated to continue to provide habitat under the current redevelopment plan.

Residential Area 4

Thirty-one constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. One VOC (acetone), four benzene, toluene, ethylbenzene and xylenes(BTEX) constituents (benzene, toluene, o-xylene, and m&p-xylene), HMW PAHs, total PCBs, 12 metals (antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc) and cyanide were identified as COPECs based on SQs greater than unity. One VOC (isopropylbenzene) and two SVOCs (carbazole and dibenzofuran) were identified as COPECs because they were detected, but do not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and six SVOCs (2,4-dimethylphenol, 2,4-dinitrophenol, 2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC because it is a BCOC and the ESV does not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. The portion of this area adjacent to the Kalamazoo River was anticipated to continue to provide habitat under the current redevelopment plan.

Waterfront Plaza

Iron was identified as COPEC based on a Screening Quotient (SQ) greater than unity. Nickel was identified as a COPEC because it is a BCOC and the ESV does not consider bioaccumulation. The evaluation of risk to ecological receptors was based on a single sample. Because this area is anticipated to be fully developed under the current redevelopment plan, no further evaluation of risk to ecological receptors will be undertaken.

Mixed Residential/Commercial Area 1

Nineteen constituents or constituent groups (e.g., PAHs) were identified as COPECs. HMW PAHs and 10 metals (arsenic, cadmium, cobalt, iron, lead, manganese, mercury, selenium, vanadium, and zinc) were identified as COPECs based on SQs greater than unity. One SVOC (carbazole) was identified as a COPEC because it was detected, but does not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and five SVOCs (2,4-dimethylphenol, 2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC because it is a BCOC and the ESV does not

consider bioaccumulation. Vegetative cover in this redevelopment area has limited value as habitat for ecological receptors. Furthermore, this area is anticipated to be fully developed under the current redevelopment plan. Based on these considerations, no further evaluation of risk to ecological receptors will be undertaken for this redevelopment area.

Mixed Residential/Commercial Area 2

Forty constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. One VOC (acetone), four BTEX constituents (benzene, toluene, o-xylene, and m&p-xylene), low molecular weight (LMW) PAHs, HMW PAHs, total PCBs, 15 metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, and zinc) and cyanide were identified as COPECs based on SQs greater than unity. Eight VOCs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-phenylbutane, cymene, isopropylbenzene, n-butybenzene, n-propylbenzene, and tetrahydrofuran,) and two SVOCs (carbazole and dibenzofuran) were identified as COPECs because they were detected, but do not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and five SVOCs (2,4-dimethylphenol, 2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Habitat for ecological receptors is currently present in this redevelopment area. Some portions of this area were anticipated to provide habitat under the current redevelopment plan.

Commercial Area 1

Nineteen constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. HMW PAHs, total PCBs, and eight metals (copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc) were identified as COPECs based on SQs greater than unity. Two SVOCs (carbazole and dibenzofuran) was identified as COPECs because they were detected, but do not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and five SVOCs (2,4-dimethylphenol, 2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC because it is a BCOC and the ESV does not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. The portion of this area adjacent to the Kalamazoo River was anticipated to continue to provide habitat under the current redevelopment plan.

Commercial Area 2

Nineteen constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. HMW PAHs, total PCBs, and nine metals (arsenic, cadmium, iron, lead, manganese, mercury, selenium, vanadium, and zinc), and cyanide were identified as COPECs based on SQs greater than unity. One VOC (1,2-dibromo-3-chloropropane) and five SVOCs (2,4-dimethylphenol, 4,6-dinitro-2-methylphenol, 2-chlorophenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC because it is a BCOC and the ESV does not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. Some portions of this area were anticipated to continue to provide habitat under the current redevelopment plan.

Commercial Area 3

Nineteen constituents or constituent groups (e.g., PAHs) were identified as COPECs. HMW PAHs, and nine metals (antimony, cadmium, iron, lead, manganese, mercury, selenium, vanadium, and zinc), and cyanide were identified as COPECs based on SQs greater than unity. One VOC (isopropylbenzene) and one SVOC (dibenzofuran) were identified as COPECs because they were detected, but do not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and four SVOCs (2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel was identified as a COPEC because it is a BCOC and the ESV does not consider bioaccumulation. Vegetative cover in this redevelopment area has limited value as habitat for ecological receptors. Furthermore, this area was anticipated to be fully developed under the current redevelopment plan. Based on these considerations, no further evaluation of risk to ecological receptors will be undertaken for this redevelopment area.

Commercial Area 4

Twenty-seven constituents or constituent groups (e.g., PAHs, PCBs) were identified as COPECs. One BTEX constituent (benzene), HMW PAHs, total PCBs, 13 metals (antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, vanadium, and zinc) and cyanide were identified as COPECs based on SQs greater than unity. One VOC (isopropylbenzene) and two SVOCs (carbazole and dibenzofuran) were identified as COPECs because they were detected, but do not have an ESV. One VOC (1,2-dibromo-3-chloropropane) and five SVOCs (2,4-dimethylphenol, 2-chlorophenol, 4,6-dinitro-2-methylphenol, hexachlorobenzene, and hexachlorobutadiene) were identified as COPECs because they were not detected, but the LODs for less than 20 percent of the samples exceed their ESVs. Nickel

was identified as a COPEC because it is a BCOC and the ESV does not consider bioaccumulation. Habitat for ecological receptors is currently present in this redevelopment area. The portions of this area adjacent to the Kalamazoo River and Mill Race were anticipated to continue to provide habitat under the current redevelopment plan.

Based on the information reviewed and presented in the RI Report, further evaluation and refinement of the constituents identified as COPECs during the Steps 1 and 2 was recommended based on several Site-specific factors, including reasonable maximum exposure (RME) concentrations rather than maximum concentrations, alternative ecological benchmarks for specific receptor groups (soil invertebrates, terrestrial plants, birds, and mammals), and historical use and generation as Step 3a of the U.S. EPA 8-step process. For BCOCs, food chain models will be used to evaluate the potential for risk to upper trophic level receptors. A Step 3 refinement of constituents of potential ecological concern was conducted as part of this FS and was used to development the ecological RAOs and PRGs (see Section 3.0).

Section 2.0 Remedial Action Objectives (RAOs)

This section presents RAOs, identifies potential ARARs and TBCs, and presents PRGs for the soil media and ecological receptors at the locations of concern that are the subject of this FS Report.

2.1 Potential Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d)(2)(a) of CERCLA specifies that Superfund remedial actions meet any Federal standards, requirements, criteria, or limitations that are determined to be legally ARARs. State ARARs must be met if they are more stringent than Federal requirements. Additionally, non-promulgated Federal or State guidance materials, local/county ordinances/requirements, and regulatory standards that are not ARARs may be considered as To Be Considered (TBC) criteria.

ARARs and TBC criteria are defined as follows:

- Applicable Requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances found at a CERCLA site.
- Relevant and Appropriate Requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal

environmental or State environmental or laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.

- TBC Criteria include non-promulgated guidance or advisories that are not legally binding and that do not have the status of potential ARARs. TBCs generally fall within three categories: health effects information with a high degree of credibility; technical information on how to perform or evaluate site investigations; or response actions, and policy.

ARARs are divided into three categories: chemical-specific, location-specific, and action-specific. The three categories are described below:

- Chemical-Specific ARARs are usually health- or risk-based numerical values or methodologies, which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.
- Location-Specific ARARs apply to the geographical or physical location of the site. These requirements limit where and how the remedial action can occur.
- Action-Specific ARARs include performance, design, or other controls on the specific activities to be performed as part of the remedial action for a site.

Potential ARARs for the Site are presented in Table 2.1. Additional requirements that were reviewed and considered, but were ultimately concluded to not apply to the Site are discussed below.

The following requirements were excluded from the list of ARARs pursuant to U.S. EPA's "CERCLA Compliance with State Requirements" (U.S. EPA, 1989), which states that if a State is authorized to implement a program in lieu of a Federal agency, then State laws arising out of that program constitute the ARARs instead of the Federal authorizing legislation. A stringency comparison is unnecessary because State regulations under Federally authorized programs are considered to be Federal requirements:

- 40 Code of Federal Regulations (CFR) Part 257 (Criteria for Classification of Solid Waste Disposal Facilities and Practices) establishes standards for determining whether solid waste disposal facilities and practices may pose adverse effects on human health and the environment

- 40 CFR Part 261 (Identification and Listing of Hazardous Waste) specifies requirements for identification and listing of Resource Conservation and Recovery Act (RCRA) Hazardous Waste
- 40 CFR Part 262 (Standards Applicable to Generators of Hazardous Waste) specifies requirements for generation and off-site transport of hazardous wastes
- 40 CFR Part 403 (General Pretreatment Regulations for Existing and New Sources of Pollution) establishes standards for discharge to publicly owned treatment works (POTWs) to control pollutants which pass through or interfere with treatment processes in POTWs

The following requirements were reviewed, but were concluded to not be ARARs because there will be no discharges to surface water or groundwater for the selected remedy:

- 40 CFR Parts 122 and 125 (NPDES Permits, Criteria, and Standards) set chemical-specific standards to discharge any pollutant from a point source to the waters of the United States.
- 40 CFR Part 129 (Toxic Pollutant Effluent Standards) sets chemical-specific standards for discharges of "toxic compounds" to navigable waters.
- 40 CFR Part 136 (Guidelines for Establishing Test Procedures for Analyses of Pollutants) establishes procedures for the analysis of pollutants in water.
- 40 CFR Part 230 (Section 404(B)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material) provide guidelines to restore and maintain the chemical, physical, and biological integrity of the waters of the U.S. by controlling the discharge of fill material.
- 40 CFR Part 232 (Exempt Activities Not Requiring 404 Permits) establishes the requirements for the placement of fill related to Section 404 permits that are generally required for discharges of dredged or fill material to waters of the U.S.
- 33 United States Code (USC) Part 403, 33 CFR Part 322, and 33 CFR Part 3230 of the Rivers & Harbors Act prohibit unauthorized obstruction or alteration of navigable waters.
- MCL 324.3112 [Michigan Public Act 451, Part 31 (Water Resources Protection)] prohibits discharges of waste or water effluent to surface water bodies without approval of the State of Michigan.
- MCL 232.2204-2207 [Michigan Public Act 451, Part 31 (Water Resources Protection)] establishes rules regarding water and wastewater provisions for the non-degradation of groundwater quality and uses of groundwater.

The following requirements were reviewed, but were concluded to not be ARARs because it is anticipated that management of identified hazardous materials may include transportation off Site for treatment and/or disposal for the selected remedy:

- 40 CFR Part 268 (Land Disposal Restrictions) restricts land placement of materials that were RCRA hazardous waste at the point of generation and that exceed applicable Universal Treatment Standards
- 40 CFR Part 267 (Standards for Hazardous Waste Facilities) establishes standards for design, construction, and operation of hazardous waste landfills

The Federal Safe Drinking Water Act (SDWA) Section 1424(e) (Sole Source Aquifer Protection Program) was considered but is not an ARAR for the Site because there will be no federal financial assistance and the remedial action will not contaminate the aquifer.

The Federal Occupational Safety and Health Standards (29 CFR Part 1910.120) is applicable to the Site, but is not an ARAR because ARARs are requirements that protect human health and the environment and, as such, they do not include occupational safety or worker protection requirements. EPA requires compliance with the Occupational Safety and Health Administration (OSHA) standards and other worker protection requirements in 40 CFR 300.150 of the NCP, not through the ARARs process (55 FR 8679, March 8, 1990). Additionally, in Michigan, the Michigan Occupational Safety and Health Act (Act 154 of 1974, as Amended) establishes the rules for safety standards in the work place.

The requirements of 40 CFR Part 6.302 and Executive Order No. 11990 (Protection of Wetlands), Protection of Wetlands Executive Order 11990 (40 CFR Part 6, Appendix A), Michigan Public Act 451, Part 303 (Wetland Protection), Michigan Public Act 451, Part 301 (Inland Lakes and Streams), MCL 324.3108 (Michigan Public Act 451, Part 31 (Water Resources Protection), and Michigan Public Act 451, Part 13 (Floodplains and Floodways) are not ARARs for the Site because there are no jurisdictional wetlands or floodplains present at the Site. Based on the review of the U.S. Fish and Wildlife National Wetlands Inventory (NWI) Wetlands Mapper at http://107.20.228.18/Wetlands/WetlandsMapper.html,wetlands are mapped for the areas immediately along the Kalamazoo River and Mill Race, which are classified as Riverine, Lower Perennial Unconsolidated Bottom, and Permanently Flooded; however, based on the description these areas are located beyond the defined extent of the Site (i.e., beyond the top of bank). Based on the review of the Federal Emergency Management Agency (FEMA) maps for the Site, portions of the Site along the Kalamazoo River and Mill Race are designated as Flood Zone A, which are defined as "areas of 100-year flood base flood elevations and flood hazard factors not determined." The remainder of the Site is designated as Flood Zone C, which is defined as "areas of minimal flooding."

The requirements of 16 USC 661-667e, 33 CFR 320-330, and 40 CFR 6.304 (Fish and Wildlife Coordination Act), 16 USC 1531-1544, 50 CFR 200, and 50 CFR 402 (Endangered Species Act),

and Michigan Act 451, Part 365 (Endangered Species Protection) are not ARARs for the Site because no threatened/endangered species were identified to be present on the Site during the RI Report (CRA, 2013a).

The Federal statute 40 CFR Part 165 [Pesticide Management and Disposal (FIFRA)] is not an ARAR for the Site because it is not anticipated that pesticides will be brought to and used at the Site.

2.2 Preliminary Remediation Goals (PRGs)

The soil PRGs for each chemical of concern (COC), for each pathway to be addressed, within each redevelopment area for human health, with the exception of soil impacted with PCBs, presented in this FS Report are the Part 201 Generic Residential or Non-Residential Cleanup Criteria, as applicable based on the anticipated future land use of the redevelopment area. It should be noted that as further discussed below, in addition to the use of the Part 201 Generic Residential or Non-Residential Cleanup Criteria as a PRG for arsenic, Site-specific risk-based concentrations (RBCs) were evaluated. Section 2.2.1 presents a discussion on the selection of the Part 201 Generic Residential and Non-Residential Cleanup Criteria as a PRG. Additionally, it should be noted that the Part 201 Generic Residential and Non-Residential Cleanup Criteria for direct contact have been developed for dermal contact and ingestion; the ambient air inhalation pathway is addressed by the Part 201 Generic Residential and Non-Residential VSIC and PSIC. The VSIC addresses migration of volatile COC in soil to ambient air, and the PSIC addresses the emission and dispersion of soil particulate to ambient air.

The soil PRGs for human health direct contact/ingestion/inhalation exposure to soil impacted with PCBs presented in this FS Report are the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without and with further restrictions), or Site-specific RBCs calculated to evaluate the target cancer risk levels of 1.0×10^{-6}, 1.0×10^{-5}, and 1.0×10^{-4}, respectively, and the target non-cancer hazard quotient of 1.0 based on anticipated future land use (i.e., Residential versus Commercial). Section 2.2.2 presents a discussion on the selection of the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without and with further restrictions) and Section 2.2.4 presents a discussion on the development of Site-specific RBCs for PCBs as PRGs. It should be noted that based on available information, in the late 1950s and early 1960s, paper that was de-inked and recycled at the Mill may have included carbonless copy paper containing PCBs. De-inking was discontinued at the Mill in 1963. It is Weyerhaeuser's position that, based on the dates when the de-inking process operated at the Mill, that the waste materials containing PCBs generated during the de-inking are not regulated under TSCA.

The soil PRGs for human health direct contact/ingestion/inhalation exposure to soil impacted with arsenic presented in this FS Report are the Part 201 Generic Residential or Non-Residential Cleanup Criteria, and Site-specific RBCs calculated to evaluate the target cancer risk levels of 1.0 x 10^{-6}, 1.0 x 10^{-5}, and 1.0 x 10^{-4}, respectively, and the target non-cancer hazard quotient of 1.0 based on anticipated future land use (i.e., Residential versus Commercial). Sections 2.2.1 and 2.2.3 present a discussion on the selection of the Part 201 Generic Residential and Non-Residential Cleanup Criteria and the development of Site-specific RBCs for arsenic as PRGs.

The PRGs for each COPEC for ecological receptors are based on the result of the completion of Step 3 of the 8-step process for conducting ecological risk assessment under guidance developed by the U.S. EPA.

Each of the aforementioned PRGs is further discussed below.

2.2.1 Part 201 Generic Residential and Non-Residential Cleanup Criteria

Chemical-specific PRGs were selected for the identified COCs, with the exception of PCBs, for soil samples consistent with the Generic Residential and Non-Residential Cleanup Criteria and Screening Levels established in Part 7 of Administrative Rules, effective December 30, 2013, pursuant to Part 201, Environmental Remediation, 1994 PA 451 as amended (MDEQ, 2012a). Part 201 has been identified as an ARAR for the Site. COCs were identified as constituents that had one or more exceedances of the Part 201 Generic Residential Cleanup Criteria.

Table 2.2 presents the COCs and Part 201 Generic Residential and Non-Residential Cleanup Criteria PRGs for soil.

2.2.2 Toxic Substances Control Act

Chemical-specific PRGs were selected for PCBs, for soil samples consistent with the TSCA Cleanup Levels for Bulk PCB Remediation Waste in High Occupancy Areas set forth in 40 CFR 761.61(a)(4)(i)(A).

PCB remediation waste is defined in 761.3 as " waste containing PCBs as a result of a spill, release or other unauthorized disposal, at the following concentrations: Materials disposed of prior to April 18, 1978, that are currently at concentrations > 50 ppm PCBs, regardless of the concentration of the original spill; materials which are currently at any volume or concentration where the original source was > 500 ppm PCBs beginning on April 18, 1978, or > 50 ppm beginning on July 2, 1979; and materials which are currently at any concentration if the PCBs are spilled or released from a source not authorized for use under this part. PCB remediation

waste means soil, rags, and other debris generated as a result of any PCB spill cleanup, including, but not limited to:

(1) Environmental media containing PCBs, such are soil and gravel; dredged materials, such as sediments, settled sediment fines, and aqueous decantate from sediment.

(2) Sewage sludge containing < 50 ppm PCBs and not in use according to §761.20(a)(4); PCB sewage sludge; commercial or industrial sludge contaminated as a result of a spill of PCBs including sludges located in or removed from any pollution control device; aqueous decantate from an industrial sludge.

(3) Buildings and other man-made structures (such as concrete floors, wood floors, or walls contaminated from a leaking PCB or PCB-Contaminated Transformer), porous surfaces, and non-porous surfaces."

The cleanup levels specified in 40 CFR 761.61(a)(4) are applicable to bulk PCB remediation waste, which is defined in 40 CFR 761.61(a)(4)(i) as "Bulk PCB remediation waste includes, but is not limited to, the following non-liquid PCB remediation waste: soil, sediments, dredged materials, muds, PCB sewage sludge, and industrial sludge."

The default cleanup levels for bulk PCB remediation waste in High Occupancy Areas are defined in 40 CFR 761.61(a)(4)(i)(A) as "…< 1 ppm without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations > 1 ppm and < 10 ppm shall be covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section."

Table 2.3 presents the TSCA Cleanup Levels for Bulk PCB Remediation Waste in High Occupancy Areas PRGs for soil.

40 CFR 761.61(c) allows for a risk-based approach for sampling, cleanup, or disposal of bulk PCB remediation waste if U.S. EPA "finds that the method will not pose an unreasonable risk of injury to health or the environment." A discussion of the proposed alternative risk-based approach for PCB PRGs is presented in Section 2.2.4.

2.2.3 Site-Specific Risk-Based Arsenic PRG

RBCs were developed that are protective of human health direct contact exposure to arsenic in soil for trespassers, recreational users, residents, commercial workers, utility workers, and construction workers. These same receptors were evaluated in the RI Report (CRA, 2013a). Two RBCs were initially developed: one protective of carcinogenic health impacts and a second protective of non-carcinogenic health impacts. The RBC for each receptor was determined to be the lower value between carcinogenic and non-carcinogenic health impacts. The RBCs were

calculated using a combination of default U.S. EPA exposure assumptions similar to those used in the RI Report and Site-specific exposure assumptions and based on target cancer risk levels of 1.0×10^{-6}, 1.0×10^{-5}, and 1.0×10^{-4}, and the target non-cancer hazard quotient of 1.0.

It should be noted that in the November 23, 2011 United States Environmental Protection Agency's (U.S. EPA's) comments on the HHRA portion of the RI Report, the U.S. EPA provided a comment (U.S. EPA Specific Comment #11) regarding the potential for residents ingesting homegrown produce at the Site. On April 20, 2012, CRA provided the following response to this comment: The Residential Areas of the Site will not be comprised of single family detached homes, where the possibility of residents ingesting homegrown produce would be a potential exposure pathway. Rather, condominiums are proposed for these Residential Areas. The U.S. EPA accepted this response and subsequently approved the RI Report (CRA, 2013a). Given this information, potential exposure of residents to arsenic through ingestion of homegrown produce is an unlikely exposure scenario for the Site and; therefore, has not been considered in the RBC development for a PRG for arsenic in soil.

A copy of the revised memorandum entitled Revised Development of Risk-Based Concentrations for Arsenic and PCBs in Soil (CRA, 2014b) is presented in Appendix A. The memorandum presents the equations used to develop the RBCs, the receptor-specific exposure assumptions applied in the development of the RBCs, and the human health toxicity values applied for arsenic. The equations, exposure assumptions, and toxicity values utilized in the derivation of the RBCs in the memorandum are the same as those used in the forward risk and hazard calculations, as summarized in the RI Report, unless otherwise noted in the memorandum.

Table 2.4 presents the RBC PRGs for direct contact exposure to arsenic in soil.

2.2.4 Site-Specific Risk-Based PCBs PRG

RBCs were developed that are protective of human health direct contact exposure to PCBs in soil for trespassers, recreational users, residents, commercial workers, utility workers, and construction workers. These same receptors were evaluated in the RI Report (CRA, 2013a). Two RBCs were initially developed: one protective of carcinogenic health impacts and a second protective of non-carcinogenic health impacts. The RBC for each receptor was determined to be the lower value between carcinogenic and non-carcinogenic health impacts. The RBCs were calculated using a combination of default U.S. EPA exposure assumptions similar to those used in the RI Report and Site-specific exposure assumptions and based on target cancer risk levels of 1.0×10^{-6}, 1.0×10^{-5}, and 1.0×10^{-4}, and the target non-cancer hazard quotient of 1.0.

A copy of the revised memorandum entitled Revised Development of Risk-Based Concentrations for Arsenic and PCBs in Soil (CRA, 2014) is presented in Appendix A. The memorandum presents the equations used to develop the RBCs, the receptor-specific exposure assumptions applied in the development of the RBCs, and the human health toxicity values applied for PCBs. The equations, exposure assumptions, and toxicity values utilized in the derivation of the RBCs in the memorandum are the same as those used in the forward risk and hazard calculations, as summarized in the RI Report, unless otherwise noted in the memorandum.

Table 2.5 presents the RBC PRGs for direct contact exposure to PCBs in soil.

2.2.5 Ecological PRGs

A refinement of chemical constituents identified in the SLERA portion of the RI Report (CRA, 2013a) as COPECs for the Site was performed as part of this FS. The refinement process is Step 3 of the 8-step process for conducting ecological risk assessment under guidance developed by the U.S. EPA. The Revised Step 3 – Refinement of Constituents of Potential Ecological Concern and Development of Ecological Preliminary Remediation Goals report (CRA, 2014b) is presented in Appendix B, with a summary provided below.

The majority of the Site evaluated in the SLERA is anticipated to be redeveloped for residential and/commercial use. As complete exposure pathways will be eliminated in those areas that will be developed, the dataset for the refinement process consisted of samples from those areas that will not be disturbed by development activities. The revised assessment area is within the riparian corridor of the Kalamazoo River. The data for the revised assessment were re-screened using the same methodology and ESVs that were used in the SLERA. The re-screening retained two VOCs (acetone and isopropylbenzene), three BTEX constituents (benzene, toluene, and m&p-xylenes), one SVOC (carbazole), HMW PAHs, total PCBs, and 13 inorganic constituents [antimony, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, selenium, vanadium, zinc, and cyanide (total)] as COPECs.

The refinement process focused on avian and mammalian wildlife. Refinement consisted of a two-phase process. In the first phase, 95 percent upper confidence limit (UCL) concentrations of the COPECs were compared to ecological benchmarks (i.e., soil concentrations) specific to avian and/or mammalian wildlife. A constituent was carried forward to the second phase if the 95 percent UCL concentration was greater than the ecological benchmark or if an ecological benchmark was not available. This phase eliminated total PCBs, antimony, arsenic, barium, chromium, manganese, and vanadium as COPECs.

The second phase of the refinement process involved use of food chain models to assess the potential for risk to avian and mammalian wildlife. The food chain models identified a potential for risk to avian insectivores exposed to lead at both a no observed adverse effect level (NOAEL) and lowest observed adverse effect level (LOAEL), and mammalian wildlife exposed to lead at the LOAEL. The food chain models also identified a potential for risk to avian and/or mammalian wildlife exposed to carbazole, HMW PAHs, cadmium, copper, mercury, selenium, and zinc at the NOAEL but not the LOAEL.

Ecological PRGs were developed for carbazole, HMW PAHs, cadmium, copper, lead, mercury, selenium, and zinc using food chain models based on the U.S. EPA's Wildlife Scenario Builder (WSB)(U.S. EPA, 2013). The rationale is that the food chain models used for the refinement process include a number of exposure parameters and assumptions that are overly conservative for development of PRGs, which trigger risk management if exceeded. The WSB methodology calculates ingestion of COPECs based on metabolic requirements of free ranging organisms and assimilation efficiencies for each dietary component. Whereas the food chain models for the refinement process assumed a single food item for an indicator species, the WSB identifies a number of dietary items for an indicator species.

LOAELs were used as the Toxicity Reference Values (TRVs) for development of the ecological PRGs. The LOAELs used in the refinement process were also used for the PRGs. As discussed in Appendix B, there is a high degree of uncertainty and conservatism associated with the LOAEL for lead for avian wildlife. Due to the uncertainty associated with the LOAEL for avian wildlife, lower and upper PRGs were developed for lead. The lower end value was based on the conservative LOAEL of 8.75 mg/kg-day. To provide an upper end value, a PRG was also developed for avian wildlife using a LOAEL (42.7 mg/kg-day) based on the geometric mean of bounded LOAELs identified in the source document for the Ecological Soil Screening Level (ECO-SSL) for lead (U.S. EPA, 2005f).

Table 2.6 presents the 95 percent UCL concentrations of the COPECs, 95 percent UCL concentrations of the COPECs to their ecological PRGs, ecological PRGs, and need for risk management measures. The 95 percent UCL of each COPEC was compared to its ecological PRG. The 95 percent exposure concentrations for carbazole, HMW PAHs, cadmium, copper, mercury, selenium, and zinc are below their ecological PRGs. For these seven COPECs, the 95 percent UCL is less than 50 percent of the PRG. This result indicates that concentrations of carbazole, HMW PAHs, cadmium, copper, mercury, selenium, and zinc in soil of the corridor of the Kalamazoo River are protective of avian and mammalian wildlife and risk management is not required for these COPECs.

For lead, the lower end and upper range PRGs are 140 mg/kg and 812 mg/kg, respectively. The 95 percent UCL of 181 mg/kg is within the range of the lower end and upper end PRGs. The 95 percent UCL is 22 percent of the upper end PRG. Soil excavation is not required to achieve the 95 UCL for the upper range PRG for lead. A decision whether or not measures for risk management should be undertaken to achieve the lower end PRG was evaluated as follows and as detailed in Appendix B. The maximum detected concentration of lead in the dataset for the refinement process is 990 mg/kg. Removal of this sample point (DG-4 at 0 to 2 feet below ground surface) from the dataset achieves the 95 percent UCL by reducing the exposure concentration from 181 mg/kg to 126 mg/kg, which is lower than the lower end PRG of 140 mg/kg. Removal of soil from four sample locations (DG-4, TP-341, SB-201, and SB-203 at 0 to 2 feet below ground surface) within the riparian corridor dataset reduces lead concentrations below the lower end PRG at all locations within the dataset. The four sample locations identified above were already targeted for soil removal as part of the remedial actions developed to address human health impacts and do not result in the generation of additional soil volume.

2.3 Remedial Action Objectives (RAOs)

RAOs are medium-specific goals for protecting human health and the environment. RAOs provide the basis for selecting potential remedial alternatives and options for a Site. The RAOs have been prepared in accordance with the results of the RI, U.S. EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (U.S. EPA, 1988), and ARARs for the Site, to address human and ecological pathways and receptors for soil and groundwater media. The RAOs have been developed consistent with the conclusions of the RI Report and discussions with the U.S. EPA.

Based on the conclusions of the RI Report, the following five soil RAOs were developed:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals, and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological PRGs.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Based on the conclusions of the RI Report, the following three groundwater RAOs were developed:

RAO 6 Prevent human exposure to groundwater with concentrations exceeding Michigan Act 451, Part 201 Drinking Water Criteria.

RAO 7 Protect surface water by mitigating the potential for groundwater to migrate to surface water above Michigan Act 451, Part 201 requirements protective of the groundwater-surface water interface.

RAO 8 Restore groundwater impacted with metals at concentrations above the PRGs to beneficial use.

Based on discussions with the U.S. EPA, the FS Report has been modified to address only soil RAOs and soil alternatives. Therefore only RAOs 1 through 5 are addressed in this FS Report. RAOs 6 through 8 address groundwater and will be further evaluated through the submittal and implementation of an Interim Groundwater Work Plan, upon approval of U.S. EPA. Therefore, while RAOs have been developed and presented for groundwater in the FS Report, groundwater will be addressed subsequent to implementation of soil remedial action in a FS Addendum, if determined to be necessary based on the results of the additional groundwater evaluation, as it relates to achieving the above RAOs.

Section 3.0 Development and Screening of Technologies

3.1 General Response Actions

General Response Actions (GRAs) are medium-specific actions that may satisfy the RAOs. During the development of alternatives, applicable areas of concern for soil were identified to which the GRAs may be applied. Table 3.1 lists the GRAs utilized in each soil remedial alternative. The GRAs developed for soil are discussed below.

The following GRAs, to be used singly or in combination, were identified for soil at the Site:

- *No Action* – The No Action response would maintain potential risks under existing conditions and provide a baseline against which the other GRAs can be compared.
- *Institutional Controls* – Institutional controls may be undertaken to isolate potential receptors from COCs in soil. Institutional controls may be necessary to reduce the likelihood of completed exposure pathways to certain receptors by providing property management guidelines and restrictions regarding on-Site activities, coupled with compliance and enforcement mechanisms.
- *Containment* - Containment actions may be undertaken to isolate potential receptors from COCs in soil and to reduce mobility of COCs. These actions may be completed through on-Site capping or a combination of on-Site consolidation and capping.
- *Excavation and Disposal* – Excavation actions may be undertaken to physically remove impacted soil for off-Site disposal at an appropriately permitted facility.
- *Treatment* – Treatment actions may be undertaken to complete on-Site treatment in-situ treatment of soil to reduce the toxicity, mobility, or volume (TMV) of media exhibiting unacceptable risk. Treatment actions may be undertaken to physically remove impacted media from in situ, followed by either on-Site or off-Site ex-situ treatment to reduce the TMV of media exhibiting unacceptable risk.

3.2 Areas and Volumes of Contaminated Media

The areas or volumes to which the GRAs may be applied are based on the potential exposure routes, the nature and extent of impact, the PRGs, and the preliminary list of action-specific ARARs. In addition, the requirement for protectiveness identified in the RAOs, and the chemical and physical characteristics of the Site were considered during the development of the GRAs. The estimated areas and/or volumes of impacted soil to which the GRAs may be applicable, are discussed below and included in Table 3.2.

Chemical-specific exceedances of the most restrictive PRGs in soil for the 11 redevelopment areas are presented in Section 1.2.4.2. Figures 3.1 through 3.44 present the conceptual area of materials impacted above the PRGs identified in Section 2.2, based on remedial alternative and/or proposed future land use, for the 11 redevelopment areas. Table 3.3 presents a summary of the PRGs utilized in the development of Figures 3.1 through 3.44, based on proposed future land use for each redevelopment area for each remedial alternative. In general, redevelopment areas Residential Areas 1 through 4 and Mixed Residential/Commercial Areas 1 and 2 were compared to residential criteria/cleanup levels and redevelopment areas Waterfront Plaza and Commercial Areas 1 through 4 were compared to

non-residential/commercial criteria/cleanup levels. It should be noted that the Waterfront Plaza Area does not include any excavation work solely within this area as soil impacted above the PRGs was not identified. Therefore, figures related to conceptual areas of materials impacted above PRGs were not included in the FS Report for the Waterfront Plaza Area.

The areas and volumes to which the GRAs may be applied are based on the PRGs for each COC in each medium of concern, for each pathway to be addressed within each redevelopment area for human health, with the exception of human direct contact/ingestion/inhalation exposure to soil impacted with arsenic and PCBs under certain remedial alternatives, are the Part 201 Generic Residential and Non-Residential Cleanup Criteria, as applicable based on the anticipated future use of each redevelopment area.

The 10^{-4} risk level for arsenic and PCBs does not meet the Part 201 or TSCA ARAR and is not considered a viable PRG; therefore, it is not further evaluated in this FS Report.

The PRGs for human direct contact/ingestion/inhalation exposure to soil impacted with arsenic include Site-specific RBCs calculated for the 10^{-5} and 10^{-6} risk levels with a hazard quotient of 1.0, in addition to comparison to the pathway specific Part 201 Generic Residential and Non-Residential Cleanup Criteria that are also based on a 10^{-5} risk level. The calculated value for the RBC for arsenic at the 10^{-6} risk level with a hazard index of 1.0 was below the Part 201 State Default Background Level (SDBL) of 5.8 mg/kg; therefore, the SDBL was substituted for the calculated value for the purposes of this evaluation.

The PRGs for human direct contact/ingestion/inhalation exposure to soil impacted with PCBs include Site-specific RBCs calculated for the 10^{-5} and 10^{-6} risk levels with a hazard index of 1.0, in addition to comparison to the TSCA Cleanup Levels for Bulk PCB Remediation Waste in High Occupancy Areas (with and without further conditions). The calculated value for the RBC for PCBs at the 10^{-6} risk level with a hazard index of 1.0 was below the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further conditions) of 1 mg/kg; therefore, the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further conditions) was substituted for the calculated value for the Residential Areas (i.e., Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2) and the TSCA Cleanup Level for Bulk Remediation Waste in High Occupancy Areas (with further conditions) was substituted for the calculated value for the Non-Residential/Commercial Areas (i.e., Waterfront Plaza and Commercial Areas 1 through 4).

Upon completion of the Step 3 Refinement of Constituents of Potential Ecological Concern and Development of Ecological RAOs presented in Appendix B and as discussed in Section 2.2.5, it was identified that the 95 percent UCL concentration was below the ecological PRG for

carbazole, HMW PAHs, cadmium, copper, mercury, selenium, and zinc. The 95 percent UCL concentrations were also less than 50 percent of the PRG for these seven COPECs. Consequently, it can be concluded that concentrations of carbazole, HMW PAHs, cadmium, copper, mercury, selenium, and zinc in soil within the corridor of the Kalamazoo River are protective of avian and mammalian wildlife and that risk management is not required to achieve RAOs. The 95 percent concentration for lead is within the range of the lower end and upper end PRGs. This result triggers a decision whether or not measures for risk management should be undertaken. Removal of the sample location with the highest concentration from the dataset reduces the 95 percent UCL concentration to a value below both the lower end and upper end PRGs. Remedial efforts would be necessary, to achieve the lower end PRG, based on the ecological risk assessment for lead impacted areas within the riparian corridor. RAO 4 was developed to demonstrate that the ecological pathway and receptors for soil along the riparian corridor were evaluated separately from the remaining areas of the Site. However, it should be noted that the sample location with the highest concentration of lead as well as three other locations from the dataset will be removed as part of the remedial actions developed to meet the human health impacts based on RAOs (i.e., RAO 1, RAO 2, and RAO 3), which would achieve the lower end PRG for lead within the riparian corridor.

In addition to materials present above the PRGs, the areas shown on Figures 3.1 through 3.44 include materials anticipated to be remediated based on operational history and future redevelopment plans, including the coal tunnel, the former fuel oil AST lines from the former tank to the boiler house, and an area identified to be impacted during the installation of a storm sewer line by MDOT.

As identified above and in Section 2.2, exceedances of Part 201 Residential/Non-Residential Cleanup Criteria for VOCs, SVOCs, and inorganics (with the exception of arsenic and PCBs, as detailed below) were screened based on anticipated future land use. Exceedances were further screened against a subset of the Part 201 Residential/Non-Residential Cleanup Criteria including the VSIC, SVIAC, PSIC, and DCC, and Soil Saturation Screening Levels. Exceedances of soil criteria protective of the groundwater pathway, such as the DWPC and GSIPC, were not specifically or separately used in the evaluation of soil volumes because they relate to the groundwater and are anticipated to be addressed through other measures, if necessary. However, it should be noted that a large mass of the soil that was noted to exclude criteria protective of groundwater will be removed through the various remedial alternatives presented.

Areas to be remediated for arsenic were based on the Site-specific approach presented in Sections 2.4.2 and 2.4.3 of the Revised Development of Risk-Based Concentrations for Arsenic and PCBs in Soil memorandum (CRA, 2014a), which is presented in Appendix A. The

memorandum presents a comparison of the surface soil and soil (surface and subsurface) exposure point concentrations (EPCs) from the RI Report to the calculated PRGs for arsenic. Those areas with EPCs greater than the PRGs were identified to require further action (management or remediation) to ensure protection of human receptors from direct contact exposure to soil. Those areas with EPCs less than the PRGs were identified to require no further action with respect to direct contact with soil. The EPC for each area is based on the 95 percent UCL of the mean, which is calculated using U.S. EPA's ProUCL 5.0 statistical software. Using this approach, redevelopment areas were identified for each of the scenarios that would require further action to mitigate potential exposure to arsenic through direct contact with soil. Using an iterative approach, specific soil sampling locations containing the highest concentrations of arsenic from these redevelopment areas were removed from the soil datasets used to calculate the EPC until the EPC met the PRG. Remediation of these areas not under concrete slabs, as detailed in Section 4.0, were included in the below volumes of materials for options utilizing the iterative approach.

Areas to be remediated for PCBs were identified based on the Site-specific RBCs presented in Section 3.0 of the Revised Development of Risk-Based Concentrations for Arsenic and PCBs in Soil Memorandum (CRA, 2014a), which is presented in Appendix A. The TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without Further Conditions) of 1 mg/kg, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (with Further Conditions) of 10 mg/kg, depending on the proposed PRG for a given alternative.

Table 3.3 presents a summary of the PRGs utilized in the development of the conceptual remedial alternative scenarios, based on proposed future land use for each redevelopment area.

The general approach for identification of the extent of the conceptual areas of materials to be addressed through remedial activities was developed based on the following:

- PRGs for a given redevelopment area were based on anticipated redevelopment plans by the City of Plainwell for land use (i.e., Residential/Mixed Residential and Commercial versus Commercial)
- Impacts above the Part 201 DWPC and GSIPC were not included in the volumes presented below
- Impacts were evaluated on an alternative scenario basis, as outlined below, to meet the specified PRGs
- Areas and volumes for single sample location exceedances were calculated assuming a 10-foot by 10-foot area, to a depth of 1 foot below the last PRG exceedance

- Areas and volumes for multiple sample locations within a reasonably close proximity to one another at equivalent elevations, with comparable analytical results for COCs and with related operational history, were identified as a larger area under the assumption that the surrounding area was impacted at similar levels as those exhibited at single sample points; this assumption will be confirmed during the Pre-Design Investigation (PDI)
- For the scenarios utilizing the iterative approach, materials present beneath buildings or at depth with an appropriate cover were assumed to be managed in place utilizing institutional controls and/or engineering controls consistent with the City of Plainwell's approach to redevelopment which includes leaving historically significant buildings in place and leaving building slabs/foundations in place for buildings that have been or will be demolished (see Section 1.2.2.1 for information regarding historical designation of Site structures)
- The areas identified as the Site and beyond the "top of bank" are consistent with the approved RI Report (Revision 2)
- Areas with historical sample results above the PRGs beyond the "top of bank" were not included in the soil volume calculations

Utilizing the above general approach, estimated volumes of soil to be addressed at the Site were developed based on the following scenarios:

- Using a combination of the identified GRAs presented in Section 3.1 (except for treatment), the primary alternative series utilized to develop the estimated areas/volumes of impacted soil to which the GRAs may be applicable include Scenario 1 (Alternative 1 - No Action), Scenario 2 (Alternative 2 [Excavation, Consolidation, Capping, and Off-Site Disposal]), and Scenario 3 (Alternative 3 [Excavation and Off-Site Disposal]
- Scenarios (Alternatives) 2 and 3 identified above were further evaluated based on the below identified PRGs, which are summarized in Tables 2.2 through 2.5:
  - Conceptual areas of impact for Alternatives 2A and 3A were developed based on evaluation of VOCs, SVOCs, metals, and inorganics to Part 201 Generic Residential Cleanup Criteria and PCBs to the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further conditions) for all redevelopment areas.
  - Conceptual areas of impact for Alternatives 2B and 3B were developed based on evaluation of VOCs, SVOCs, metals, and inorganics to Part 201 Generic Residential and Non-Residential Cleanup Criteria (i.e., Residential for Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2, and Non-Residential for Waterfront Plaza and Commercial Areas 1 through 4), utilizing an iterative approach for addressing arsenic-impacted material, and PCB Residential (i.e., Residential Areas 1 through 4, and

Mixed Residential/Commercial Areas 1 and 2) and Commercial (Waterfront Plaza and Commercial Areas 1 through 4) Risk-Based Criteria (developed based on 10^{-5} risk level)

- Conceptual areas of impact for Alternatives 2C and 3C were developed based on evaluation of VOCs, SVOCs, metals (except arsenic), and inorganics to Part 201 Generic Residential and Non-Residential Cleanup Criteria (i.e., Residential for Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2, and Non-Residential for Waterfront Plaza and Commercial Areas 1 through 4), 10^{-5} Risk Level for arsenic Residential (i.e., Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2) and Commercial (Waterfront Plaza and Commercial Areas 1 through 4) Risk-Based Criteria with an iterative approach, and PCB Residential (i.e., Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2) and Commercial (Waterfront Plaza and Commercial Areas 1 through 4) Risk-Based Criteria (developed based on 10^{-5} risk level)
- Conceptual areas of impact for Alternatives 2D and 3D were developed based on evaluation of VOCs, SVOCs, metals (except arsenic), and inorganics to Part 201 Generic Residential and Non-Residential Cleanup Criteria (i.e., Residential for Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2, and Non-Residential for Waterfront Plaza and Commercial Areas 1 through 4), 10^{-6} Risk Level for arsenic Residential (i.e., Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2) and Commercial (Waterfront Plaza and Commercial Areas 1 through 4) Risk-Based Criteria with an iterative approach, and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further conditions for residential areas [i.e., Residential Areas 1 through 4, and Mixed Residential/Commercial Areas 1 and 2and with further conditions for non-residential areas [i.e., Waterfront Plaza and Commercial Areas 1 through 4])

The estimated volume of materials to be remediated utilizing the PRG scenario for Alternatives 2A and 3A is presented below and identified on Figures 3.1 through 3.11:

- Residential Area 1 - 4,905 cubic yards (cy)
- Residential Area 2 - 3,585 cy
- Residential Area 3 - 1,895 cy
- Residential Area 4 - 10,535 cy
- Waterfront Plaza - No materials will be removed from this redevelopment area under this scenario.
- Mixed Residential and Commercial Area 1 – 1,060 cy
- Mixed Residential and Commercial Area 2 – 7,916 cy

- Commercial Area 1 - 2,215 cy
- Commercial Area 2 – 2,455cy
- Commercial Area 3 - 5,765 cy
- Commercial Area 4 – 16,115 cy

The estimated volume of materials to be remediated utilizing the PRG scenario for Alternatives 2B and 3B is presented below and identified on Figures 3.12 through 3.22:

- Residential Area 1 - 910 cy
- Residential Area 2 – 25 cy
- Residential Area 3 - 1,495 cy
- Residential Area 4 - 5,340 cy
- Waterfront Plaza - No materials will be removed from this redevelopment area under this scenario.
- Mixed Residential and Commercial Area 1 - 40 cy
- Mixed Residential and Commercial Area 2 – 5,800 cy
- Commercial Area 1 - 12 cy
- Commercial Area 2 - No materials will be removed from this redevelopment area under this scenario.
- Commercial Area 3 - No materials will be removed from this redevelopment area under this scenario.
- Commercial Area 4 – 7,185 cy

The estimated volume of materials to be remediated utilizing the PRG scenario for Alternatives 2C and 3C is presented below and identified on Figures 3.23 through 3.33:

- Residential Area 1 - 935 cy
- Residential Area 2 – 620 cy
- Residential Area 3 - 1,895 cy
- Residential Area 4 - 9,390 cy
- Waterfront Plaza - No materials will be removed from this redevelopment area under this scenario.
- Mixed Residential and Commercial Area 1 - 70 cy
- Mixed Residential and Commercial Area 2 – 6,395 cy

- Commercial Area 1 - 12 cy
- Commercial Area 2 - 12 cy
- Commercial Area 3 - No materials will be removed from this redevelopment area under this scenario.
- Commercial Area 4 – 7,185 cy

The estimated volume of materials to be remediated utilizing the PRG scenario for Alternatives 2D and 3D is presented below and identified on Figures 3.34 through 3.44:

- Residential Area 1 - 2,730 cy
- Residential Area 2 –3,550 cy
- Residential Area 3 – 4,320 cy
- Residential Area 4 - 9,965 cy
- Waterfront Plaza - No materials will be removed from this redevelopment area under this scenario.
- Mixed Residential and Commercial Area 1 - 205 cy
- Mixed Residential and Commercial Area 2 - 6,963 cy
- Commercial Area 1 - 165 cy
- Commercial Area 2 – 2,460 cy
- Commercial Area 3 - 3,845 cy
- Commercial Area 4 – 15,375 cy

3.3 Identification and Technical Implementability Screening of Remedial Technology Types and Process Options

Remedial technologies and associated process options, corresponding to the identified GRAs, were developed and screened by evaluation of the process options with respect to technical implementability at the Site. Remedial technology types and process options are identified on Figure 3.45 for soil for each applicable GRA identified above in Section 3.1.

Within each of the identified remedial technology types (underlined below), the below process options were identified for soil (bulleted below), as follows:

<u>No Action</u>

- No action

Access Restriction Technologies

- Zoning restrictions
- Deed/use restrictions
- Restrictive covenants

Containment Technologies

- Capping
- Consolidation (soil relocation)/capping

Excavation Technologies

- Excavation and off-Site disposal

Treatment Technologies

- In-situ chemical/biological treatment
- Ex-situ physical/chemical/biological treatment

The identified process options were screened relative to technical implementability based on Site contaminant types and concentrations, and other Site-specific characteristics. The identification of remedial technology types and process options for soil, together with a description of each process option, and the results of the technical implementability screening is presented on Figure 3.45.

3.4 Evaluation of Process Options

The process options that were identified on Figure 3.45 for soil, to be technically implementable were evaluated in greater detail to select one or a smaller number of process options to represent each remedial technology type. Each process option was evaluated based on effectiveness, implementability and cost. The evaluation placed more emphasis on effectiveness and less emphasis on implementability and cost. Because the process options had already undergone technical implementability screening in Section 3.3, the implementability screening of the evaluation in this section placed greater emphasis on the institutional aspects of implementability. The evaluation criteria are discussed below.

Effectiveness

- The effectiveness in handling the estimated areas or volumes of contaminated media and meeting the remediation goals identified in the RAOs

- The effectiveness in protecting human health and the environment during the construction and implementation phase
- The effectiveness with respect to the COCs and conditions at the Site

Implementability

- Disruption to the project site and surrounding area
- Ability to obtain necessary permits, if required
- Availability of treatment, storage, and disposal services
- Availability of necessary specialized equipment and technically proficient workers to implement the technology

Cost

- Based on evaluating whether costs are low, moderate, or high relative to other processes in the same remedial technology type and capital versus operations, maintenance, and monitoring (OM&M) costs

Figure 3.46 summarizes the results of the evaluation process for soil process options. The process options retained following evaluation represent an inventory of process options considered most suitable for addressing the media of interest at the Site. The remedial technology types and process options retained in this section may be used either alone or combined with others to develop remedial alternatives.

Section 4.0 Alternatives Array

4.1 Assembly of Retained Remedial Technology Types and Process Options into Remedial Alternatives

The retained remedial technology types and process options were assembled into Site-wide comprehensive soil remedial alternatives.

The following remedial alternatives have been developed for soil:

- Soil Remedial Alternative 1 – No Action
- Soil Remedial Alternative 2 – Excavation, Consolidation, Capping, and Off-Site Disposal
  - Soil Remedial Alternative 2A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)
  - Soil Remedial Alternative 2B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 2C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 2D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)
- Soil Remedial Alternative 3 – Excavation and Off-Site Disposal
  - Soil Remedial Alternative 3A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)
  - Soil Remedial Alternative 3B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 3C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 3D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

Table 4.1 presents a summary of the soil alternatives. Each remedial alternative is discussed in the following sections, including generalized design components and achievements of RAOs:

Section 4.1.1 Soil Remedial Alternative 1 – No Action
Section 4.1.2 Soil Remedial Alternative 2-Series – Excavation, Consolidation, Capping, and Off-Site Disposal
Section 4.1.3 Soil Remedial Alternative 3-Series – Excavation and Off-Site Disposal

4.1.1 Soil Remedial Alternative 1 – No Action

Soil Alternative 1, the No Action alternative, is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR 300) and its purpose is to serve as a baseline for the comparative analysis of alternatives.

No active remediation would be performed at the Site.

Table 4.2.A presents the institutional control relationship matrix chart for Soil Remedial Alternative 1.

4.1.2 Soil Remedial Alternatives 2-Series – Excavation, Consolidation, Capping, and Off-Site Disposal

The Soil Remedial Alternative 2-Series includes the excavation of impacted soil above the PRGs, the consolidation and on-Site capping of soil impacted with metals at concentrations above the residential PRGs and below the non-residential/commercial PRGs on a designated non-residential/commercial land use portion the Site, the off-Site disposal of impacted soil above the PRGs that does not meet the criteria (see Sections 4.1.2.1, 4.1.2.2, 4.1.2.3 and 4.1.2.4 for the specific criteria) for the consolidation and capping component of the alternative, and implementation of institutional and/or engineering controls. Section 3.2 presents a summary of general approaches utilized when developing the conceptual excavation areas for all Soil Remedial Alternative 2-Series options.

The primary components of Soil Remedial Alternative 2-Series are:

- Pre-design delineation of the vertical and horizontal extent of soil impacts in each area exceeding the PRGs
- Pre-excavation activities will vary by redevelopment area and are detailed in Appendix C by remedial alternative and redevelopment area. Soil Remedial Alternatives 2-Series pre-excavation activities would include, but are not limited to: erosion control measures; purging the remaining buried fuel oil line from the former 200,000-gallon AST; removal of

fuel oil within the coal tunnel; abandonment of monitoring wells in the excavation areas; and structural evaluation of the southern portion of Building 1 (loading dock). Pre-excavation activities for Soil Remedial Alternative 2-Series will also include the potential for limited asbestos abatement around the former coal tunnel and the exterior piping runs along Building 5A

- Excavation of areas impacted above the PRGs for soil
- Removal of coal tunnel and associated former fuel oil AST lines
- Consolidation/soil relocation of inorganics-impacted material at concentrations above the residential PRGs and below the non-residential/commercial PRGs on a designated non-residential/commercial land use portion the Site, as applicable based on the sub-alternatives
- Installation of a capping/cover system over consolidated material
- Off-Site disposal of VOCs, SVOCs, and metals above the PSIC and/or the Non-Residential/Commercial PRGs, material that contains coal or coal debris, and PCB-impacted material
- Backfilling of excavation areas with clean fill
- Restoration, as appropriate
- Monitoring and maintenance of cap/cover
- Institutional controls
- Engineering controls, including preparation and implementation of a Soil Management Plan
  - Alternatives 2B, 2C and 2D would result in varying amounts of soil above the PRGs for arsenic left in place (i.e., beneath existing concrete slabs). See Sections 4.1.2.2 through 4.1.2.4 for details.

Prior to implementation of this option, deed restrictions would be prepared and implemented consistent with the future land use plan to serve as a basis for the applicable PRGs for a given geographic area, including but not limited to:

- Zoning and/or land use restrictions on-Site consistent with future anticipated land use, including the requirement for existing building foundations/slabs to remain in place and the development of Soil Management Plans as part of the future development process to ensure that impacted materials in place following completion of the Remedial Action either remain in place or are re-placed at similar locations/depths, or are disposed of off Site in an appropriately licensed disposal facility
- Designation of an area for use as a raised bed community garden for residential properties and restrictive covenant prohibiting gardens in other areas

- Prohibition of digging in areas not remediated to Part 201 GRCC without proper training and protective measures
- Implementation of a restrictive covenant for contamination remaining in place above Part 201 Generic Residential Cleanup Criteria (GRCC) pursuant to Michigan Consolidated Laws (MCL) 324.20120b, if applicable
- Implementation of a deed restrictions requiring maintenance of caps for areas of PCB contamination remaining in place ≥ 1 mg/kg and ≤ 10 mg/kg for high occupancy areas, if applicable based on the PRGs (i.e., 1 mg/kg or risk-based criteria).
- Installation of permanent markers on the property identifying depth to which digging is prohibited, as applicable. Enroll property in state-wide utility location program to identify areas where digging if prohibited, as applicable.

Tables 4.2.B and 4.2.C present the institutional control relationship matrices for Soil Remedial Alternatives 2B and 2C, respectively.

A pre-design investigation would be completed to evaluate the vertical and horizontal extent of impacts identified in soil during the RI to meet the PRGs. The delineated areas will be utilized to determine the final areas to be excavated and volumes/concentrations of media to be addressed. In addition to the removal of materials impacted above the PRGs, the coal tunnel and former fuel oil AST lines will be evaluated and removed, along with any identified impacted adjoining materials at concentrations above the PRGs. Specific details regarding excavation areas and specific assumptions used to estimate the costs are presented in Appendix C, with the exception of Soil Remedial Alternatives 2A and 2D, as further discussed in the subsections below.

The Soil Remedial Alternative 2-Series includes the following options for PRGs to meet the ARARs:

- Soil Remedial Alternative 2A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)
- Soil Remedial Alternative 2B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, Level for PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 2C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)

- Soil Remedial Alternative 2D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

Table 3.3 presents a summary of the PRGs utilized in the development of the Soil Remedial Alternatives 2-Subseries, Soil Remedial Alternatives 2A, 2B, 2C, and 2D, based on proposed future land use for each redevelopment area. The Soil Remedial Alternative 2-Subseries, Soil Remedial Alternatives 2A, 2B, 2C, and 2D, are further described below.

4.1.2.1 Soil Remedial Alternative 2A

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 2A to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 2A would include implementation of institutional/engineering controls, completion of the excavation, on-Site consolidation and capping of metals-impacted soils, and/or off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals, and inorganics above Part 201 Residential Cleanup Criteria (not including the DWPC and GSIPC), as identified in Tables 2.2 and 3.3

- PCBs above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions), as identified in Tables 2.3 and 3.3

Figures 3.1 through 3.11 present the conceptual excavation areas to meet these PRGs.

The Site-wide residential PRGs under Soil Remedial Alternative 2A cannot be achieved if an on-Site consolidation and capping component is included, as the premise of the consolidation and capping component is the approved movement of soil impacted above the residential PRGs and below the non-residential/commercial PRGs on a designated non-residential/commercial land use portion the Site, and for the purposes of this alternative, the entirety of the Site is assumed to be residential land use (i.e., there is no area designated for non-residential/commercial use for the consolidation and capping to occur). Therefore, Soil Remedial Alternative 2A does not meet RAO 1 and is not carried further in the screening process as a viable alternative or in the detailed analysis of alternatives; however, the soil excavation volume for Soil Remedial Alternative 2A was calculated for comparison purposes and is included in Table 4.1. The estimated volume of material to be excavated under Soil Remedial Alternative 2A is presented in Section 3.2 and Table 3.2 by redevelopment area, and is 56,446 cy. Given the fact that Soil Remedial Alternative 2A does not meet RAO 1 due to the proposed relocation of soils at concentrations above the PRGs and is; therefore, not a viable option, a cost estimate for implementation of Soil Remedial Alternative 2A is not included in the FS Report.

As identified above, Soil Remedial Alternative 2A cannot meet RAO 1 with the consolidation and capping component and, as such, is not carried further in the screening process. Soil Remedial Alternative 2A meets RAO 2 through the removal and off-Site disposal of the majority of the soil impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 2A meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 2A meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 2A meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.2.2 Soil Remedial Alternative 2B

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 2B to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 2B would include implementation of institutional/engineering controls, completion of the excavation, on-Site consolidation and capping of metals-impacted soils, and/or off-Site -disposal of materials specifically impacted as follows:

- VOCs, SVOCs, metals, and inorganics above Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) based on anticipated future Residential and Non-Residential land use, as identified in Tables 2.2 and 3.3
- PCBs above the 10^{-5} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.5 and 3.3
- Use of an iterative approach for excavation to meet the arsenic PRGs, as described in Appendix A and below

As stated in Section 4.1.2, excavated materials impacted with metals/inorganics at concentrations above residential PRGs but below the nonresidential/commercial PRGs are deemed eligible for consolidation on Site. Materials with VOCs, SVOCs, metals above the PSIC and/or the non-residential/commercial PRGs, material that contains coal or coal debris, and PCB impacted material will be targeted for off-Site disposal.

Figures 3.12 through 3.22 present the conceptual excavation areas to meet these PRGs.

The soil excavation volume for Soil Remedial Alternative 2B was calculated utilizing a strict comparison to the Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) proposed for all PRGs, with the exception of arsenic, which was calculated utilizing an iterative approach. The iterative approach involved the removal of specific sampling locations that were identified to have the highest concentrations of arsenic from each redevelopment area from the datasets used to calculate the EPC until the EPC met the PRG. Soil Remedial Alternative 2B utilized a comparison to the Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) based on anticipated future Residential and Non-Residential land use to the EPC. The EPC is the conservative estimate of the average concentration of arsenic in soil to which a receptor may be exposed at a specific location known as the "exposure point." Redevelopment areas with EPCs greater than the PRGs require further action to ensure protection of human receptors from direct contact exposure with soil; redevelopment areas with EPCs less than the PRGs require no further action to ensure protection of human receptors from direct contact exposure with soil. Use of this approach does not remove all locations where arsenic is present above the PRGs at the Site. Table 4.1A presents the targeted locations, included in the calculations within Appendix A, and identifies which locations would be excavated or remains in place. Approximately 95 cy of soil above the PRG for arsenic would be left in place under the concrete slabs for Alternative 2B. Institutional controls/deed restrictions in conjunction with the exiting engineering barriers/concrete slabs would be put in place to address the impacted soils left in place. Figures 4.2, 4.3 and 4.4 show the locations with arsenic above the PRG (and included in the iterative approach) that would remain in place under the existing building slabs in Mixed Residential/Commercial Area 2, Commercial Area 2 and Commercial Area 4. The estimated volume of material to be excavated under Soil Remedial Alternative 2B is 20,807 cy as presented in Section 3.2. The estimated excavation volume is included in Table 3.2 for comparison with the other alternatives and redevelopment areas.

Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG. Areas will be backfilled with clean imported fill and restoration completed, as necessary. Materials containing VOCs, SVOCs, and/or PCBs at concentrations above the PRGs will be disposed of off Site at an appropriately licensed facility. Materials containing metals above the Part 201 Non-Residential Cleanup Criteria or arsenic above the Commercial RBC will be disposed of off Site at an appropriately

licensed facility. Furthermore, materials that contain coal or coal debris were not included in soils eligible for relocation/consolidation.

Eligible soils impacted with metals above the residential but below the non-residential/commercial Part 201 PRGs for Soil Remedial Alternative 2B will be consolidated on-Site and capped. An estimated 3,668 cy of material would be eligible for consolidation on Site for Soil Remedial Alternative 2B. Figure 4.1 presents the conceptual consolidation and capping area, which is located in the former basement areas of Buildings 9A, 9B, 9D, 9E, and 23 within Commercial Area 4. For Alternative 2B, the receiving area for the relocated or consolidated soils was estimated to be 150 feet wide by 150 feet long with an average thickness of 5 feet of relocated soil. The cover system was assumed to be a three-foot system, with a 40 mil LLDPE liner overlain with a 12-ounce geotextile, general fill (or the existing gravel) to within six inches of grade, with gravel placed to achieve grade. Prior to the excavation and relocation of the materials on Site, a Soil Relocation Plan will be prepared and submitted to the U.S. EPA and MDEQ for approval. The cap will be constructed in accordance with the general requirements of Michigan Act 451, Part 115. The relocated soil is not considered solid waste nor will the consolidation area be considered a landfill under Part 201 Section 20120c. An Operations, Maintenance and Monitoring (OM&M) Plan will be developed and implemented for the cap. If future redevelopment of this area requires excavation of soils, then the Soil Management Plan will dictate that the soils are properly disposed of off Site and any remaining soils are recovered/capped.

The cost estimate, along with assumptions, for implementation of Soil Remedial Alternative 2B is presented in the Cost Summary Tables in Appendix C.

Soil Remedial Alternative 2B meets RAO 1 through the removal and off-Site disposal, and consolidation and capping of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternative 2B meets RAO 2 through the removal and off-Site disposal of the majority of the soil identified as impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 2B meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 2B meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 2B meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, the

consolidation and capping of impacted soils on-Site with on-going OM&M to monitor the adequacy of the cap, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.2.3 Soil Remedial Alternative 2C

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 2C to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 2C would include implementation of institutional/engineering controls, completion of the excavation, on-Site consolidation and capping of metals-impacted soils, and/or off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals (except for arsenic), and inorganics above Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) based on anticipated future Residential and Non-Residential land use, as identified in Tables 2.2 and 3.3
- Arsenic above the 10^{-5} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.4 and 3.3
- PCBs above the 10^{-5} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.5 and 3.3

- Use of an iterative approach for excavation to meet the arsenic PRGs, as described in Appendix A and below

As stated in Section 4.1.2, excavated materials impacted with metals/inorganics at concentrations above residential PRGs but below the non-residential/commercial PRGs are deemed eligible for consolidation on Site. Materials with VOCs, SVOCs, metals above the PSIC and/or the non-residential/commercial PRGs, material that contains coal or coal debris, and PCB-impacted material will be targeted for off-Site disposal.

Figures 3.23 through 3.33 present the conceptual excavation areas to meet these PRGs.

The soil excavation volume for Soil Remedial Alternative 2C was calculated utilizing a strict comparison to the Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) proposed for all PRGs, with the exception of arsenic, which was calculated utilizing an iterative approach. The iterative approach involved the removal of specific sampling locations that were identified to have the highest concentrations of arsenic from each redevelopment area from the datasets used to calculate the EPC until the EPC met the PRG. Soil Remedial Alternative 2C utilized a comparison to the RBC, which was based on anticipated future residential and commercial land use with a 10^{-5} Risk Level and Hazard Quotient of 1 to the EPC. Information regarding the iterative approach is presented above in the discussion for Soil Remedial Alternative 2B. Table 4.1B presents the targeted locations, included in the calculations within Appendix A, and identifies which locations would be excavated or remains in place. Approximately 185 cy of soil above the PRG for arsenic would be left in place under the concrete slabs for Alternative 2C. Institutional controls/deed restrictions in conjunction with the exiting engineering barriers/concrete slabs would be put in place to address the impacted soils left in place. Figures 4.5, 4.6 and 4.7 present the locations with arsenic above the PRG (and included in the iterative approach) that would remain in place under the existing building slabs in Mixed Residential/Commercial Area 2, Commercial Area 2 and Commercial Area 4. The estimated volume of material to be excavated under Soil Remedial Alternative 2C is 26,514 cy as presented in Section 3.2 and included in Table 3.2 broken down by redevelopment area.

Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG. Areas will be backfilled with clean imported fill and restoration completed, as necessary. Materials containing VOCs, SVOCs, and/or PCBs at concentrations above the PRGs will be disposed of off Site at an appropriately licensed facility. Materials containing metals above the Part 201 Non-Residential Cleanup

Criteria or arsenic above the Commercial RBC will be disposed of off Site at an appropriately licensed facility. Furthermore, materials that contain coal or coal debris were not included in soils eligible for relocation/consolidation.

Eligible soils impacted with metals above the residential but below the non-residential/commercial Part 201 criteria/PRGs for Soil Remedial Alternative 2C will be consolidated on Site and capped. An estimated 4,700 cy of material would be eligible for consolidation on Site for Soil Remedial Alternative 2C. Figure 4.1 presents the conceptual consolidation and capping area, which is located in the former basement areas of Buildings 9A, 9B, 9D, 9E, and 23 within Commercial Area 4. The consolidation area for Alternative 2C was estimated at 180 feet by 260 feet with an average thickness of relocated soils of 5 feet. The cover system was assumed to be a 3-foot system, with a 40 mil LLDPE liner overlain with a 12-ounce geotextile, general fill (or the existing gravel) to within six inches of grade, with gravel placed to achieve grade. Prior to the excavation and relocation of the materials on Site, a Soil Relocation Plan will be prepared and submitted to the U.S. EPA and MDEQ for approval. The cap will be constructed in accordance with the general requirements of Michigan Act 451, Part 115. The relocated soil is not considered solid waste nor will the consolidation area be considered a landfill under Part 201 Section 20120c. An OM&M Plan will be developed and implemented for the cap. If future redevelopment of this area requires excavation of soils, then the Soil Management Plan will dictate that the soils are properly disposed of off Site and any remaining soils are recovered/capped.

The cost estimate, along with assumptions, for implementation of Soil Remedial Alternative 2C is presented in the Cost Summary Tables in Appendix C.

Soil Remedial Alternative 2C meets RAO 1 through the removal and off-Site disposal, and consolidation and capping of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternative 2C meets RAO 2 through the removal and off-Site disposal of the majority of the soil currently identified to be impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 2C meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 2C meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 2C meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, the

consolidation and capping of impacted soils on Site with on-going OM&M to monitor the adequacy of the cap, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.2.4 Soil Remedial Alternative 2D

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 2D to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 2D would include implementation of institutional/engineering controls, completion of the excavation, on-Site consolidation and capping of metals-impacted soils, and/or off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals, and inorganics above Part 201 Residential Cleanup Criteria (not including the DWPC and GSIPC), as identified in Tables 2.2 and 3.3
- PCBs above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (with and without further restrictions), as identified in Tables 2.3 and 3.3
- Arsenic above the 10^{-6} Risk Level based on anticipated future residential and commercial land use, as identified in Tables 2.4 and 3.3
- Use of an iterative approach for excavation to meet the arsenic PRGs, as described in Appendix A and below

Figures 3.34 through 3.44 present the conceptual excavation areas to meet these PRGs.

The Site-wide residential PRGs under Alternative 2D cannot be achieved if an on-Site consolidation and capping component is included, as the premise of the consolidation and capping component is the approved movement of soil impacted above the residential PRGs, including arsenic, and below the non-residential/commercial PRGs on a designated non-residential/commercial land use portion the Site. For the purposes of this alternative, the PRG for arsenic to meet the 10^{-6} Risk Level is the SDBL; therefore, the entirety of the Site is assumed to meet a threshold lower than residential land use (i.e., there is no area designated for non-residential/commercial use for the consolidation and capping to occur). Therefore, Soil Remedial Alternative 2D does not meet RAO 1 and is not carried further in the screening process as a viable alternative or in the detailed analysis of alternatives; however, the soil excavation volume for Soil Remedial Alternative 2D was calculated for comparison purposes and is included in Table 4.1. The estimated volume of material to be excavated under Soil Remedial Alternative 2D is 48,763 cy as presented in Section 3.2 and included in Table 3.2 broken down by redevelopment area. Given the fact that Soil Remedial Alternative 2D does not meet RAO 1 due to the proposed relocation of soils at concentrations above the PRGs and is; therefore, not a viable option, a cost estimate for implementation of Soil Remedial Alternative 2D is not included in the FS.

As identified above, Soil Remedial Alternative 2D cannot meet RAO 1 with the consolidation and capping component and, as such, is not carried further in the screening process. Soil Remedial Alternative 2C meets RAO 2 through the removal and off-Site disposal of some of the soil impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 2D meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 2D meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 2D meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.3 Soil Remedial Alternatives 3-Series – Excavation and Off-Site Disposal

The Soil Remedial Alternative 3-Series includes the excavation of impacted soil above the PRGs, the off-Site disposal of impacted soil above the PRGs, and implementation of institutional and/or engineering controls. Section 3.2 presents a summary of general approaches utilized when developing the conceptual excavation areas for all Soil Remedial Alternative 3-Series options.

The primary components of Soil Remedial Alternative 3-Series are:

- Pre-design delineation of the vertical and horizontal extent of soil impacts in each area exceeding the PRGs
- Pre-excavation activities will vary by redevelopment area and are detailed in Appendix C by remedial alternative and redevelopment area. Soil Remedial Alternatives 3-Series pre-excavation activities would include, but are not limited to: erosion control measures; relocation of power poles; clearing and grubbing; purging the remaining buried fuel oil line from the former 200,000-gallon AST; removal of fuel oil within the coal tunnel; abandonment of monitoring wells in the excavation areas; and structural evaluation of the buildings to be affected by excavation activities; limited asbestos abatement and decommissioning activities necessary to prepare for excavation activities
- Excavation of areas impacted above the PRGs for soil
- Removal of coal tunnel and associated former fuel oil AST lines
- Off-Site disposal of VOCs, SVOCs, metals, and inorganics, material that contains coal or coal debris, and PCB-impacted material above the PRGs
- Backfilling of excavation areas with clean fill
- Restoration, as appropriate
- Monitoring and maintenance of cap/cover
- Institutional controls
- Engineering controls
  - Alternatives 3B, 3C and 3D would result in varying amounts of soil above the PRGs for arsenic left in place (beneath existing concrete slabs). See Sections 4.1.3.2 through 4.1.3.4 for details.

Prior to implementation of this option, deed restrictions would be prepared and implemented consistent with the future land use plan to serve as a basis for the applicable PRGs for a given geographic area, including but not limited to:

- Zoning and/or land use restrictions on-Site consistent with future anticipated land use, including the requirement for existing building foundations/slabs to remain in place and the development of Soil Management Plans as part of the future development process to ensure that impacted materials in place following completion of the Remedial Action either remain in place or are re-placed at similar locations/depths, or are disposed of off Site in an appropriately licensed disposal facility
- Designation of an area for use as a raised bed community garden for residential properties and restrictive covenant prohibiting gardens in other areas
- Prohibition of digging in areas not remediated to Part 201 GRCC without proper training and protective measures
- Implementation of a restrictive covenant for contamination remaining in place above Part 201 GRCC pursuant to Michigan Consolidated Laws (MCL) 324.20120b, if applicable
- Implementation of deed restrictions requiring maintenance of caps for areas of PCB contamination remaining in place > 1 mg/kg and < 10 mg/kg for high occupancy areas, if applicable based on the PRGs (i.e., 1 mg/kg or risk-based criteria)
- Installation of permanent markers on the property identifying depth to which digging is prohibited, as applicable. Enroll property in state-wide utility location program to identify areas where digging if prohibited, as applicable.

Tables 4.2.D through and 4.2.G present the institutional control relationship matrices for Soil Remedial Alternatives 3A, 3B, 3C, and 3D, respectively.

A pre-design investigation would be completed to evaluate the vertical and horizontal extent of impacts identified in soil during the RI to meet the PRGs. The delineated areas will be utilized to determine the final areas to be excavated and volumes/concentrations of media to be addressed. In addition to the removal of materials impacted above the PRGs, the coal tunnel and former fuel oil AST lines will be evaluated and removed, along with any identified impacted adjoining materials at concentrations above the PRGs. Specific details regarding excavation areas and specific assumptions used to estimate the costs are presented in Appendix C.

The Soil Remedial Alternative 3-Series includes the following options for PRGs to meet the ARARs:

- Soil Remedial Alternative 3A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)

- Soil Remedial Alternative 3B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 3C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 3D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

Table 3.3 presents a summary of the PRGs utilized in the development of the Soil Remedial Alternatives 3-Subseries, Soil Remedial Alternatives 3A, 3B, 3C, and 3D, based on proposed future land use for each redevelopment area. The Soil Remedial Alternative 3-Subseries, Soil Remedial Alternatives 3A, 3B, 3C, and 3D, are further described below.

4.1.3.1 Soil Remedial Alternative 3A

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 3A to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 3A would include completion of the excavation and off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals, and inorganics above Part 201 Residential Cleanup Criteria (not including the DWPC and GSIPC), as identified in Tables 2.2 and 3.3
- PCBs above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions), as identified in Tables 2.3 and 3.3

Figures 3.1 through 3.11 present the conceptual excavation areas to meet these PRGs.

The soil excavation volume for Soil Remedial Alternative 3A was calculated utilizing a strict comparison to the proposed PRGs (not including the DWPC and GSIPC). The soil excavation volume for Soil Remedial Alternative 3A is included in Table 4.1. The estimated volume of material to be excavated under Soil Remedial Alternative 3A is 54,446 cy as presented in Section 3.2 and in Table 3.2 broken down by redevelopment area.

Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG. Areas will be backfilled with clean imported fill and restoration completed, as necessary. Materials containing VOCs, SVOCs, metals, and/or PCBs at concentrations above the PRGs will be disposed of off Site at an appropriately licensed facility.

The cost estimate, along with assumptions, for implementation of Soil Remedial Alternative 3A is presented in the Cost Summary Tables in Appendix C.

Soil Remedial Alternative 3A meets RAO 1 through the removal and off-Site disposal of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternative 3A meets RAO 2 through the removal and off-Site disposal of the majority of the soil impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 3A meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 3A meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of

140 mg/kg. Soil Remedial Alternative 3A meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.3.2 Soil Remedial Alternative 3B

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 3B to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 3B would include implementation of institutional/engineering controls, completion of the excavation, and off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals, and inorganics above Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) based on anticipated future Residential and Non-Residential land use, as identified in Tables 2.2 and 3.3
- PCBs above the 10^{-5} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.5 and 3.3
- Use of an iterative approach for excavation to meet the arsenic PRGs, as described in Appendix A and below

Figures 3.12 through 3.22 present the conceptual excavation areas to meet these PRGs.

The soil excavation volume for Soil Remedial Alternative 3B was calculated utilizing a strict comparison to the Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) proposed for all PRGs, with the exception of arsenic, which was calculated utilizing an iterative approach. The iterative approach involved the removal of specific sampling locations that were identified to have the highest concentrations of arsenic from each redevelopment area from the datasets used to calculate the EPC until the EPC met the PRG. Soil Remedial Alternative 3B utilized a comparison to the Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) based on anticipated future Residential and Non-Residential land use to the EPC. Information regarding the iterative approach is presented above in the discussion for Soil Remedial Alternative 2B. Table 4.1A presents the targeted locations, included in the calculations within Appendix A, and identifies which locations would be excavated or remains in place. Approximately 95 cy of soil above the PRG for arsenic would be left in place under the concrete slabs for Alternative 3B. Institutional controls/deed restrictions in conjunction with the exiting engineering barriers/concrete slabs would be put in place to address the impacted soils left in place. Figures 4.2, 4.3 and 4.4 identify the locations with arsenic above the PRG (and included in the iterative approach) that would remain in place under the existing building slabs, present in Mixed Residential/Commercial Area 2, Commercial Area 2 and Commercial Area 4. The estimated volume of material to be excavated under Soil Remedial Alternative 3B is 20,807 cy as presented in Section 3.2 and in Table 3.2 broken down by redevelopment area.

Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG. Areas will be backfilled with clean imported fill and restoration completed, as necessary. Materials containing VOCs, SVOCs, metals, and/or PCBs at concentrations above the PRGs will be disposed of off Site at an appropriately licensed facility.

The cost estimate, along with assumptions, for implementation of Soil Remedial Alternative 3B is presented in the Cost Summary Tables in Appendix C.

Soil Remedial Alternative 3B meets RAO 1 through the removal and off-Site disposal of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternative 3B meets RAO 2 through the removal and off-Site disposal of the majority

of the soil currently identified to be impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 3B meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 3B meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 3B meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.3.3 Soil Remedial Alternative 3C

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 3C to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 3C would include implementation of institutional/engineering controls, completion of the excavation, and off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals (except for arsenic), and inorganics above Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) based on anticipated future Residential and Non-Residential land use, as identified in Tables 2.2 and 3.3
- Arsenic above the 10^{-5} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.4 and 3.3
- PCBs above the 10^{-5} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.5 and 3.3
- Use of an iterative approach for excavation to meet the arsenic PRGs, as described in Appendix A and below

Figures 3.23 through 3.33 present the conceptual excavation areas to meet these PRGs.

The soil excavation volume for Soil Remedial Alternative 3C was calculated utilizing a strict comparison to the Part 201 Residential and Non-Residential Cleanup Criteria (not including the DWPC and GSIPC) proposed for all PRGs, with the exception of arsenic, which was calculated utilizing an iterative approach. The iterative approach involved the removal of specific sampling locations that were identified to have the highest concentrations of arsenic from each redevelopment area from the datasets used to calculate the EPC until the EPC met the PRG. Soil Remedial Alternative 3C utilized a comparison to the RBC, which was based on anticipated future residential and commercial land use with a 10^{-5} Risk Level and Hazard Quotient of 1 to the EPC. Information regarding the iterative approach is presented above in the discussion for Soil Remedial Alternative 2B. Table 4.1B presents the targeted locations, included in the calculations within Appendix A, and identifies which locations would be excavated or remains in place. Approximately 185 cy of soil above the PRG for arsenic would be left in place under the concrete slabs for Alternative 3C. Institutional controls/deed restrictions in conjunction with the exiting engineering barriers/concrete slabs would be put in place to address the impacted soils left in place. Figures 4.5, 4.6 and 4.7 show the locations with arsenic above the PRG (and included in the iterative approach) that would remain in place under the existing building slabs in Mixed Residential/Commercial Area 2, Commercial Area 2 and Commercial Area 4. The estimated volume of material to be excavated under Soil Remedial Alternative 3C is 26,514 cy as presented in Section 3.2 and in Table 3.2 broken down by redevelopment area.

Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In

instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG. Areas will be backfilled with clean imported fill and restoration completed, as necessary. Materials containing VOCs, SVOCs, metals, and/or PCBs at concentrations above the PRGs will be disposed of off Site at an appropriately licensed facility.

The cost estimate, along with assumptions, for implementation of Soil Remedial Alternative 3C is presented in the Cost Summary Tables in Appendix C.

Soil Remedial Alternative 3C meets RAO 1 through the removal and off-Site disposal of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternative 3C meets RAO 2 through the removal and off-Site disposal of the majority of the soil currently identified as impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 3C meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 3C meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 3C meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.1.3.4 Soil Remedial Alternative 3D

The remediation of soil to the below PRGs is proposed under Soil Remedial Alternative 3D to achieve the following RAOs:

RAO 1 Prevent human direct contact exposure to soil impacted with VOCs, SVOCs, PCBs, metals, and other inorganics in exceedance of the PRGs.

RAO 2 Prevent the potential for leaching of contaminants from soil to groundwater and ultimately migrating to surface water at concentrations above the PRGs for VOCs, SVOCs, PCBs, metals and other inorganics.

RAO 3 Mitigate the potential for human inhalation exposure to indoor air vapors resulting from soil impacted above Michigan Act 451, Part 201 Cleanup Criteria for VOCs and metals.

RAO 4 Prevent avian and mammalian receptor exposure to surface soil in wooded riparian areas along the Kalamazoo River with 95 percent UCL concentrations above the Site-specific ecological preliminary remediation goals.

RAO 5 Protect surface water and sediments by mitigating the potential for erosion of soil to the Kalamazoo River and Mill Race.

Soil Remedial Alternative 3D would include implementation of institutional/engineering controls, completion of the excavation, and off-Site removal of materials specifically impacted as follows:

- VOCs, SVOCs, metals, and inorganics above Part 201 Residential Cleanup Criteria (not including the DWPC and GSIPC), as identified in Tables 2.2 and 3.3
- PCBs above the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (with and without further restrictions), as identified in Tables 2.3 and 3.3
- Arsenic above the 10^{-6} Risk Level Site-specific RBCs based on anticipated future residential and commercial land use, as identified in Tables 2.4 and 3.3
- Use of an iterative approach for excavation to meet the arsenic PRGs, as described in Appendix A and below

Figures 3.34 through 3.44 present the conceptual excavation areas to meet these PRGs.

The soil excavation volume for Soil Remedial Alternative 3D was calculated utilizing a strict comparison to the Part 201 Residential Cleanup Criteria (not including the DWPC and GSIPC) and TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (with and without further restrictions, proposed for all PRGs, with the exception of arsenic, which was calculated utilizing an iterative approach. The iterative approach involved the removal of specific sampling locations that were identified to have the highest concentrations of arsenic from each redevelopment area from the datasets used to calculate the EPC until the EPC met the PRG. Soil Remedial Alternative 3D utilized a comparison to the RBC, which was based on anticipated future residential and commercial land use with a 10^{-6} Risk Level and Hazard Quotient of 1 to the EPC. Information regarding the iterative approach is presented above in the discussion for Soil Remedial Alternative 2B. Table 4.1C presents the targeted locations, included in the calculations within Appendix A, and identifies which locations would be excavated or remains in place for Alternative 3D. Approximately 800 cy of soil above the PRG

for arsenic would be left in place under the concrete slabs for Alternative 3D. Institutional controls/deed restrictions in conjunction with the exiting engineering barriers/concrete slabs would be put in place to address the impacted soils left in place. Figures 4.8, 4.9 and 4.10 present the locations with arsenic above the PRG (and included in the iterative approach) that would remain in place under the existing building slabs in Mixed Residential/Commercial Area 2, Commercial Area 2 and Commercial Area 4. The estimated volume of material to be excavated under Soil Remedial Alternative 3C is 48,763 cy as presented in Section 3.2 and in Table 3.2 broken down by redevelopment area.

Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG. Areas will be backfilled with clean imported fill and restoration completed, as necessary. Materials containing VOCs, SVOCs, metals, and/or PCBs at concentrations above the PRGs will be disposed of off Site at an appropriately licensed facility.

The cost estimate, along with assumptions, for implementation of Soil Remedial Alternative 3D is presented in the Cost Summary Tables in Appendix C.

Soil Remedial Alternative 3D meets RAO 1 through the removal and off-Site disposal of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternative 3D meets RAO 2 through the removal and off-Site disposal of the majority of the soil currently identified as impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternative 3D meets RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternative 3D meets RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternative 3D meets RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

4.2 Screening of Remedial Alternatives

In accordance with U.S. EPA (1988), the remedial alternatives were screened against the short- and long-term aspects of effectiveness, implementability, and cost. The effectiveness of each remedial alternative was assessed based on its ability to provide protection, and reduction in TMV through treatment. The implementability of each remedial alternative was assessed from both the technical perspective (i.e., the ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete, and OM&M after the remedial action is complete) and the administrative perspective (i.e., the ability to obtain approvals, equipment, and services). The estimated cost for each remedial alternative was assessed based on capital, the net present value (NPV) of OM&M, and engineering and design costs.

The results of screening based on effectiveness, implementability, and cost are discussed below in Sections 4.2.1, 4.2.2 and 4.2.3, respectively. The discussion below excludes Soil Remedial Alternative 1 - No Action alternative for soil. Retained remedial alternatives are listed in Section 4.2.4.

4.2.1 Effectiveness

The Soil Remedial Alternative 2-Series and 3-Series options are effective both in the short-term and long-term at reducing the volume of impacted materials on Site through the removal and off-Site disposal of impacted materials above the PRGs. The Soil Remedial Alternative 2-Series do not reduce the entirety of the volume of impacted materials on Site due to the consolidation and capping of a limited volume of impacted materials to the alternative specific PRGs on Site, and the use of engineering controls.

Soil Remedial Alternatives 2A and 3A are the most effective at preventing exposure to Site COCs for human receptors because the PRGs are the most stringent; however, the consolidation of soils in Soil Remedial Alternative 2A, along with Soil Remedial Alternative 2D, would not achieve RAO 1. Therefore, as identified in Section 4.1.2 and 4.2.4, Soil Remedial Alternatives 2A and 2D will not be retained for the detailed analysis of alternatives. The remainder of the Soil Remedial Alternatives in the 2-Series and 3-Series (i.e., Soil Remedial Alternatives 2B, 2C, 3A, 3B, 3C, and 3D) would be effective in preventing exposure to the COCs for human receptors consistent with the PRGs to meet the RAOs.

Soil Remedial Alternatives 2B, 3B, 2C, 3C, 2D and 3D utilize an iterative approach for arsenic remediation. The iterative approach for arsenic is detailed in Appendix A; generally, following the iterative approach for arsenic remediation, targeted locations were selected to reduce the risk of exposure to arsenic down to the PRG as indicated above for each Soil Remedial

Alternative. Tables in Appendix A list the soil boring locations targeted for excavation based on the iterative approach for each alternative. All of the Soil Remedial Alternatives, with the exception of Soil Remedial Alternatives 2A and 3A, soils above the PRGs that are present under existing concrete slabs (i.e., that are not planned to be removed during redevelopment activities) were assumed to be left in place/not excavated. The concrete slabs are considered an engineering control (EC) preventing direct contact with the impacted soils, when used in conjunction with an institutional control, such as a deed restriction identifying the locations of the remaining exceedances of the PRGs and requiring that the slabs not be removed. Tables 4.1.A, 4.1.B and 4.1.C list the soil boring locations identified in the various iterative approach calculations and distinguishes between ones that are under building slabs/would remain in place or those subject to excavation activities. Figures 4.2 through 4.9 identify the specific areas under the concrete slabs that would not be excavated.

Effectiveness of the Soil Remedial Alternative 2-Series and 3-Series differs based on the PRGs required to be achieved in the sub-alternative series. Soil Remedial Alternatives 2B and 3B utilize a higher PRG for arsenic than Soil Remedial Alternatives 2C and 3C. The PRGs for the remainder of the constituents, with the exception of PCBs, are the same for Soil Remedial Alternatives 2B, 2C, 3B, 3C, and 3D. The PRGs for the remainder of the constituents, with the exception of PCBs, are more stringent for Soil Alternative 3A, due to the fact that the PRGs proposed for this alternative are to residential levels for all areas, regardless of future anticipated land use for the areas.

Effectiveness of the Soil Remedial Alternative 2-Series and 3-Series differs based on the PRGs required to be achieved in the sub-alternative series. The PRG for PCBs is the most stringent for Soil Remedial Alternative 3A, due to the fact that the PRG proposed for this alternative is to unrestricted high occupancy use (i.e., residential level) for all areas, regardless of future anticipated land use for the areas. The PCB PRGs for Soil Remedial Alternatives 2B, 2C, 3B, and 3C are RBC for residential and commercial land use and are less stringent than the proposed PRG under Soil Remedial Alternative 3A. The PCB PRGs for Soil Remedial Alternative 3D are consistent with Bulk PCB Remediation Waste in High Occupancy Areas (with and without further restrictions) for the residential and commercial land use and receptors, and are more stringent than the RBC for the residential scenario under Soil Remedial Alternatives 2B, 2C, 3B, and 3C, and less stringent than the RBC for the commercial scenario under Soil Remedial Alternatives 2B, 2C, 3B, and 3C. Alternative 3A is the most effective at reducing the volume of PCB impacted soils at the Site. Alternative 3D is the next most effective at removing the greatest volume of PCB impacted soils from the Site. Alternatives 2B, 2C, 3B and 3C remove the same volume of PCB impacted soil from the Site.

The Soil Remedial Alternative 2-Series will require long term monitoring of the consolidation area; however, due to the proposed subgrade consolidation and construction of a cap over the soils this effort is expected to be minimal. Consolidation and capping of the impacted soils as detailed would be effective in reducing the risks associated with the impacted soils both in the short- and long-term.

Implementation of an Operation and Maintenance Plan (OM&M Plan), including periodic Site inspections and a contingency plan for the engineering controls incorporated in Soil Remedial Alternatives 2B, 2C, 3B, 3C, and 3D, would ensure the controls remain effective and protective of human health and the environment.

The Soil Remedial Alternative 2-Series and 3-Series alternatives would require institutional controls (ICs)(i.e., land use restrictions) to be effective, including those listed in Section 4.1. ICs are expected to be effective for both the short- and long-term in reducing the risks associated with impacted soils that would remain on-Site after remedial action is complete.

4.2.2 Implementability

The implementability of each remedial alternative was assessed from both the technical perspective (i.e., the ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete, and OM&M after the remedial action is complete) and the administrative perspective (i.e., the ability to obtain approvals from other offices and agencies, the availability of treatment, storage, and disposal services and capacity).

The majority of the project would be limited to excavation of impacted soils from the Site. Similar alternatives have been successfully implemented at many other sites and can be readily accomplished. Contractors required to conduct specific tasks within the scope of work (i.e., limited asbestos abatement, surface water divergence and structural evaluations of structures on-Site) are available within the project area.

The local availability of backfill soil materials that will meet the required PRGs is limited; local gravel pits (i.e., within a half-hour radius of the Site) have historically failed chemical testing requirements for State Default Criteria and/or Residential Direct Contact for arsenic.

The Soil Remedial Alternative 2-Series requires access to the Site to complete the excavation, waste load out, backfilling, consolidation, capping, and restoration activities. The Soil Remedial Alternative 3-Series requires access to the Site to complete excavation, load out of the waste, backfilling and restoration. Prior to implementation of any remedial activities, access agreements will be secured with the current property owners. U.S. EPA and MDEQ would need

to approve the Soil Relocation Plan for any of the Alternative 2-Series options, and the City of Plainwell would need to agree to the Soil Relocation Plan and proposed consolidation location.

Currently licensed landfills capable of accepting both the non-hazardous (i.e., non-RCRA) and TSCA regulated waste generated from the project are available within reasonable transportation distances from the project site. Landfills anticipated for use during this project have the capacity to accept the volume of impacted soils targeted for excavation from all of the retained Soil Remedial Alternatives.

OM&M of engineering controls incorporated in Alternatives 2B, 2C, 3B, 3C, and 3D are implementable through an OM&M Plan that would include periodic Site inspections.

4.2.3 Cost

Estimated capital costs for the Soil Remedial Alternative 3A is higher than the Soil Remedial Alternative B-Subseries, C-Subseries and D-Subseries alternatives due to the volume of material to be removed to meet the more restrictive PRGs. The OM&M costs for the Soil Remedial Alternative 2-Series alternatives are slightly higher than the Soil Remedial Alternative 3-Series alternatives (3B, 3C and 3D) due to the on-going OM&M that would be required associated with the consolidated and capped materials. Alternatives 3B, 3C and 3D also include OM&M in the form of Site inspections, but would not include inspection of a consolidation area.

As state previously, Table 4.1 presents of a summary of the remedial alternatives and includes the estimated cost for each retained Soil Remedial Alternative. The Soil Remedial Alternatives including the consolidation and capping components, Soil Remedial Alternatives 2B and 2C, do not significantly reduce the overall cost of the remediation efforts from those calculated for the Soil Remedial Alternatives that removal all impacted material above the specified PRGs for off-Site disposal, Soil Remedial Alternatives 3B and 3C. The following provides a comparison of the capital cost differentials of Soil Remedial Alternatives 2B and 3B, and Soil Remedial Alternatives 2C and 3C:

Alternative	Total Capital Cost	Alternative	Total Capital Cost
2B	$4,462,820	3B	$4,363,857
2C	$4,998,195	3C	$4,875,232

Preparation of the proposed consolidation area will require significant effort. The cost to prepare the consolidation area, excavate the impacted soils, relocate the impacted soils and then install the capping system over the soils ends up just slightly less costly than sending the excavated soils for off-Site disposal. Inclusion of the costs for the long-term OM&M activities

reduces the cost advantage further to pursue the consolidation Soil Remedial Alternatives 2B and 2C (see Table 4.1).

Cost summaries for each retained Soil Remedial Alternative (see Section 4.2.4) are presented in Table 5.1 by capital costs (i.e., pre-design, construction, engineering, and oversight) and OM&M costs. Specific assumptions utilized in the development of the cost estimates for each of the retained Soil Remedial Alternatives are presented in the Cost Summary Notes in Appendix C.

4.2.4 Retained Remedial Alternatives

The following Soil Remedial Alternatives, including the No Action Alternative, have been retained for detailed analysis in Section 5.0.

- Soil Remedial Alternative 1 – No Action
- Soil Remedial Alternative 2 – Excavation, Consolidation, Capping, and Off-Site Disposal
  - Soil Remedial Alternative 2B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 2C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 3 – Excavation and Off-Site Disposal
  - Soil Remedial Alternative 3A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)
  - Soil Remedial Alternative 3B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 3C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
  - Soil Remedial Alternative 3D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

Section 5.0 Detailed Analysis of Remedial Alternatives

5.1 Introduction

This section presents the detailed analysis of retained soil remedial alternatives that are described in Section 4.0. The detailed analysis consists of an assessment of individual alternatives against each of seven evaluation criteria, and a comparative analysis that focuses on the relative performance of each alternative against those criteria [40 CFR 300.430(e)(9)(ii)]. The seven evaluation criteria are categorized into two groups; namely threshold criteria that each alternative must meet in order to be eligible for selection (see Section 5.1.1) and primary balancing criteria (see Section 5.1.2). In addition, the U.S. EPA will evaluate two modifying criteria (see Section 5.1.3) that will be considered in remedy selection [40 CFR 300.430(f)(1)(i)(A) through (C)].

The nine evaluation criteria are categorized into three groups as follows:

- Threshold Criteria – "statutory requirements that each alternative must satisfy in order to be eligible for selection"
- Balancing Criteria – "technical criteria that are considered during the detail analysis"
- Modifying Criteria – State support and agency acceptance, and community acceptance

The nine criteria are described below [descriptions taken from Section 6.2.2 of U.S. EPA (1988)].

5.1.1 Threshold Criteria

1. *Overall Protection of Human Health and the Environment* – CRA assessed the alternatives to determine whether they can adequately protect human health and the environment from unacceptable risks posed by exposure to media at concentrations greater than applicable criteria. This criterion also draws on the assessment of other criteria especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.
2. *Compliance with ARARs* – CRA assessed the alternatives to determine whether they attain ARARs or provide justification for invoking a variance. A summary of ARARs is presented in Table 2.1.

5.1.2 Balancing Criteria

3. *Long-Term Effectiveness and Permanence* – CRA assessed the alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty

that the alternative will prove successful considering the magnitude of residual risk and the adequacy and reliability of controls.

4. *Reduction of Toxicity, Mobility, or Volume through Treatment (TMV)* – CRA assessed the alternatives to determine the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume of contaminants at the Site.
5. *Short-Term Effectiveness* – CRA assessed the alternatives to determine the short-term impacts of alternatives considering the community, the workers, potential environmental contaminants, and timing.
6. *Implementability* – CRA assessed the alternatives to determine the ease or difficulty of implementing the alternatives considering technical and administrative feasibility, and the availability of services and materials.
7. *Cost* – CRA assessed the alternatives to determine their costs and the types of costs including capital and OM&M costs. In accordance with U.S. EPA guidance, the cost estimates were prepared to provide accuracy in the range of +50 to -30 percent. The capital and OM&M cost estimates are expressed in 2014 dollars. After development of the capital and OM&M costs, NPV analysis of the overall remedial action costs associated with each alternative was conducted. An NPV analysis relates costs that occur over different time periods to present costs by discounting all future costs to the present value. This allows the cost of remedial alternatives to be compared on the basis of a single figure that represents the capital required in 2014 dollars to construct, operate, and maintain the remedial alternative throughout its planned life. The NPV calculations were based on a discount rate of 7 percent. A summary of the remedial action cost estimates for each alternative are provided in Table 5.1. The detailed remedial action cost estimates including assumptions, excavation and disposal quantities, restoration efforts etc. are provided in Appendix C.

5.1.3 Modifying Criteria

8. *State Acceptance* - Assessment of State concerns/position related to the alternatives, ARARs, and variances.
9. *Community Acceptance* - Assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose.

5.2 Individual Analysis of Alternatives

In this section, each of the remedial alternatives that were developed undergoes a detailed analysis against each of the first seven of the nine evaluation criteria, with the U.S. EPA evaluating the last two evaluation criteria. Because the remedial alternatives were already described in Section 4.0, and given the descriptive nature of the titles of this section of the

report, the detailed description of each alternative is not repeated in this section, but rather, the text proceeds directly to the detailed analysis of each of the individual alternatives. This section is structured as follows:

Section 5.2.1 Soil Remedial Alternative 1 – No Action
Section 5.2.2 Soil Remedial Alternatives 2-Series – Excavation, Consolidation, Capping and Off-Site Disposal
Section 5.2.3 Soil Remedial Alternatives 3-Series – Excavation and Off-Site Disposal

Table 4.1 provides details to illustrate the differences between each alternative including alternative specific PRGs for arsenic and PCBs, soil targeted for off-Site disposal and soils considered eligible for on-site consolidation and capping (for the Soil Remedial Alternative 2 -Series). Table 5.1 provides a summary of costs by each alternative and lists the major categories of each task/item. Additional assumptions and details utilized to estimate the cost for each Soil Remedial Alternative are included in Appendix C of the FS. Table 5.2 presents a summary of the individual analysis of the retained alternatives.

5.2.1 Soil Remedial Alternative 1 – No Action

Overall Protection of Human Health and the Environment
This alternative provides no additional overall protection of human health and the environment. Risks posed by contaminated media would remain the same as those identified in the RI Report.

Compliance with ARARs
ARARs would not be met.

Long-Term Effectiveness and Permanence
This alternative provides a low degree of long-term effectiveness and permanence because there is no remedial action and no controls.

Reduction of TMV through Treatment
This alternative would not reduce the TMV of contaminated media through treatment.

Short-Term Effectiveness
Short-term effectiveness is not achieved by this alternative because it does not include either remedial action, engineering controls nor institutional controls.

Implementability

This alternative is easily implemented because there is no construction or permitting considerations.

Cost

The net present value (NPV) of Alternative 1 is estimated to be $0.

5.2.2 Soil Remedial Alternatives 2-Series - Excavation, Consolidation, Capping, and Off-Site Disposal

The Soil Remedial Alternative 2-Series includes the following options during the implementation of the excavation and off-Site disposal of materials impacted VOCs, SVOCs, and PCBs and the excavation, consolidation, capping, and off-Site disposal of materials impacted with metals to the below PRGs to meet the ARARs:

- Soil Remedial Alternative 2B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 2C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and for PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)

The primary components of Soil Remedial Alternative 2-Series are:

- Pre-design delineation of the vertical and horizontal extent of soil impacts in each area exceeding the PRGs
- Pre-excavation activities will vary by redevelopment area and are detailed in Appendix C by remedial alternative and redevelopment area. Soil Remedial Alternatives 2-Series pre-excavation activities would include, but are not limited to: erosion control measures; purging the remaining buried fuel oil line from the former 200,000-gallon AST; removal of fuel oil from the coal tunnel; abandonment of monitoring wells in the excavation areas; and structural evaluation of the southern portion of Building 1 (loading dock). Pre-excavation activities for Soil Remedial Alternative 2-Series will also include the potential for limited asbestos abatement around the former coal tunnel and the exterior piping runs along Building 5A.
- Excavation of areas impacted above the PRGs for soil
- Removal of coal tunnel and associated former fuel oil AST lines

- Consolidation/soil relocation of inorganics-impacted material at concentrations above the residential PRGs and below the non-residential/commercial PRGs on a designated non-residential/commercial land use portion the Site, as applicable based on the sub-alternatives
- Installation of a capping/cover system over consolidated material
- Off-Site disposal of VOCs, SVOCs, and metals above the PSIC and/or the Non-Residential/Commercial PRGs, material that contains coal or coal debris, and PCB-impacted material
- Backfilling of excavation areas with clean fill
- Restoration, as appropriate
- Monitoring and maintenance of cap/cover
- Institutional controls
- Engineering controls, including preparation and implementation of a Soil Management Plan
- Alternatives 2B, 2C and 2D would result in varying amounts of soil above the PRGs for arsenic left in place beneath existing concrete slabs. See Sections 4.1.2.2 through 4.1.2.4 for details.

RAOs are addressed by the Soil Remedial Alternative 2-Series in the following manner, as described in Section 4.1.2:

<u>Exposure Pathway Objectives</u>

- Human direct contact (including ingestion and dermal contact) and ambient air inhalation exposure to soil COCs, with the exception of arsenic and PCBs: likelihood of exposure reduced/controlled through excavation and off-Site disposal, consolidation, capping, and institutional and engineering controls
- Human direct contact/ingestion/inhalation exposure to soil impacted with arsenic posing excess carcinogen risk levels of 10^{-4} to 10^{-6} or a non-carcinogenic hazard level of 1.0: likelihood of exposure reduced/controlled through excavation and off-Site disposal, consolidation, capping, and institutional and engineering controls
- Human direct contact/ingestion/inhalation exposure to soil impacted with PCBs posing excess carcinogen risk levels of 10^{-4} to 10^{-6} or a non-carcinogenic hazard level of 1.0: likelihood of exposure reduced/controlled through excavation and off Site disposal and institutional and engineering controls
- Human inhalation exposure to indoor air vapors to soil COCs: likelihood of exposure reduced/controlled through excavation and off-Site disposal, and institutional and engineering controls

Containment Objectives

- Leaching of constituents from soil to groundwater and ultimately migrating to surface water: likelihood of significant migration reduced/controlled through excavation and off-Site disposal, consolidation, and capping
- Erosion of COC-impacted soil potentially migrating to surface water and sediments: likelihood of significant migration reduced/controlled through use of appropriate best management practices during construction activities/ excavation , consolidation, and capping

Overall Protection of Human Health and the Environment

This alternative provides overall protection of human health and the environment through the following:

- Site risks posed by the COCs are eliminated, which makes them protective of human receptors, by the:
  - Removal and off-Site disposal of VOC, SVOC, metals (above PSIC) and/or PCB-impacted soil
  - Removal and off-Site disposal of the coal tunnel and associated former fuel oil AST lines

- Site risks posed by the COCs are reduced, which makes them protective of human receptors in conjunction with the controlled Site risks, by the:
  - On-Site containment and capping of inorganics-impacted soil
  - Implementation of institutional and engineering controls

- Site risks posed by the COCs are controlled, which makes them protective of human receptors in conjunction with the reduced Site risks, by the:
  - Zoning and/or land use restrictions on-Site consistent with future anticipated land use, including the requirement for existing building foundations/slabs to remain in place and the development of Soil Management Plans as part of the future development process to ensure that impacted materials in place following completion of the Remedial Action either remain in place or are re-placed at similar locations/depths, or are disposed of off Site in an appropriately licensed disposal facility
  - Designation of an area for use as a raised bed community garden for residential properties and restrictive covenant prohibiting gardens in other areas
  - Prohibition of digging in areas not remediated to Part 201 GRCC without proper training and protective measures

- Implementation of a restrictive covenant for contamination remaining in place above Part 201 GRCC pursuant to Michigan Consolidated Laws (MCL) 324.20120b, if applicable
- Installation of permanent markers on the property identifying depth to which digging is prohibited, as applicable. Enroll property in state-wide utility location program to identify areas where digging is prohibited, as applicable
- Implementation of deed restrictions requiring maintenance of caps for areas of PCB contamination remaining in place > 1 mg/kg and < 10 mg/kg for high occupancy areas, if applicable based on the PRGs (i.e., 1 mg/kg or risk-based criteria)

Soil Remedial Alternatives 2B and 2C meet RAO 1 through the removal and off-Site disposal, and consolidation and capping of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternatives 2B and 2C meet RAO 2 through the removal and off-Site disposal of the majority of the soil impacted at concentrations above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternatives 2B and 2C meet RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternatives 2B and 2C meet RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternatives 2B and 2C meet RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, the consolidation and capping of impacted soils on-Site with on-going OM&M to monitor the adequacy of the cap, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

Compliance with ARARs

The Soil Remedial Alternative 2-Series complies with ARARs as discussed below.

- **TSCA, 40 CFR 761:** Establishes storage, treatment and disposal requirements for PCB remediation wastes and for non-porous and porous surfaces contaminated with PCBs. Determines PCB cleanup level for soil using self-implementing, performance-based, or risk-based criteria; cleanup levels based on future land use.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the inclusion of licensed transporters and disposal facilities based on the levels of PCBs in bulk remediation waste generated during the implementation of the remedial activities;

the development and use of risk-based criteria as a PRG based on anticipated future land use in a manner that will not pose an unreasonable risk of injury to health or the environment; and the use of appropriate delineation and verification sampling methodologies specified in this regulation

- **Clean Air Act, 40 CFR 50 and 52:** Establishes requirements for constituent emission rates in accordance with National Ambient Air Quality Standards.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the implementation of monitoring of air emissions during implementation of the alternatives (i.e., dust during excavation, etc.)

- **Clean Air Act, 42 U.S.C. 7401 et seq.:** Provides guidelines with respect to minimizing the harmful effects of fugitive dust and airborne contaminants that result from excavation, construction, or other removal activities. Establishes primary and secondary ambient air quality standards for emissions of chemicals and particulate matter.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the implementation of monitoring of air emissions during implementation of the alternatives (i.e., dust during excavation, etc.)

- **U.S. DOT Placarding and Handling, 40 CFR 264.227 and 49 CFR 171:** Transportation and handling requirements for materials containing PCBs with concentrations of 20 mg/kg or more.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the use of appropriate marking/placarding of licensed transportation vehicles with waste meeting this requirement and the inclusion of licensed transporters and disposal facilities based on the levels of PCBs in bulk remediation waste generated during the implementation of the remedial activities

- **National Historic Preservation Act, 16 U.S.C. 470, as amended:** Establishes a program for the preservation of historical and archaeological sites. Created the National Register of Historic Places, list of National Historic Landmarks, and State Historic Preservation Offices.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the excavation activities will not cause physical destruction or damage, or alteration to any of the designated historic structures, including the existing building slabs

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20118(2) and 324.20120a, and MAC 299.5705:** Requires that a remedial action shall provide for response activity that will satisfy cleanup criteria.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the proposal of PRGs, which meet or exceed the Part 201 Residential and Non-Residential Cleanup Criteria; and soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120a and MAC 299.5705:** If the target detection limit or background concentration is greater than the risk-based cleanup criteria, the target detection limit or background concentration shall be used instead of the risk-based cleanup criterion.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the use of the existing Multi-Area Quality Assurance Project Plan, which evaluates the target detection limits (TDLs) relative to current Part 201 Cleanup Criteria; and evaluation of the TDLs in comparison to the selected PRGs during the PDI.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20107a and 324.20114:** Requirements for owner of a facility, such as preventing exacerbation and exercising due care.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: providing the Site owner(s) with documentation regarding the current Site conditions relative to COCs exceeding PRGs, which will be outlined during the PDI.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120(c):** Requirements for relocation of excavated soil.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: meeting the requirements for relocation of excavated soil set forth in this section, including, but not limited to notification to the MDEQ, preparation of a Soil Relocation Plan, and implementation of institutional and engineering controls.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20116, 324.20120a(16), and 324.20120b, and MAC 299.5524:** Restrictions on transfer of real property designated as a facility. Requirement that if residential criteria are not met, land use restrictions must be provided. Actions required upon approval of remedial action plans.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: implementation of institutional controls.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20118, et al. and MAC 299.5532(11):** Required elements of remedial action plans (remedial design documents).
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: primary requirements will be met in remedial design documents by including plans identifying points of compliance for evaluating the effectiveness of the remedial action

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120c:** Required action if contaminated soil is moved off-Site or relocated within the Site.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: material disposed of off Site will be properly characterized to determine if it is subject to the requirements of Part 111 (Hazardous Waste Management); and required approval for soil relocation can be attained through MDEQ approval of a Remedial Design and Soil Relocation Plan

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MAC 299.5520 and 299.51003-51005:** Objectives of response activities, determination (or nullification) that a response activity is complete.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: upon completion of approved remedial actions, written documentation will be provided to the agency

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MAC 299.5522 and 299.51017:** Liable parties must provide notice to the department and adjacent land owners in certain situations, such as if hazardous substances emanate beyond the property boundary.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: notification will be made to the agency if it is determined during the PDI that there is a

release (above PRGs) from the Site or if Part 201 Generic Residential Cleanup Criteria are exceeded and contamination is believed to be migrating off-Site (i.e., Notice of Migration (NOM)); there are no instances where this scenario has been identified to exist at this time

- **Michigan Act 451, Part 111 Hazardous Waste Management and Rules Promulgated Thereunder, MCL 324.11101-11153 and MAC 299.9101 -11107:** Establishes requirements for hazardous waste generators, transporters, and treatment/storage/disposal facilities.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the characterization of waste consistent with the requirements of this regulation; the use of appropriate marking/placarding of licensed transportation vehicles with waste meeting this requirement; and the inclusion of licensed transporters and disposal facilities based on the nature of the waste generated during the implementation of the remedial activities

- **Michigan Act 451, Part 31 Water Resources Protection and Rules Promulgated Thereunder, MCL 324.3109b:** States that remedial actions that satisfy Part 201, satisfy this section.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the proposal of PRGs, which meet or exceed the Part 201 Residential and Non-Residential Cleanup Criteria; and soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG

- **Michigan Act 451, Part 91 Soil Erosion and Sedimentation Control, MCL 324.9112 and 324.9116, and MAC 323.1701-1714:** Requirements for owners of land undergoing an earth change. Establishes rules prescribing soil erosion and sedimentation control plans, procedures, and measures.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the implementation and maintenance of soil erosion and sedimentation control measures, with substantive requirements of permit satisfied

- **Michigan Act 451, Part 55 Air Pollution Control and Rules Promulgated Thereunder, MAC 336.1101-2706:** Establishes rules prohibiting the emission of air contaminants in quantities

which cause injurious effects to human health, animal life, plant life or significant economic value, and/or property.

- Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the implementation of monitoring of air emissions during implementation of the alternatives (i.e., dust during excavation, etc.)

- **Michigan Public Act 300 of 1949, as amended Michigan Vehicle Code, MCL 257.716, 257.722, et seq and MAC 257.101, et seq:** Rules governing the reduction of maximum axle loads during springtime frost periods.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the sequencing of the remedial activities such that weight limits are not exceeded during restricted timeframes

- **Michigan Public Act 306 of 1969, as amended Well Construction Code, MCL 24.233, 24.263, and 333.12714:** Establishes rules for well installation and abandonment.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: wells requiring abandonment during the implementation of excavation activities will be re-installed consistent with the requirements in this section, as applicable

- **Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL 324.11501-11504, 324.11507, and 324.11540, and MAC 299.4101-4106a and 299.4301 (3)(d):** Establishes rules for methods of solid waste disposal and for design/operational standards for disposal areas.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: implementation of the consolidation and capping of the metals-impacted soils will be performed in accordance with the requirements of this section, as applicable

- **Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MAC 299.4305, 299.4307 and 299.4308:** Landfill location restrictions and liner design standards.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: Not applicable because the Site is not a new disposal area; however, location restrictions and liner design standards may be considered for these alternatives

- **Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MAC 299.4306:** Water quality performance standards.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the cap design will ensure that all requirements for the protection of surface and groundwater under Part 31 (and rules) are met. A design that keeps the final cover from being inundated is capable of limiting erosion and infiltration to the extent necessary to protect human health and the environment.

- **Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MAC 299.4912:** Requirements for natural soil barriers.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: natural soil barriers (or augments) may be evaluated by the specifications in this rule to help determine if the barriers are adequate to prevent lateral flow of groundwater into and out of the consolidated materials; however, proposed consolidation area is not below the water table

- **Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MAC 299.4913 and 299.4915:** Requirements for final cover materials.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: the cap design will ensure that all requirements for the final cover materials are met

- **Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MAC 299.4916-4921:** Construction Quality Control Program.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: construction quality control will be met during the Remedial Design and Remedial Action phases of work, as required under this part

- **Public Safety – Excavations, Chapter 9-3 – Plainwell Code of City Ordinances:** Requires that any open excavation be surrounded by temporary fencing to protect the public.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: implementation of the excavation activities will include the use of proper safety controls to protect the public; enforcement of Occupational Health and Safety Administration (OSHA) laws and regulations at the Site during remedial activities
- **Soil Erosion and Sedimentation Control, Allegan County Ordinance No. 1013.1:** Control soil erosion and sedimentation with respect to earth change activities within the County.
  - Soil Remedial Alternatives 2B and 2C include the following to meet this ARAR: implementation of the remedial activities involving earth change activities (i.e., excavation, consolidation, capping, etc.) will include the use and maintenance of soil

erosion and sedimentation control measures; substantive requirements of the permit will be satisfied

Additional details on the specifics to be implemented during the activities described above are presented in the subsections below and in Appendix C.

Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of the Soil Remedial Alternative 2-Series options is dependent on the effective design, operation, maintenance, and monitoring of the containment systems and compliance with the institutional controls. In general, implementation of the retained Soil Remedial Alternative 2-Series options would be expected to achieve the RAOs for the Site.

The Soil Remedial Alternative 2-Series includes caveats regarding which soils will be disposed of off Site and which soils would be considered eligible for consolidation on Site. Under the Soil Remedial Alternative 2-Series, soils that are determined through the PDI to be impacted above the PRGs for VOCs, SVOCs, and PCBs, or contain coal or buried debris would not be eligible for consolidation on Site and; therefore, would be disposed of off Site in an appropriately licensed landfill. Soils with inorganic COCs that do not meet the PRG for inhalation hazards would also be disposed of off Site. Soils that are above the PRGs for inorganic COCs only would be eligible for on Site relocation, consolidation and capping.

Retained Soil Remedial Alternatives 2B and 2C assume impacted soils as indicated above will be excavated and disposed of off-Site or relocated, consolidated and capped on Site. Furthermore, Alternatives 2B and 2C assume soils under the existing Mill Building concrete slabs will not be excavated in these alternatives. The building slabs would be considered a cap/containment in place. The exceptions to this directive include soil above the PRGs under the remaining concrete slabs for Buildings 3A, 25 (southern portion), and 28, which will be excavated as directed by the results of the PDI. The concrete slabs for these buildings are currently at or near grade and do not have existing fill over top. It should be noted that the Train Shed and Building 6A do not have concrete slab floors and; therefore, soils above the PRGs in these two buildings will be removed consistent with the alternative selected (i.e., to varying depths to meet the PRGs). Additionally, it is assumed that once Building 1A is demolished the concrete slab will be removed. Soil under the concrete slab of Building 1A does not require remediation efforts under Alternatives 2B or 2C. Furthermore, the remaining concrete slab for Building 9C will likely be removed during redevelopment efforts; this area does not require excavation activities under Alternatives 2B or 2C.

The magnitude of the residual risk, and the adequacy and reliability of the controls under the aforementioned scenarios is further discussed below.

Magnitude of Residual Risk

The combination of removal and off-Site disposal of soils impacted with VOCs, SVOCs and PCBs above the PRGs and soils with inorganic COCs above inhalation hazards, consolidation and capping soils with inorganics above the PRGs, institutional controls and long-term maintenance of the cap(s) is expected to produce a low residual risk to human health and the environment. The Soil Remedial Alternatives 2-Series would provide long-term effectiveness via isolation of the inorganic soils remaining on Site above the PRGs by capping and containment. Capping of the inorganic COCs would prevent direct contact and erosion of the soils. The consolidation area selected for the eligible soils is positioned below the current grade (and above the water table) and will not create a berm or mound requiring monitoring and maintenance from burrowing animals. The consolidation area is utilized as parking area periodically by the City of Plainwell. Alternative 2B would include the consolidation and capping of approximately 3,668 cy of soil. Alternative 2C would include the consolidation and capping of approximately 4,700 cy of soil.

The expected ability of the remedy to maintain a reliable protection of human health and the environment over time is high. Verification sampling will be conducted in each excavation area to document the characteristics of the soil remaining in place are at or below the PRGs. Soils above the inorganic PRGs will be either be capped in place (building slabs) or relocated, consolidated and capped with an impermeable liner material and cover soils/aggregate. Capped soils will not be subject to rain infiltration and therefore should not migrate via this mechanism. The consolidated and capped soils will be above the water table and therefore should not become dissolved and enter the groundwater.

Soil treatment is not a part of Soil Remedial Alternatives 2-Series options for soils.

A five-year review of the remedy will be required to document the redevelopment of the property has complied with the Institutional Controls and that Engineering Controls are being maintained and continue to be protective of human health and the environment. Redevelopment of the property is expected to take between 5 to 20 years.

Adequacy and Reliability of Controls

The types of OM&M activities necessary to ensure continued performance of Soil Remedial Alternative 2-Series include:

Containment Systems:

- Maintaining the cover – liner and soil/aggregate cap
  - Institutional controls via prohibition of excavation into the liner material /capping soils
  - Monitoring the soil and gravel cover over the liner for settled or eroded areas
- Maintaining the cover – building slabs
  - Institutional controls prohibiting the permanent removal of the building slabs and identifying the locations and concentrations of any residual concentrations above the PRGs

Monitoring of the cover will take place on a monthly basis for the first year and then drop to quarterly for the next 5 years. After the 5 year period, the monitoring of the capped areas will be reduced to annually for perpetuity unless additional removal of impacts is conducted. Monitoring will include a visual inspection of the soil consolidation area, which is slated for pavement upon completion of the Site redevelopment. Observations will be documented on a form. Damage or subsidence in the area of interest will be repaired /restored as appropriate. The level of effort and difficulty in monitoring the capped area outside of the buildings is minimal.

Compaction requirements for the existing fill as well as specifications for the consolidated soils, and cover soils will reduce the chances of subsidence.

The basement areas of the buildings will be monitored until the structure is demolished and backfilled to achieve Site grade. Photographs will be taking prior to backfill operations to document the condition of concrete slab(s). Once the concrete slab has been covered with backfill the monitoring of the backfill or surface cover in this area will be reduced to an annual event.

Based on current redevelopment plans, the backfill over the concrete slabs will be between 3 to 5 feet thick for Buildings 4, 4A, 5, 6 and 7. Backfill over buildings demolished in 2012 (Building 9A, 9B, 9D, 9E and 23) is 6 to 9 feet thick. Building 25, demolished in 2013, has (at the time of this document) less than a foot of backfill (therefore will be excavated per the selected Alternative and PDI results) over the southern half of the concrete slab. The northern half of the concrete slab was a pit associated with the on-Site waste water treatment plant. This pit (6- to 8-foot deep) was cleaned, cracked and backfilled in place.

The potential for replacement of the concrete slabs is low; however, it is possible that during decommissioning activities the concrete floor could be discovered to be impacted (i.e., PCB). The impacted concrete may need to be removed prior to backfilling activities. Based on the historical uses of the remaining buildings to be demolished (see Section 1.0), the potential for PCB-impacted concrete is low. The potential to need to replace the cap over the relocated and consolidated soils is also low. The location selected for the consolidated soils has included a set back of a minimum of 20 feet away from the remaining buildings and allows plenty of space for the installation of underground utilities that may be required as the Site is redeveloped. As stated previously, the area selected for the consolidated soils is anticipated to become a parking lot.

If the concrete slabs or cap system need to be replaced, the risk to human health and the environment is low. As stated above, soils that have an inhalation hazards potential would not be eligible for consolidation on Site. A Soil Management Plan for the Site will provide required health and safety measures for workers tasked with repairing or replacing any cap system at the Site.

Consolidation and capping with institutional controls are proven technologies that meet the requirements for effectiveness and permanence. Off-site disposal at a properly licensed landfill of manifested soils (and debris) that do not meet eligibility requirements specified above would also achieve the requirements of effectiveness and permanence.

Reduction of TMV through Treatment

No reduction of TMV through treatment will be accomplished by Soil Remedial Alternative 2-Series. The overall reduction in toxicity will be accomplished through the removal and off-Site disposal and consolidation/capping on-Site of materials above the PRGs. The potential mobility of the impacted soils consolidated on site will be significantly reduced by the installation of the cap.

Impacted materials present on Site are considered low-level threat waste for which removal/off-Site disposal and containment are appropriate and treatment impracticable.

Short-Term Effectiveness

<u>Protection of the Community During Remedial Actions</u>

The Soil Remedial Alternative 2-Series poses low level risks to the community during construction (e.g., dust, noise, transportation, emissions associated with excavation of waste) that can be readily mitigated through dust control, restricted work hours, engineering controls, compliance with U.S. DOT regulations, and air monitoring.

Fugitive dust emissions will be controlled and monitored to ensure that they comply with Part 55, Air Pollution Control of the NREPA. Typical dust controls measures may include the use of municipally-supplied water to wet down haul roads during material transportation.

Work hours for the project will be restricted to fall between 7 a.m. and 6 p.m., Monday through Friday (except on Federal Holidays). Reducing the work hours will reduce the impact that the construction traffic has on the community. In addition, the far west entrance to the Site will be the primary route in and out of the Site. This entrance/exit has a long access drive (part of Prince Street) that can be utilized to stage trucks and provide an easier route for the trucks in and out of the Site and is west of the residential properties along Allegan Street.

Risks to Site workers and the community can also be mitigated by adherence to the "Superfund Green Remediation Strategy" (U.S. EPA, 2010) and "Green Remediation: Best Management Practices for Excavation and Surface Restoration" (U.S. EPA, 2008).

Protection of Workers During Remedial Actions

The Soil Remedial Alternative 2-Series poses risks to Site workers associated with construction (e.g., exposure to contaminated media, occupational hazards) that can be mitigated through a health and safety plan and personal protective equipment. Air monitoring will be conducted during excavation activities where soils have been determined to contain metals above the PSIC and/or PCBs. If based on monitoring, the exposure to the contaminants are above the action level for one or more constituents, workers will be required to don a respirator with a particulate cartridge or combination cartridge if PCBs are present in the breathing zone. Good personal hygiene will be encouraged. Hand washing stations will be required at the contamination reduction zones. Decontamination stations will be required for workers to use prior to exiting the exclusion zones. Workers will not be allowed to eat, drink or smoke within the exclusion zone(s).

Environmental Impacts

The environmental impacts to the Site in the short-term will include exposure of additional impacted soils once the limited vegetation has been removed from portions of the Site. Best management practices will be implemented including, but not limited to silt fence, turbidity curtain and dust control (potable water). It is assumed that the majority of the soils targeted for off-Site disposal will be direct loaded into trucks and will not be staged on-Site. Excavation along the Mill Race will require the temporary divergence of part of the Mill Race (the methodology will be determined during the PDI). Turbidity of the Mill Race will be monitored during excavation activities. Preparation of the consolidation area will require the excavation of the imported gravel material and placement of this material on the Mill property. The temporarily staged gravel will be placed on either pavement or visqueen and surrounded with

silt fence, hay bales or other erosion/sedimentation control methods to prevent sediment runoff from entering the City of Plainwell stormwater system.

Time Until Remedial Action Objectives Are Achieved

Remedial design, contracting and agency approval has been estimated to require six months to one year. Estimated time for construction is less than 1 year, at the conclusion of which the containment system should be operational and effective.

Implementability

Ability to Construct and Operate the Technology

The remedial components of Soil Remedial Alternative 2-Series options could be readily implemented and reliably designed and constructed. Soil relocation/consolidation and capping are commonly practiced technologies. Manufactured materials needed for construction of the components of this alternative are readily available. The liner material is typical for this application. The local availability of soil materials that will pass the chemical testing is limited. Local gravel pits (i.e., half-hour radius of the Site) have historically failed chemical testing requirements for State Default Criteria or Residential Direct Contact for arsenic. Contractors with experience completing the components included in Soil Remedial Alternative 2-Series options are available in the general area.

The remedial alternative will not include any components that would require operational activities.

Availability of Necessary Equipment and Specialists

A structural engineering specialist will be contracted during the PDI stage of the remedial action to evaluate the need for shoring prior to excavation activities. Structural engineers are locally available to conduct the necessary evaluations. The installation of shoring to maintain building foundation and or the pedestrian bridge footer integrity may be required depending on the alternative selected. Sheet pile shoring technology would most likely be utilized. Sheet piling contractors are located within one to three hours of the Site.

Limited asbestos abatement would be conducted on an as needed basis on the exterior of Building 5A and 5. Depending on the alternative selected additional asbestos abatement would be required inside the buildings primarily in Buildings 5 and 6 (boilers). Abatement workers would be required to hold current contractor worker licenses for asbestos.

The liner material will need to be welded together, contractors hired to install the liner will need to have provide trained individuals to weld the liner.

The alternatives will include the installation of specialized equipment to facilitate excavation along the Mill Race. The equipment necessary for this work will be determined during the PDI stage of the remedial action. An engineer experienced in remedial actions along rivers will design the system to temporarily divert the water within the Mill Race. It is anticipated that the equipment required to complete this portion of the remedial action will be available for rent from either the Chicago area or the Detroit area, which are both in reasonable proximity to the Site. The contractor conducting this portion of the work will demonstrate experience working adjacent to a river. Local contractors have conducted this type of work.

No other special techniques, materials, or labor are required to complete the excavation, backfilling, consolidation, portions of Soil Remedial Alternative 2-Series.

Reliability of the Technology

The Soil Remedial Alternative 2-Series will include a component of off-Site soil disposal. This component is considered reliable to reduce the amount of impacted soils on the Site. The soil relocation and capping portion of the remedial action is also considered reliable in reducing the exposure to soils impacted above the PRGs particularly when applied in conjunction with deed restrictions prohibiting the removal of the cap. Leaving the concrete building slabs in place will also restrict the direct contact, and reduce the potential for the metals to leach to groundwater. Leaving the concrete slabs in place along with an IC prohibiting the removal of the slabs will be a reliable solution to impacted soils below the concrete slabs.

Ability to Monitor Effectiveness of Remedy

The effectiveness of the components associated with this alternative is easily monitored. Verification soil samples will be collected prior to backfilling activities to document that the remaining soils meet the PRG objectives. As redevelopment progresses at the Site, the ICs in place will ensure that the concrete slabs are left in place for any future demolition projects. The City of Plainwell periodically utilizes the area selected for the consolidation of soils on Site as a gravel parking lot. Monitoring the consolidation area for subsidence or erosion can easily be achieved.

Ability to Obtain Approvals from Other Agencies and Coordination with Other Agencies

The Soil Remedial Alternative 2-Series requires access to the Site to complete the excavation, backfilling, consolidation, capping, and off-Site disposal handling activities. An access agreement with the City of Plainwell is already in place for the Site. The City of Plainwell would need to agree to the soil relocation plan; it is likely that the City of Plainwell will agree to the consolidation option as well as the proposed location.

A Soil Relocation Plan would require U.S. EPA and MDEQ approval prior to initiating the remedial action. If one of the alternatives including the soil relocation/consolidation is selected, it is assumed that this approval would be easily obtainable. Compliance with the requirements of a Soil Erosion and Sedimentation Control Permit would be followed. Asbestos abatement may require a notification to the State of Michigan [MDEQ Air Quality Division - National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Michigan Department of Licensing and Regulatory Affairs (LARA)] 10 days prior to the abatement work. Sending in the notice within the required time follows the guidance documents and does not require any formal approval.

Availability of Off-Site Disposal Services and Capacity

Off-Site disposal of impacted materials would require waste characterization sampling and landfill approval. Soils impacted with VOCs, SVOCs, metals, and non-TSCA PCBs are anticipated to be transported to either the Waste Management Autumn Hills Recycling and Disposal Facility in Zeeland, Michigan or the Ottawa County Farms Landfill in Coopersville, Michigan. Both facilities accept the type of waste that would be generated during the remedial action at the Site, are operating under current licenses and have capacity to accept the waste.

TSCA-regulated soils would be transported to the Environmental Quality Company (EQ)/U.S. Ecology Company Wayne Disposal, Inc. Site #2 Landfill in Belleville, Michigan. This facility is operating under current approval from both the MDEQ and U.S. EPA.

Ease of Undertaking Additional Remedial Actions, if Necessary

It is not anticipated that additional remedial actions will be necessary after the completion of the scope of work previously discussed. Verification sampling will be conducted to ensure that soils remaining on Site meet the PRGs for each redevelopment area. If however, additional excavation is required it would be completed assuming off-site disposal of all materials, unless another section of the Site is selected for non-residential land use at which time, an additional location for consolidation of impacted soils could be considered.

Cost

Table 5.1 provides a breakdown of costs for each technically feasible remedial alternative. As stated previously soil Alternatives 2A and 2D were determined not to be technically feasible and were not carried through the details alternative analysis process. Detailed cost estimates (included assumptions and clarifications) are included in Appendix C.

The following provides a summary of the costs:

- The total cost of Soil Remedial Alternative 2B is estimated to be $4,462,820 with a capital cost of $4,319,869 an annual OM&M cost of $1,920/30-year NPV for OM&M of $142,952.
- The total cost for Soil Remedial Alternative 2C is estimated to be $4,998,195 with a capital cost of $4,855,244, an annual OM&M cost of $1,920/30-year NPV for OM&M of $142,952.

The capital cost is primarily for the excavation, backfilling, consolidation, capping, and off-Site disposal. The annual OM&M costs are for the cap OM&M.

5.2.3 Soil Remedial Alternative 3-Series – Excavation and Off-Site Disposal

The Soil Remedial Alternative 3-Series includes the following options during the implementation of the excavation and off-Site disposal of materials impacted VOCs, SVOCs, metals, and PCBs to the below PRGs to meet the ARARs:

- Soil Remedial Alternative 3A to Meet Part 201 Generic Residential Cleanup Criteria and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions)
- Soil Remedial Alternative 3B to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria with Iterative Approach for Arsenic, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 3C to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-5} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and PCB Residential and Commercial Risk-Based Criteria (developed based on 10^{-5} risk level)
- Soil Remedial Alternative 3D to Meet Part 201 Generic Residential and Non-Residential Cleanup Criteria, 10^{-6} Risk Level for Arsenic Residential and Commercial Risk-Based Criteria with Iterative Approach, and the TSCA Cleanup Level for Bulk PCB Remediation Waste in High Occupancy Areas (without further restrictions for Residential Areas and with further restrictions for Non-Residential Areas)

The primary components of Soil Remedial Alternative 3-Series are:

- Pre-design delineation of the vertical and horizontal extent of soil impacts in each area exceeding the PRGs
- Pre-excavation activities will vary by redevelopment area and are detailed in Appendix C by remedial alternative and redevelopment area. Soil Remedial Alternatives 3-Series pre-excavation activities would include, but are not limited to: erosion control measures; relocation of power poles; clearing and grubbing; purging the remaining buried fuel oil line

from the former 200,000-gallon AST; removal of fuel oil from the coal tunnel; abandonment of monitoring wells in the excavation areas; and structural evaluation of the buildings to be affected by excavation activities; limited asbestos abatement and decommissioning activities necessary to prepare for excavation activities

- Excavation of areas impacted above the PRGs for soil
- Removal of coal tunnel and associated former fuel oil AST lines
- Off-Site disposal of VOCs, SVOCs, metals, and inorganics, material that contains coal or coal debris, and PCB-impacted material above the PRGs
- Backfilling of excavation areas with clean fill
- Restoration, as appropriate
- Monitoring and maintenance of cap/cover
- Institutional controls
- Engineering controls
- Alternatives 3B, 3C and 3D would result in varying amounts of soil above the PRGs for arsenic left in place beneath existing concrete slabs. See Sections 4.1.3.2 through 4.1.3.4 for details.

RAOs are addressed by Soil Remedial Alternative 3-Series in the following manner, as described in Section 4.1.2:

<u>Exposure Pathway Objectives</u>

- Human direct contact (including ingestion and dermal contact) and ambient air inhalation exposure to soil COCs, with the exception of arsenic: likelihood of exposure reduced/controlled through excavation to land use PRGs and off-Site disposal, and institutional controls
- Human direct contact/ingestion/inhalation exposure to soil impacted with arsenic and PCBs posing excess carcinogen risk levels of 10^{-4} to 10^{-6} or a non-carcinogenic hazard level of 1.0: likelihood of exposure reduced/controlled through excavation to land use PRGs and off-Site disposal, and institutional controls
- Human inhalation exposure to indoor air vapors to soil COCs: likelihood of exposure reduced/controlled through excavation to land use PRGs and off-Site disposal, and institutional controls

Overall Protection of Human Health and the Environment

This alternative provides overall protection of human health and the environment through the following:

- Site risks posed by the COCs are eliminated, which makes them protective of human receptors, by the:
  - Removal and off-Site disposal of VOC, SVOC, metals (above PSIC) and/or PCB-impacted soil
  - Removal and off-Site disposal of the coal tunnel and associated former fuel oil AST lines

- Site risks posed by the COCs are reduced, which makes them protective of human receptors in conjunction with the controlled Site risks, by the:
  - Implementation of institutional and engineering controls

- Site risks posed by the COCs are controlled, which makes them protective of human receptors in conjunction with the reduced Site risks, by the:
  - Zoning and/or land use restrictions on-Site consistent with future anticipated land use, including the requirement for existing building foundations/slabs to remain in place and the development of Soil Management Plans as part of the future development process to ensure that impacted materials in place following completion of the Remedial Action either remain in place or are re-placed at similar locations/depths, or are disposed of off Site in an appropriately licensed disposal facility
  - Designation of an area for use as a raised bed community garden for residential properties and restrictive covenant prohibiting gardens in other areas
  - Prohibition of digging in areas not remediated to Part 201 GRCC without proper training and protective measures
  - Implementation of a restrictive covenant for contamination remaining in place above Part 201 GRCC pursuant to Michigan Consolidated Laws (MCL) 324.20120b, if applicable
  - Installation of permanent markers on the property identifying depth to which digging is prohibited, as applicable. Enroll property in state-wide utility location program to identify areas where digging if prohibited, as applicable.
  - Implementation of deed restrictions requiring maintenance of caps for areas of PCB contamination remaining in place $\geq$ 1 mg/kg and $\leq$ 10 mg/kg for high occupancy areas, if applicable based on the PRGs (i.e., 1 mg/kg or risk-based criteria)

Soil Remedial Alternatives 3A, 3B, 3C, and 3D meet RAO 1 through the removal and off-Site disposal of soil impacted at concentrations above the PRGs related to human direct contact exposure. Soil Remedial Alternatives 3A, 3B, 3C, and 3D meet RAO 2 through the removal and off-Site disposal of the majority of the soil currently identified to be impacted at concentrations

above the leaching to groundwater criteria and further evaluation of potential impacts to groundwater through the submittal and implementation of an Interim Groundwater Work Plan, upon approval from U.S. EPA. Soil Remedial Alternatives 3A, 3B, 3C, and 3D meet RAO 3 through the removal and off-Site disposal of soil impacted at concentrations above the Michigan Act 451, Part 201 Cleanup Criteria related to human inhalation exposure to indoor air vapors. Soil Remedial Alternatives 3A, 3B, 3C, and 3D meet RAO 4 through the removal and off-Site disposal of soil impacted with lead above in the single location, which reduces the 95 percent UCL from 181 mg/kg to 126 mg/kg, an exposure concentration below the lower end PRG of 140 mg/kg. Soil Remedial Alternatives 3A, 3B, 3C, and 3D meet RAO 5 through the development and implementation of a Soil Management Plan, the removal of soils impacted above the PRGs for off-Site disposal, completion of the remedial action design in accordance with local, state and federal requirements for stormwater management, and following proper stormwater erosion control measures.

Compliance with ARARs

The Soil Remedial Alternative 3-Series complies with ARARs as discussed below.

- **TSCA, 40 CFR 761:** Establishes storage, treatment and disposal requirements for PCB remediation wastes and for non-porous and porous surfaces contaminated with PCBs. Determines PCB cleanup level for soil using self-implementing, performance-based, or risk-based criteria; cleanup levels based on future land use.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the inclusion of licensed transporters and disposal facilities based on the levels of PCBs in bulk remediation waste generated during the implementation of the remedial activities; the development and use of risk-based criteria as a PRG based on anticipated future land use in a manner that will not pose an unreasonable risk of injury to health or the environment; and the use of appropriate delineation and verification sampling methodologies specified in this regulation

- **Clean Air Act, 40 CFR 50 and 52:** Establishes requirements for constituent emission rates in accordance with National Ambient Air Quality Standards.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the implementation of monitoring of air emissions during implementation of the alternatives (i.e., dust during excavation, etc.)

- **Clean Air Act, 42 U.S.C. 7401 et seq.:** Provides guidelines with respect to minimizing the harmful effects of fugitive dust and airborne contaminants that result from excavation, construction, or other removal activities. Establishes primary and secondary ambient air quality standards for emissions of chemicals and particulate matter.

- Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the implementation of monitoring of air emissions during implementation of the alternatives (i.e., dust during excavation, etc.)

- **U.S. DOT Placarding and Handling, 40 CFR 264.227 and 49 CFR 171:** Transportation and handling requirements for materials containing PCBs with concentrations of 20 mg/kg or more.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the use of appropriate marking/placarding of licensed transportation vehicles with waste meeting this requirement and the inclusion of licensed transporters and disposal facilities based on the levels of PCBs in bulk remediation waste generated during the implementation of the remedial activities

- **National Historic Preservation Act, 16 U.S.C. 470, as amended:** Establishes a program for the preservation of historical and archaeological sites. Created the National Register of Historic Places, list of National Historic Landmarks, and State Historic Preservation Offices.
  - Soil Remedial Alternatives 3B, 3C and 3D include the following to meet this ARAR: the excavation activities will not cause physical destruction or damage, or alteration to any of the designated historic structures, including the existing building slabs. Alternative 3A would alter the historic structures through the removal of the concrete above impacted areas targeted for excavation. Restoration activities would require the use of materials consistent with the historic preservation of the structures affected.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20118(2) and 324.20120a, and MAC 299.5705:** Requires that a remedial action shall provide for response activity that will satisfy cleanup criteria.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the proposal of PRGs, which meet or exceed the Part 201 Residential and Non-Residential Cleanup Criteria; and soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120a and MAC 299.5705:** If the target detection limit or background concentration is greater than the risk-based cleanup criteria, the target

detection limit or background concentration shall be used instead of the risk-based cleanup criterion.

- Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the use of the existing Multi-Area Quality Assurance Project Plan, which evaluates the target detection limits (TDLs) relative to current Part 201 Cleanup Criteria; and evaluation of the TDLs in comparison to the selected PRGs during the PDI.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20107a and 324.20114:** Requirements for owner of a facility, such as preventing exacerbation and exercising due care.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: providing the Site owner(s) with documentation regarding the current Site conditions relative to COCs exceeding PRGs, which will be outlined during the PDI.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20116, 324.20120a(16), and 324.20120b, and MAC 299.5524:** Restrictions on transfer of real property designated as a facility. Requirement that if residential criteria are not met, land use restrictions must be provided. Actions required upon approval of remedial action plans.
  - Soil Remedial Alternatives 3B, 3C, and 3D include the following to meet this ARAR: implementation of institutional controls.

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20118, et al. MAC 299.5532(11):** Required elements of remedial action plans (remedial design documents).
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: primary requirements will be met in remedial design documents by including plans identifying points of compliance for evaluating the <u>effectiveness</u> of the remedial action

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MAC 299.5520 and 299.51003-51005:** Objectives of response activities, determination (or nullification) that a response activity is complete.
  - Soil Remedial <u>Alternatives</u> 3A, 3B, 3C, and 3D include the following to meet this ARAR: upon completion of approved remedial actions, written documentation will be provided to the agency

- **Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MAC 299.5522 and 299.51017:** Liable parties must provide notice to the

department and adjacent land owners in certain situations, such as if hazardous substances emanate beyond the property boundary.

- Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: notification will be made to the agency if it is determined during the PDI that there is a release (above PRGs) from the Site or if Part 201 Generic Residential Cleanup Criteria are exceeded and contamination is believed to be migrating off-Site; there are no instances where this scenario has been identified to exist at this time

- **Michigan Act 451, Part 111 Hazardous Waste Management and Rules Promulgated Thereunder, MCL 324.11101-11153 and MAC 299.9101 -11107:** Establishes requirements for hazardous waste generators, transporters, and treatment/storage/disposal facilities.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the characterization of waste consistent with the requirements of this regulation; the use of appropriate marking/placarding of licensed transportation vehicles with waste meeting this requirement; and the inclusion of licensed transporters and disposal facilities based on the nature of the waste generated during the implementation of the remedial activities

- **Michigan Act 451, Part 31 Water Resources Protection and Rules Promulgated Thereunder, MCL 324.3109b:** States that remedial actions that satisfy Part 201, satisfy this section.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the proposal of PRGs, which meet or exceed the Part 201 Residential and Non-Residential Cleanup Criteria; and soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. In instances where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRG

- **Michigan Act 451, Part 91 Soil Erosion and Sedimentation Control, MCL 324.9112 and 324.9116, and MAC 323.1701-1714:** Requirements for owners of land undergoing an earth change. Establishes rules prescribing soil erosion and sedimentation control plans, procedures, and measures.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the implementation and maintenance of soil erosion and sedimentation control measures, with substantive requirements of permit satisfied

- **Michigan Act 451, Part 55 Air Pollution Control and Rules Promulgated Thereunder, MAC 336.1101-2706:** Establishes rules prohibiting the emission of air contaminants in quantities which cause injurious effects to human health, animal life, plant life or significant economic value, and/or property.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the implementation of monitoring of air emissions during implementation of the alternatives (i.e., dust during excavation, etc.)

- **Michigan Public Act 300 of 1949, as amended Michigan Vehicle Code, MCL 257.716, 257.722, et seq and MAC 257.101, et seq:** Rules governing the reduction of maximum axle loads during springtime frost periods.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: the sequencing of the remedial activities such that weight limits are not exceeded during restricted timeframes

- **Michigan Public Act 306 of 1969, as amended Well Construction Code, MCL 24.233, 24.263, and 333.12714:** Establishes rules for well installation and abandonment.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: wells requiring abandonment during the implementation of excavation activities will be re-installed consistent with the requirements in this section, as applicable

- **Public Safety – Excavations, Chapter 9-3 – Plainwell Code of City Ordinances:** Requires that any open excavation be surrounded by fencing to protect the public.
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: implementation of the excavation activities will include the use of proper safety controls to protect the public; enforcement of Occupational Health and Safety Administration (OSHA) laws and regulations at the Site during remedial activities

- **Soil Erosion and Sedimentation Control, Allegan County Ordinance No. 1013.1:** Control soil erosion and sedimentation with respect to earth change activities within the County
  - Soil Remedial Alternatives 3A, 3B, 3C, and 3D include the following to meet this ARAR: implementation of the remedial activities involving earth change activities (i.e., excavation, grading etc.) will include the use and maintenance of soil erosion and sedimentation control measures; substantive requirements of the permit will be satisfied

Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of the Soil Remedial Alternative 3-Series is dependent on the effective removal of materials and compliance with the institutional controls.

Soil Remedial Alternative 3A assumes impacted soils as indicated above will be excavated and disposed of off Site. Soil Remedial Alternatives 3B, 3C, and 3D assume impacted soils under the existing Mill Building concrete slabs will not be excavated in these alternatives. The building slabs would be considered a cap/containment in place. The exceptions to this directive include soil above the PRGs under the remaining concrete slabs for Buildings 3A, 9C, 25 (southern portion), and 28, which will be excavated as directed by the results of the PDI. Soils under the remaining slab of Building 9C do not require remediation efforts under Alternatives 3B or 3C. The concrete slabs for these buildings are currently at or near grade and do not have existing fill over top. It should be noted that the Train Shed and Building 6A do not have concrete slab floors and; therefore, soils above the PRGs in these two buildings will be removed consistent with the alternative selected (i.e., to varying depths to meet the PRGs). Additionally, it is assumed that once Building 1A is demolished the concrete slab will be removed. Under Alternative 3D, a PCB exceedance of 1 mg/kg will be investigated and remediated under the concrete slab of Building 1A. Soils under Building 1A do not require remediation efforts under Alternatives 3B or 3C.

The magnitude of the residual risk, and the adequacy and reliability of the controls under the aforementioned scenarios is further discussed below.

Magnitude of Residual Risk

The combination of excavation and off-site disposal of soils impacted with VOCs, SVOCs, inorganics and PCBs above the PRGs, and institutional controls is expected to produce a low residual risk to human health and the environment. Soil Remedial Alternative 3-Series options would provide long-term effectiveness via off-site disposal of the impacted soils.

The expected ability of the remedy to maintain a reliable protection of human health and the environment over time is high. Verification sampling will be conducted in each excavation area to document the characteristics of the soil remaining in place are at or below the PRGs. Soils above the PRGs that are capped in place (building slabs) will not be subject to rain infiltration and therefore should not migrate via this mechanism.

Soil treatment is not a part of the Soil Remedial Alternatives 3-Series options for soils.

A 5-year review of the remedy will be required to document the redevelopment of the property has complied with the Institutional Controls and that Engineering Controls are being maintained and continue to be protective of human health and the environment. Redevelopment of the property is expected to take between 5 to 20 years.

Adequacy and Reliability of Controls

The types of OM&M activities necessary to ensure continued performance of Soil Remedial Alternative 3-Series include maintaining the concrete building slabs as a cover. Additionally, institutional controls prohibiting the permanent removal of the building slabs and identifying the locations and concentrations of any residual concentrations above the PRGs will be maintained.

The concrete slabs will be monitored until the above grade structure is demolished and backfilled to achieve Site grade. Photographs will be taking prior to backfill operations to document the condition of concrete slab(s). Once the concrete slab has been covered with backfill, the monitoring of the backfill or surface cover in this area will be conducted annually.

Based on current redevelopment plans, the backfill over the concrete slabs will be between three to five feet thick for Buildings 4, 4A, 5, 6 and 7. Backfill over buildings demolished in 2012 (Building 9A, 9B, 9D, 9E and 23) is six to nine feet thick. Building 25, demolished in 2013, has (at the time of this document) less than a foot of backfill (and therefore will be excavated per the selected alternative and PDI results) over the southern half of the concrete slab. The northern half of the concrete slab was a pit associated with the onsite waste water treatment plant. This pit (6 to 8 feet deep) was cleaned, cracked and backfilled in place.

The potential for replacement of the concrete slabs is low; however, it is possible that during decommissioning activities sections of the concrete floor will be determined to be impacted and would require remediation efforts that could include removal of the slab. Based on the historical uses of the remaining buildings to be demolished, the potential for PCB impacted concrete is low.

If the concrete slabs need to be replaced, the risk to human health and the environment is low. A Soil Management Plan for the Site will provide required health and safety measures for workers tasked with repairing or replacing the concrete slabs (contact with Site soils).

Off-site disposal at a properly licensed landfill of manifested soils (and debris) would also achieve the requirements of effectiveness and permanence.

No OM&M activities are necessary to ensure continued performance of the Soil Remedial Alternative 3-Series, with the exception of meeting the requirements of the institutional controls and engineering controls (concrete slabs) monitoring and maintenance.

Reduction of TMV through Treatment

No reduction of TMV through treatment will be accomplished by Soil Remedial Alternative 3-Series. The overall reduction in TMV will be accomplished through the removal and off-Site disposal of materials above the PRGs.

Impacted materials present on Site are considered low-level threat waste for which removal/off-Site disposal are appropriate and treatment impracticable.

Short-Term Effectiveness

Protection of the Community During Remedial Actions

The Soil Remedial Alternative 3-Series poses low level risks to the community during construction (e.g., dust, noise, transportation, emissions associated with excavation of waste) that can be readily mitigated through dust control, restricted work hours, engineering controls, compliance with U.S. DOT regulations, and air monitoring. Risks to Site workers and the community can also be mitigated by adherence to the "Superfund Green Remediation Strategy" (U.S. EPA, 2010) and "Green Remediation: Best Management Practices for Excavation and Surface Restoration" (U.S. EPA, 2008).

Fugitive dust emissions will be controlled and monitored to ensure that they comply with Part 55, Air Pollution Control of the NREPA. Typical dust controls measures may include the use of municipally-supplied water to wet down haul roads during material transportation.

Work hours for the project will be restricted to fall between 7 a.m. and 6 p.m., Monday through Friday (except on Federal Holidays). Reducing the work hours will reduce the impact that the construction traffic has on the community. In addition, the far west entrance to the Site will be the primary route in and out of the Site. This entrance/exit has a long access drive (part of Prince Street) that can be utilized to stage trucks and provide an easier route for the trucks in and out of the Site and is west of the residential properties along Allegan Street.

Protection of Workers During Remedial Actions

The Soil Remedial Alternative 3-Series poses risks to Site workers associated with construction (e.g., exposure to contaminated media, occupational hazards) that can be mitigated through a health and safety plan and personal protective equipment. Air monitoring will be conducted during excavation activities where soils have been determined to contain metals above the PSIC or PCBs. If, based on monitoring, the exposure to the contaminants are above the action level for one or more constituents, workers will be required to don a respirator with a particulate cartridge or combination cartridge. Good personal hygiene will be encouraged. Hand washing stations will be required at the contamination reduction zones. Decontamination stations will

be required for workers to utilize prior to exiting the exclusion zones. Workers will not be allowed to eat, drink or smoke within the exclusion zone(s).

Environmental Impacts

The environmental impacts to the Site in the short-term will include exposure of additional impacted soils once the limited vegetation has been removed from portions of the Site. Best management practices will be implemented including, but not limited to silt fence, turbidity curtain and dust control (potable water). It is assumed that the majority of the soils targeted for off-Site disposal will be direct loaded into trucks and will not be staged on-Site. Excavation along the Mill Race will require the temporary divergence of part of the Mill Race (the methodology will be determined during the PDI). Turbidity of the Mill Race will be monitored during excavation activities.

Time Until Remedial Action Objectives Are Achieved

Remedial design, contracting and agency approval has been estimated to require six months to one year. Estimated time for construction is less than 1 year. However, Alternatives 3A and 3D could require a spring mobilization for final restoration/seeding due to the length of the time estimated for construction completion.

Implementability

Ability to Construct and Operate the Technology

The remedial components of Alternative 3-Series could be readily implemented and reliably designed and constructed. Soil excavation and off-site disposal are commonly practiced technologies. Contractors with experience completing the components included in Soil Remedial Alternative 3-series options are available in the general area. The local availability of soil backfill materials that will pass the chemical testing is limited, as local gravel pits (i.e., half-hour radius of the Site) have failed chemical testing requirements for State Default Criteria or Residential Direct Contact for arsenic.

The remedial alternative will not include any components that would require operational activities.

Because the majority of the constructed components of the Soil Remedial Alternative 3-Series are common to many remediation projects, major technical difficulties and unknowns are not expected.

Availability of Necessary Equipment and Specialists

A structural engineering specialist will be contracted during the PDI stage of the remedial action to evaluate the need for shoring prior to excavation activities (primarily required for Alternative

3A). Structural engineers are locally available to conduct the necessary evaluations. The installation of shoring to maintain building foundation and or the pedestrian bridge footer integrity may be required depending on the alternative selected. Sheet pile shoring technology would most likely be utilized. Sheet piling contractors are located within one to three hours of the Site.

Limited asbestos abatement would be conducted on an as needed basis on the exterior of Building 5A and 5. Depending on the alternative selected additional asbestos abatement would be required inside the buildings primarily in Buildings 5 and 6 (boilers). Abatement workers would be required to hold current contractor worker licenses for asbestos.

Excavation along the Mill Race will require specialized equipment to divert the water away from the excavation area. The equipment necessary for this work will be determined during the PDI stage of the remedial action. An engineer experienced in remedial actions along rivers will design the system to temporarily divert the water within the Mill Race. It is anticipated that the equipment required to complete this portion of the remedial action will be available for rent from either the Chicago area or the Detroit area, which are both in reasonable proximity to the Site. The contractor conducting this portion of the work will demonstrate experience working adjacent to a river. Local contractors have conducted this type of work.

No other special techniques, materials, or labor are required to complete the excavation, off-site disposal and restoration for the Soil Remedial Alternative 3-Series. Because the majority of the constructed components of Soil Remedial Alternative 3-Series are common to many remediation projects, major technical difficulties and unknowns are not expected.

Reliability of the Technology

Soil Remedial Alternative 3-Series will include off-Site soil disposal. This component is considered reliable to reduce the amount of impacted soils on the Site. Leaving the concrete building slabs in place will restrict direct contact, and reduce the potential for the metals to leach to groundwater. Leaving the concrete slabs in place as an EC along with an IC prohibiting the removal of the slabs will be a reliable solution to impacted soils below the concrete slabs (Soil Remedial Alternatives 3B, 3C, and 3D).

Ability to Monitor Effectiveness of Remedy

The effectiveness of the components associated with Soil Remedial Alternative 3-Series is easily monitored. Verification soil samples will be collected prior to backfilling activities to document that the remaining soils meet the PRG objectives. As redevelopment progresses at the Site, the ICs in place will ensure that the concrete slabs are left in place for any future demolition projects.

Ability to Obtain Approvals from Other Agencies and Coordination with Other Agencies
The Soil Remedial Alternative 3-Series requires access to the Site to complete the excavation, off-Site disposal and restoration activities. An access agreement is already in place for the Site.

Compliance with a Soil Erosion and Sedimentation Control Permit would be conducted and submitted to the Allegan County Health Department, it is expected that a permit could be readily obtained. Asbestos abatement may require a notification to the State of Michigan (MDEQ Air Quality Division - NESHAP and Michigan LARA) 10 days prior to the abatement work. Sending in the notice within the required time follows the guidance documents and does not require any formal approval.

Availability of Offsite Disposal Services and Capacity
Off-Site disposal of impacted materials would require waste characterization sampling and landfill approval. Soils impacted with VOCs, SVOCs, metals, and non-TSCA PCBs are anticipated to be transported to either the Waste Management Autumn Hills Recycling and Disposal Facility in Zeeland, Michigan or the Ottawa County Farms Landfill in Coopersville, Michigan. Both facilities accept the type of waste that would be generated during the remedial action at the Site, are operating under current licenses and have capacity to accept the waste.

TSCA regulated soils and/or any debris determined to fall within this regulation would be transported to the Environmental Quality Company (EQ)/U.S. Ecology Company Wayne Disposal, Inc. Site #2 Landfill in Belleville, Michigan. This facility is operating under current approval from both the MDEQ and U.S. EPA.

Ease of Undertaking Additional Remedial Actions, if Necessary
It is not anticipated that additional remedial actions will be necessary after the completion of the scope of work previously discussed. Verification sampling will be conducted to ensure that soils remaining on Site meet the PRGs for each redevelopment area. If however, additional excavation is required it would be completed assuming off-Site disposal of all materials.

Cost
Table 5.1 provides a breakdown of costs for each of the Alternative 3-series remedial options. Detailed cost estimates (included assumptions and clarifications) are included in Appendix C.

The following provides a summary of the costs:

- The total cost of Soil Remedial Alternative 3A is estimated to be $9,424,482 with a capital cost of $9,388,744, and an annual OM&M cost of $2,400/30-year NPV for OM&M of $35,738.

- The total cost for Soil Remedial Alternative 3B is estimated to be $4,363,857 with a capital cost of $4,328,119, and an annual OM&M cost of $2,400/30-year NPV for OM&M of $35,738.
- The total cost for Soil Remedial Alternative 3C is estimated to be $4,875,232 with a capital cost of $4,839,494, and an annual OM&M cost of $2,400/30-year NPV for OM&M of $35,738.
- The 30-year NPV for Soil Remedial Alternative 3D is estimated to be $7,477,202 with a capital cost of $7,334,250 and an annual OM&M cost of $9,600/30-year NPV of $142,952.

The capital cost is primarily for the excavation, backfilling, and off-Site disposal.

5.3 Comparative Analysis of Alternatives

This section presents a comparative analysis of the remedial alternatives against each other in consideration of the two threshold and five primary balancing criteria. Table 5.3 provides a summary of the comparisons below.

5.3.1 Overall Protection of Human Health and the Environment

Exposure Pathway RAOs

Soil Remedial Alternative 1 (No Action) is not protective as it does not address identified exposure pathways.

With the exception of Soil Remedial Alternative 1, all of the retained alternatives address RAOs for identified exposure pathways in the same manner, but with varying degrees of effectiveness. All of the retained alternatives (except No Action) achieve protection at the completion of construction and with implementation of the institutional controls. However, the Soil Remedial Alternative 3A would not require the use of institutional controls relative to soil impacts. Exposure to remaining impacted soils on Site (Soil Remedial Alternatives 2B, 2C, 3B, 3C, and 3D) would be reduced by the cover systems; either the cap system with liner for Soil Remedial Alternatives 2B and 2C along with the building concrete slabs or only the concrete slabs as in Alternatives 3B, 3C, and 3D. The cover systems, in conjunction with the ICs will prevent direct contact with the impacted soils as well as reduce storm water infiltration through the soils. Exposure to impacted soils on Site is reduced in the following descending order: Alternative 3A, Alternative 3D, Alternative 3C, Alternative 2C, Alternative 3B and Alternative 2B.

Containment RAOs

Soil Remedial Alternative 1 (No Action) does not address migration of contamination.

The retained Soil Remedial Alternative 2-Series alternatives meet the containment requirements through the construction of an engineered cap system to contain consolidated impacted material, along with the removal of impacted soil from the Site. Soil Remedial Alternatives 2B and 2C would also rely on existing concrete building slabs to prevent direct contact with impacted soils. The Soil Remedial Alternative 3-Series options do not include an on-Site containment component; however, Soil Remedial Alternatives 3B, 3C and 3D include the utilization of the concrete building slabs as an engineering control to prevent direct contact with the soils.

Soil Remedial Alternative 2C is more protective of human health and the environment than Soil Remedial Alternative 2B, because the arsenic cleanup levels/PRGs are lower resulting in additional off-Site disposal and consolidation.

Restoration RAOs

Soil Remedial Alternative 1 (No Action) does not actively contribute to restoration of impacted media; however, natural degradation of COCs would likely occur in the soil.

Chemical testing on imported backfill utilized for the project would be compared to applicable PRGs based on the selected Soil Remedial Alternative. Backfill material imported to the Site will be of equal or better chemical makeup than existing Site soils. Areas of the Site that will be limited to Non-Residential/Commercial use will include a restrictive covenant that limits the use of these areas to Non-Residential/Commercial activities. Soil Remedial Alternative 3A would require the most imported material, followed by Alternatives 2D and 3D, Alternatives 2C and 3C and Alternatives 2B and 3B, respectively.

5.3.2 Compliance with ARARs

Soil Remedial Alternative 1 (No Action) does not comply with ARARs identified in Table 2.1 or in Section 2.1.

The Soil Remedial Alternative 2 and 3-Series, with the exception of Soil Remedial Alternatives 2A and 2D, comply with ARARs identified in Table 2.1 and Section 2.1. As discussed in Sections 4.1.2.1 and 4.1.2.4, Soil Remedial Alternatives 2A and 2D cannot achieve the PRGs or ARARs. Alternative compliance with each ARAR is discussed in Sections 5.2.2 and 5.2.3. A comparison of Alternatives 2B, 2C, 3A, 3B, 3C, and 3D by ARAR follows:

Federal ARARs

TSCA, 40 CFR 761

Soil Remedial Alternatives 2B, 2C, 3A, 3B, 3C and 3D meet the TSCA, 40 CFR 761 ARAR. Licensed transporters will be contracted to transport the waste to an appropriately licensed disposal facility for all alternatives. Alternatives 2B, 2C, 3A, 3B and 3C will not require deed restrictions requiring maintenance of caps under TSCA since the PRGs are either 1 mg/kg or a risk-based value under 10 mg/kg. Alternative 3D would include deed restrictions and require maintenance of a cap in Commercial Areas 1, 2 and 4 where PCBs would remain in place between 1 and 10 mg/kg.

Clean Air Act, 40 CFR 50 and 52 and Clean Air Act, 42 U.S.C. 7401 et seq.:

All alternatives comply with the Clean Air Act ARAR. Each alternative that includes an excavation component would require air monitoring and fugitive dust control. Alternatives 2B and 2C include relocation of soils at the Site; additional handling of the impacted soil would result in extra efforts to control fugitive dust from the stockpiled material. Alternative 3A would also include asbestos fiber control requirements during the preparation for excavation within some of the buildings. None of the other alternatives include indoor excavation activities where asbestos emissions will need to be controlled and monitored.

U.S. DOT Placarding and Handling, 40 CFR 264.227 and 49 CFR 171:

Alternatives 2B, 2C, 3A, 3B, 3C and 3D include the removal of the same volume of soil impacted with PCBs above 20 mg/kg in Commercial Area 4. All alternatives comply with the U.S. DOT Placarding and Handling ARAR to the same degree. PCB impacted waste will be transported via licensed waste haulers to an appropriately licensed disposal facility.

National Historic Preservation Act, 16 U.S.C. 470, as amended:

Portions of the Main Mill building are registered on the National Register of Historic Places. Alternatives 2B, 2C, 3A, 3B, 3C and 3D consider this designation and comply with the ARAR by mitigating the potential for physical destruction, damage or alterations to the historic structures. Alternative 3A provides the most risk to damage to the building due to the excavation activities within the historic and non-historic sections of the building. Alternative 3A will alter the historic structure due to the removal of the concrete slab that will be required to excavate impacted soils beneath.

STATE ARARs

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20118(2) and 324.20120a, and MAC 299.5705:
All of the remedial actions specified for Alternatives 2B, 2C, 3A, 3B, 3C, and 3D meet this ARAR. The varying PRGs established by each alternative result in differing cleanup criteria being met by the remedial action in each alternative. Soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology. Table 4.1 provides summary information for each alternative and includes the PRGs utilized to calculate the estimated excavation volumes.

Risk-based criteria were calculated for arsenic and PCBs at the Site consistent with the requirements of Part 201. The risk-based criteria were utilized for Alternatives 2B, 2C, 3B, and 3C as shown in Table 4.1. The remedial action/excavation for Alternative 3A was based on Part 201 Residential Cleanup Criteria and TSCA Unrestricted High Occupancy Criteria. The remedial action/excavation for Alternative 3D utilized Part 201, a 10^{-6} risk level for arsenic and TSCA High Occupancy Criteria (with restrictions where PCBs would remain between 1 mg/kg and 10 mg/kg).

An iterative approach for arsenic remediation was utilized for Alternatives 2B, 2C, 3B, 3C, and 3D. The iterative approach is detailed in Appendix A. Using the iterative approach for arsenic, various locations within each redevelopment area were targeted for excavation to achieve the risk-based arsenic concentration for the area. Arsenic identified in soils under the existing concrete slabs (that are not targeted for demolition/removal) will be left in place and the concrete slabs will serve as an engineering barrier. Institutional controls/deed restrictions will be established to require the concrete slabs be left in place, maintained or any soils removed from under the slabs be properly characterized, handled by trained personnel and disposed of off Site in appropriately licensed disposal facility.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120a, and MAC 299.5705:
The Site and therefore all alternatives will utilize the existing Multi Area Quality Assurance Project Plan, which evaluates the target detection limits (TDLs) relative to current Part 201 Cleanup Criteria; and evaluation of the TDLs in comparison to the selected PRGs during the PDI.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.2017a, and MCL 324.20114:
Soil Remedial Alternatives 2B, 2C, 3A, 3B, 3C, and 3D meet this ARAR by providing the Site owner(s) with documentation regarding the current Site conditions relative to COCs exceeding

PRGs, which will be outlined during the PDI. Upon completion of the remedial actions under Alternative 3A, soils above the PRGs would not remain on Site. Soils above the specific PRGs for arsenic would remain on Site under the existing concrete slabs for Alternatives 2B, 2C, 3B, 3C, and 3D. PCBs between 1 mg/kg and 10 mg/kg requiring engineering controls and institutional controls would remain in place for Alternative 3D.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120(c):

This ARAR is relevant to Soil Remedial Alternatives 2B and 2C. The requirements for relocation of excavated soil set forth in this section, including, but not limited to notification to the MDEQ, preparation of a Soil Relocation Plan, and implementation of institutional and engineering controls are only relevant to Alternatives 2B and 2C.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20116. 324.20120a(16), and 324.20120b, and MAC 299.5524:

Alternatives 2B, 2C, 3B, 3C and 3D require institutional controls including land use designations as presented in Table 3.3 and documentation of the arsenic-impacted soil locations under the existing and remaining concrete slabs. Alternative 3D will include institutional controls for the remaining arsenic-impacted soils along with the location and maintenance of the cap(s) over the PCB contaminated soils left in place between 1 mg/kg and 10 mg/kg in the Commercial Areas. Deed restrictions on the property, as applicable to the selected alternative, will be transferred to any subsequent property owner(s) for all applicable alternatives.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20118, et al. and MAC 299.5532(11):

Any of the alternatives except for Alternative 1, would include remedial design documents including plans identifying points of compliance to evaluate the effectiveness of the remedial action.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MCL 324.20120c:

Alternatives 2B, 2C, 3A, 3B, 3C, and 3D include off-Site disposal of impacted soils above the PRGs and limited debris (i.e., concrete, pavement etc.). Compliance with the ARAR would include characterization of the waste to determine the applicability of Part 111. Alternatives 2B and 2C include an on-Site consolidation component that would require the approval of a Soil Relocation Plan which would also comply with this ARAR.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MAC 299.5520 and 299.51003-51005:
This ARAR is applicable to Alternatives 2B, 2C, 3A, 3B, 3C, and 3D, upon completion of the remedial activities written documentation will be provided to the agency.

Michigan Act 451, Part 201 Environmental Remediation and Rules Promulgated Thereunder, MAC 299.5522 and 299.51017:
Alternatives 2B, 2C, 3A, 3B, 3C, and 3D would comply with this ARAR. If it is determined that hazardous substances emanate beyond the property boundary then a Notice of Migration would be generated and submitted to the MDEQ and adjacent property owner.

Michigan Act 451, Part 111 Hazardous Waste Management and Rules Promulgated Thereunder, MCL 324.11101-11153 and MAC 299.9101-11107:
Alternatives 2B, 2C, 3A, 3B, 3C and 3D would comply with this ARAR by characterizing the waste and the use of licensed, properly placarded transportation vehicles for waste meeting the hazardous waste definition. Furthermore, properly licensed waste disposal facilities would be utilized for the disposal of the remedial waste generated during these alternatives.

Michigan Act 451, Part 31 Water Resources Protection and Rules Promulgated Thereunder, MCL 324.3109b:
Soil Remedial Alternatives 2B, 2C, 3A, 3B, 3C, and 3D include the following to meet this ARAR: the proposal of PRGs, which meet or exceed the Part 201 Residential and Non Residential Cleanup Criteria; and soil verification sampling will be conducted in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the PRGs. For Alternatives 2B, 2C, 3B, 3C, and 3D, where the iterative approach will be implemented, soil verification samples will be collected in accordance with applicable regulations and guidance documents regarding sampling methodology, as required, to meet the specified PRGs.

Michigan Act 451, Part 91 Soil Erosion and Sedimentation Control, MCL 324.9112 and 324.9116, and MAC 323.1701-1714:
The remedial design for Alternatives 2B, 2C, 3A, 3B, 3C, and 3D will include implementation and maintenance of soil erosion and sedimentation control measures that meet the substantive requirements of a Soil Erosion and Sedimentation Control permit.

Michigan Act 451, Part 55 Air Pollution Control and Rules Promulgated Thereunder, MAC 336.1101-2706:
Each alternative that includes an excavation component would require air monitoring and fugitive dust control. Alternatives 2B and 2C include relocation of soils at the Site; additional

handling of the impacted soil would result in extra efforts to control fugitive dust from the stockpiled material. Alternative 3A would also include asbestos fiber control requirements during the preparation for excavation within some of the buildings. None of the other alternatives include indoor excavation activities where asbestos emissions will need to be controlled and monitored.

Michigan Act 451, Part 55 Air Pollution Control and Rules Promulgated Thereunder, MAC 336.1101-2706:
Alternatives 2B, 2C, 3A, 3B, 3C, and 3D all require the use of local road to import and export heavy equipment, import backfill and transport the waste off Site therefore compliance with this ARAR will be met by sequencing the project such that local weight limits are not exceeded during restricted timeframes (e.g. frost laws).

Michigan Act 306 of 1969, as amended Well Construction Code, MCL 24.233, 24.263, and 333.12714:
The Site includes several historic water supply wells (production wells) utilized by the Mill. If any of the wells need to be abandoned as part of the remediation efforts, the wells will be reinstalled (per the City) in a manner consistent with this regulation/ARAR.

Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL 324.11501-11504, 324.11507, and 324.1150, and MAC 299.4101-4106a and 299.4301(3) (d):
Although the soils relocated for Alternatives 2B and 2C are not defined as solid waste, these two alternatives will comply with this ARAR. Alternatives 3A, 3B, 3C, and 3D do not include on-Site consolidation of impacted soils and; therefore, this ARAR does not apply.

Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL MAC 299.4305, 299.4307 and 299.4308:
Although the soils relocated for Alternatives 2B and 2C are not defined as solid waste, the design of the cap over the consolidated soils and location of the consolidated soils will consider guidelines in this ARAR. Alternatives 3A, 3B, 3C, and 3D do not include on-Site consolidation of impacted soils and; therefore, this ARAR does not apply.

Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL MAC 299.4306:
Although the soils relocated for Alternatives 2B and 2C are not defined as solid waste, the design of the cap over the consolidated soils will consider guidelines in this ARAR. The cap design will ensure that all requirements for the protection of surface and groundwater under Part 31 (and rules) are met. A design that keeps the final cover from being inundated is capable of limiting erosion and infiltration to the extent necessary to protect human health and the

environment. Alternatives 3A, 3B, 3C, and 3D do not include on site consolidation of impacted soils and; therefore, this ARAR does not apply to those alternatives.

Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL MAC 299.4912:
The proposed consolidation area for Alternatives 2B and 2C is subgrade; however, it does not extend to or below the water table. Alternatives 2B and 2C will comply with this ARAR. This ARAR does not apply to Alternatives 3A, 3B, 3C, or 3D.

Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL MAC 299.4915:
The materials selected for the cap over the consolidated materials comply with this regulation. Alternatives 2B and 2C include the cap over the consolidated material (although not defined as a solid waste) and; therefore, this ARAR applies to these alternatives. This ARAR does not apply to Alternatives 3A, 3B, 3C, or 3D.

Michigan Act 451, Part 115 Solid Waste Management and Rules Promulgated Thereunder, MCL MAC 299.4916-4921:
Alternatives 2B and 2C include the cap over the consolidated material (although not defined as a solid waste) quality control documentation would be maintained during construction of either alternative to comply with the regulation/ARAR. This ARAR does not apply to Alternatives 3A, 3B, 3C, and 3D.

LOCAL ARARs

Public Safety – Excavations, Chapter 9-3 – Plainwell Code of City Ordinances:
Implementation of the excavation activities for Alternatives 2B, 2C, 3A, 3B, 3C, or 3D would include the proper safety controls to protect the public and enforcement of OSHA laws and regulations.

Soil Erosion and Sedimentation Control, Allegan County Ordinance No. 1013.1:
Alternatives that include an excavation/earth change component (Alternatives 2B, 2C, 3A, 3B, 3C, and 3D) will include the use and maintenance of best management practices to control erosion and sedimentation; substantive requirements of the County permit will be satisfied.

As shown above, Alternatives 2B and 2C comply with additional ARARS that are not relevant to Alternatives 3A, 3B, 3C and 3D due to the relocation and consolidation of impacted soils on Site component. Alternatives 2B, 2C, 3A, 3B, 3C, and 3D comply with all relevant ARARS listed in Table 2.1.

5.3.3 Long-Term Effectiveness and Permanence

Soil Remedial Alternative 1 (No Action) has the lowest degree of long-term effectiveness and permanence as no additional remedial action is taken.

The long-term effectiveness and permanence of the Soil Remedial Alternative 2-Series options is dependent on the effective design, operation, maintenance, and monitoring of the containment system and compliance with the institutional controls. The magnitude of residual risk associated with the consolidated and capped materials to be contained on Site is only applicable to the retained Soil Remedial Alternatives 2B and 2C. Consolidation and capping are considered reliable technologies and offer long-term effectiveness at reducing the risk to human health and the environment at the Site.

The amount of soil relocated, consolidated and capped on site varies between these Soil Remedial Alternatives 2B and 2C. Soil Remedial Alternative 2B assumed 3,225 cubic yards of soil were would be capped on Site and under Alternative 2C, 5,050 cubic yards of soil were assumed. The residual risk would be slightly greater for Alternative 2C, since more impacted soil would remain on Site. Monitoring efforts would not vary between the two options since the volume of soil is not significantly different and the consolidation area/capped area would be in the same location. Both Soil Remedial Alternatives 2B and 2C include the off-Site disposal of soil and debris that do not meet eligibility requirements for on-Site consolidation. A larger volume of soil would be transported and disposed of off Site for Soil Remedial Alternative 2C than 2B.

Alternative 2B reduces the risk posed by the impacted soils on Site to meet the MDEQ requirements for all constituents except for PCBs for the soil pathways, which reduces the risk posed by impacted soils on Site to a 1×10^{-5} cancer risk level. Alternative 2C reduces the risk posed by impacted soils to meet the Part 201 requirements for all constituents except for PCBs and arsenic for the soil pathways, which reduces the risk posed by impacted soils on Site to a 1×10^{-5} cancer risk level.

The Soil Remedial Alternative 3-Series options produce a greater long-term effectiveness and permanence than the Soil Remedial Alternative 2-Series. The greater long-term effectiveness and permanence is gained by excavation and disposal (at a licensed disposal facility) of all the targeted soils above the PRGs. Soil Remedial Alternative 3A achieves the greatest long-term effectiveness. Soil Remedial Alternatives 3B, 3C, and 3D all include reliance on engineering controls and intuitional controls for their long-term effectiveness. Redevelopment of the Site could modify the effectiveness of the engineering controls (concrete slabs), although the

majority of the impacted soils left in place under these alternatives are under historical buildings not slated for demolition.

Comparing Soil Remedial Alternative 2B to 3B, the impacted soil consolidated for Soil Remedial Alternative 2B would not reduce the volume of impacted material on the Site as a whole as much as Soil Remedial Alternative 3B; however, all of the redevelopment areas except for Commercial Area 4 would be remediated to the same extent for both alternatives as presented in Figures 3.12 – 3.22. The difference would be the consolidation of the soils included in Soil Remedial Alternative 2B. Utilization of the consolidation area within Commercial Area 4, presented on Figure 4.1, would produce a net increase in impacted soil; however, exposure to the soil would be prevented by the proposed cap system. A comparison of Soil Remedial Alternatives 2C and 3C produce the same general differences as Soil Remedial Alternative 2B and 3B, with Soil Remedial Alternative 3C providing greater long term effectiveness and permanence than Soil Remedial Alternative 2C.

The long-term effectiveness of the containment and or engineering components of the various alternatives is easily monitored. Evaluations of remedy performance should be included in periodic reports, the frequency and content of which will be established during remedial design. As impacted material will remain on Site (except for Alternative 3A), the alternatives will require 5-year reviews to determine if the selected alternative is functioning as intended and continues to provide adequate protection.

The alternatives are most effective and offer the greatest permanence based on soil volume excavated, PRGs and remaining soils above the PRGs (arsenic) in descending order as follows: Soil Remedial Alternatives 3A, 3D, 3C, 2C, 3B, and 2B.

5.3.4 Reduction of Toxicity, Mobility or Volume Through Treatment

None of the alternatives would reduce the TMV of contaminated media through treatment. The overall reduction in TMV will be accomplished through the removal and off-Site disposal and/or consolidation/capping of materials on Site above the PRGs.

Impacted materials present on Site are considered low-level threat waste for which removal/off-Site disposal and/or consolidation/capping on Site are appropriate and treatment impracticable.

5.3.5 Short-Term Effectiveness

Soil Remedial Alternative 1 (No Action) poses no additional short-term risks to the community, workers, or the environment; however, this is not an effective option.

All of the other alternatives pose some risks to the community associated with the construction (e.g., dust, noise, transportation, emissions associated with excavation of waste). These risks can be readily mitigated through dust control, restricted work hours, engineering controls, compliance with U.S. DOT regulations, and air monitoring. Risks to workers and the community can also be reduced by adherence to the "Superfund Green Remediation Strategy" (U.S. EPA, 2010) and "Green Remediation: Best Management Practices for Excavation and Surface Restoration" (U.S. EPA, 2008).

All of the other alternatives pose risks to workers associated with construction (e.g., exposure to contaminated media, occupational hazards) that can be reduced through a health and safety plan and personal protective equipment (including decontamination stations). A worker health and safety plan and personal protective equipment would be utilized as construction workers would be exposed to contaminated media during consolidation, capping, and excavation. It is anticipated that these activities would occur during an overall construction period of less than one year for any of the Soil Remedial Alternative 2 and 3-Series alternatives.

The environmental impacts to the Site in the short-term will include exposure of additional impacted soils once the limited vegetation has been removed from portions of the Site. Best management practices will be implemented including, but not limited to silt fence, turbidity curtain and dust control (potable water). It is assumed that the majority of the soils targeted for off-site disposal will be direct loaded into trucks and will not be staged onsite. Excavation along the Mill Race will require the temporary divergence of part of the Mill Race (the methodology will be determined during the PDI). Turbidity of the Mill Race will be monitored during excavation activities adjacent to the River and/or Mill Race. Preparation of the consolidation area will require the excavation of the previously imported gravel material and temporary placement of this material on the Mill property. The temporarily staged gravel will be placed on either pavement or visqueen and surrounded with silt fence, hay bales or other erosion/sedimentation control methods to prevent sediment run off from entering the City stormwater system.

Soil Remedial Alternative 3B would produce the shortest period of risk to workers and the community. The estimated period to complete construction/remediation efforts for Soil Remedial Alternative 3B would be approximately 13 weeks/3.5 to 4 months. Soil Remedial Alternative 2B could also be completed in this same time period although there would be additional excavation efforts to prepare the consolidation area and double handling of the soils slated for consolidation. Conversely additional trucking/off site transportation of the impacted soils off site to the appropriate disposal facility would be necessary to complete Soil Remedial Alternative 3B. Similarly Soil Remedial Alternatives 2C and 3C would could be completed in the generally the same amount of time (18 weeks/5 months) but Soil Remedial Alternative 2C

would result in more exposure to the on Site workers and Soil Remedial Alternative 3C would require more off site trucking. Construction efforts to complete remedial activities for Soil Remedial Alternative 3D are anticipated to require approximately 28 weeks/8 months. Remedial efforts to conduct the tasks including for Soil Remedial Alternative 3A have been estimated to require approximately 48 to 50 weeks/11 months on Site.

5.3.6 Implementability

The remedial components of all of the retained Soil Remedial Alternatives, except for Alternative 1 – No Action, could be readily implemented and reliably designed and constructed.

Soil relocation/consolidation and capping are commonly practiced technologies. Manufactured materials needed for construction of the components of this alternative are readily available. The proposed liner material is typical for this application. Contractors with experience completing the components included in Soil Remedial Alternative 2-Series options are available in the general area. Soil Remedial Alternatives 2B and 2C would be of equal complexity to construct. The remedial alternatives will not include any components that would require operational activities. Periodic monitoring of the consolidation area would be conducted and would require the same effort for either Soil Remedial Alternative 2B or 2C.

The remedial components of Soil Remedial Alternative 3-Series could be readily implemented and reliably designed and constructed. Soil excavation and off-site disposal are commonly practiced technologies. Contractors with experience completing the components included in Alternative 3-series options are available in the general area. Soil Remedial Alternative 3A would be the most complex option due to the many excavation areas located with existing occupied and unoccupied buildings. Soil Remedial Alternative 3D would be less complicated than Soil Remedial Alternative 3A because there wouldn't be any excavation under existing buildings; however, due to the low arsenic PRG, many of the excavations extend below 10 feet below grade and will require fair shoring efforts. Soil Remedial Alternative 3B and 3C would generally be equal to each other in regards excavation and complexity, and would be the least complex of the Soil Remedial Alternative 3-Series.

<u>Necessary Specialists, Equipment and Materials</u>

A structural engineering specialist will be contracted during the PDI stage of the remedial action to evaluate the need for shoring prior to excavation activities (primarily required for Soil Remedial Alternative 3A). Structural engineers are locally available to conduct the necessary evaluations. The installation of shoring to maintain building foundation and or the pedestrian bridge footer integrity may be required again primarily for Soil Remedial Alternative 3A. Sheet

pile shoring technology would most likely be utilized. Sheet piling contractors are located within 1 to 3 hours of the Site.

Limited asbestos abatement would be conducted on an as needed basis on the exterior of Building 5A and 5 for all alternatives. Soil Remedial Alternative 3A would require additional asbestos abatement inside the buildings primarily in Buildings 5 and 6 (boilers). Abatement workers would be required to hold current contractor worker licenses for asbestos. Contract workers are readily available in the area to complete the asbestos abatement work.

All of the Soil Remedial Alternatives, with the exception of No Action, will include excavation activities along the Mill Race, in Commercial Area 4. Prior to initiating the excavation activities, engineering controls will be temporarily installed to divert the Mill Race water away from the excavation area. The equipment necessary for this work will be determined during the PDI stage of the remedial action. An engineer experienced in remedial actions along rivers will design the system to temporarily divert the water within the Mill Race. It is anticipated that the equipment required to complete this portion of the remedial action will be available for rent from either the Chicago area or the Detroit area, which are both in reasonable proximity to the Site. The contractor conducting this portion of the work will demonstrate experience working adjacent to a river. Local contractors have conducted this type of work.

The local availability of soil backfill material that will pass the chemical testing is limited. Local gravel pits (half hour radius of the Site) have historically failed chemical testing requirements for State Default Criteria or Residential Direct Contact for arsenic.

No other special techniques, materials, or labor are required to complete the excavation and backfilling. Because the majority of the constructed components of the alternatives are common to many remediation projects, major technical difficulties and unknowns are not expected. Technical problems associated with implementation of the shoring could lead to significant schedule delays.

Reliability of the Technology

Each remedial alternative will include a component of off-Site soil disposal. Off-Site disposal at a licensed facility is considered reliable to reduce the amount of impacted soils on the Site. Soil relocation and capping of the Soil Remedial Alternative 2-Series remedial action options is also considered reliable in reducing the exposure to soils impacted above the PRGs particularly when applied in conjunction with deed restrictions prohibiting the removal of the cap. Leaving the concrete building slabs in place will also restrict the direct contact, and reduce the potential for the metals to leach to groundwater. Leaving the concrete slabs in place along with an IC

prohibiting the removal of the slabs will be a reliable solution to impacted soils below the concrete slabs. Removal and off Site disposal of the impacted soils above the PRGs is more reliable then consolidation and capping the soils on Site.

Ability to Monitor Effectiveness of Remedy

The effectiveness of the components associated with any of the alternatives is easily monitored. Verification soil samples will be collected prior to backfilling activities to document that the remaining soils meet the PRG objectives.

Soil Remedial Alternatives 2B, 2C, 3B, 3C, and 3D all include leaving the concrete building slabs in place. As redevelopment progresses at the Site, the ICs in place will ensure that the concrete slabs are left in place for any future demolition projects. For Soil Remedial Alternative 2B and 2C, the area selected for the consolidation of soils on Site can easily be monitored for subsidence, erosion or eventually pavement deterioration.

Manufactured materials needed for construction of the components of Soil Remedial Alternatives 2B and 2C are readily available. The availability of soil materials for capping will depend on development activity in the area at the time of cap construction.

Ability to Obtain Approvals from Other Agencies and Coordination with Other Agencies

All of the Soil Remedial Alternatives require access to the Site to complete remedial components. An access agreement with the City of Plainwell is already in place for the Site.

Soil Remedial Alternatives 2B and 2C would require the City of Plainwell to agree to the soil relocation plan; it is likely that the City of Plainwell would agree to the consolidation option as well as the proposed location. Furthermore, Soil Remedial Alternatives 2B and 2C would include a Soil Relocation Plan. A Soil Relocation Plan would require U.S. EPA and MDEQ approval prior to initiating the remedial action. If either Soil Remedial Alternative 2B or 2C is selected, it is assumed that this approval would be easily obtainable.

The remedial project (any Soil Remedial Alternative) would include compliance with the requirements of a Soil Erosion and Sedimentation Control Permit. Asbestos abatement may require a notification to the State of Michigan (MDEQ Air Quality Division - NESHAP and Michigan Department of LARA) 10 days prior to the abatement work. Sending in the notice within the required time follows the guidance documents and does not require any formal approval.

Availability of Off-Site Disposal Services and Capacity

Off-Site disposal of impacted materials would require waste characterization sampling and landfill approval. Soils impacted with VOCs, SVOCs, metals, and non-TSCA PCBs are anticipated to be transported to either the Waste Management Autumn Hills Recycling and Disposal Facility in Zeeland, Michigan or the Ottawa County Farms Landfill in Coopersville, Michigan. Both facilities accept the type of waste that would be generated during the remedial action at the Site, are operating under current licenses and have capacity to accept the waste.

TSCA regulated soils and/or any debris determined to fall within this regulation would be transported to the Environmental Quality Company (EQ)/U.S. Ecology Company Wayne Disposal, Inc. Site #2 Landfill in Belleville, Michigan.

Ease of Undertaking Additional Remedial Actions, if Necessary

It is not anticipated that additional remedial actions will be necessary after the completion of the scope of work previously discussed. Verification sampling will be conducted to ensure that soils remaining on Site meet the PRGs for each redevelopment area. If however, additional excavation is required it would be completed assuming off-Site disposal of all materials, unless another section of the Site is selected for non-residential land use at which time, an additional location for consolidation of impacted soils could be considered.

5.3.7 Cost

The estimated capital and NPV OM&M costs for the remedial alternatives are presented in Table 5.1.

The Cost Summary Tables in Appendix C provide details on capital and NPV OM&M costs relative to each cleanup scenario and proposed cleanup level utilizing the different PRGs.

Comparing the overall cost (pre-design investigation, construction, engineering and operations, monitoring and maintenance), Soil Remedial Alternative 3A presents the highest cost at an estimated $9,424,482. The remaining Soil Remedial Alternatives, in order from highest to lowest total estimated cost are as follows: Alternative 3D ($7,477,202), Alternative 2C ($4,998,195), Alternative 3C ($4,875,232), Alternative 2B ($4,462,820) and Alternative 3B ($4,363,857), and Alternative 1 ($0), respectively.

The PDI costs decrease in cost in the following order: Alternative 3A ($478,100), Alternative 3D ($336,500), Alternatives 2C and 3C ($295,700), Alternatives 2B and 3B ($272,000) and

Alternative 1 ($0), respectively. The cost differences between the alternatives for the PDI are produced by the efforts required to delineate down to the varying PRGs. Soil Remedial Alternative 3A has the lowest site-wide PRG for PCBs. Soil Remedial Alternative 3D includes the low PRG for PCBs of 1 mg/kg for the residential properties. It was assumed that sampling efforts to delineate PCBs below 1 mg/kg would require significant effort. Furthermore, Soil Remedial Alternative 3D has the lowest site-wide PRG for arsenic of 5.8 mg/kg. Significant effort was assumed to delineate arsenic to below this PRG for Soil Remedial Alternative 3D. Another contributing factor to the expense of the PDI for Soil Remedial Alternative 3A was sampling conducted under the existing buildings. Sampling efforts under the concrete slabs of the buildings was only including in Soil Remedial Alternative 3A (except for SPI-1 in Building 1A for Soil Remedial Alternative 3D). Sampling activities within the Mill Buildings would require temporary lighting, carbon monoxide control measures and concrete coring. It was assumed that the PDI process for Soil Remedial Alternative 3A would take twice as long as Soil Remedial Alternative 3D. PDI efforts for Soil Remedial Alternatives 2C and 3C were greater than Soil Remedial Alternatives 2B and 3B due to the lower PRG for arsenic utilized for Soil Remedial Alternatives 2C and 3C.

Construction costs for each Soil Remedial Alternative in descending order as follows: Alternative 3A ($5,968,795), Alternative 3D ($4,653,900), Alternative 2C ($3,067,395), 3C ($3,057,295), Alternative 3B ($2,729,995), Alternative 2C ($2,724,695) and Alternative 1 ($0), respectively. The primary difference in the costs between the alternatives is the amount of effort required to excavate the soil above the PRGs and the transportation and disposal of the waste off-Site. Excavation efforts decrease in cost from Alternative 3A ($981,200), Alternative 3D ($468,700), Alternatives 2C and 3C ($293,100), Alternatives 2B and 3B ($279,900) to Alternative 1 ($0). The effort to remove the impacted soils beneath the building slabs as included in Soil Remedial Alternative 3A significantly increases the excavation costs. Transportation and disposal costs vary from Alternative 3A ($2,895,765), Alternative 3D ($2,636,682), Alternative 3C ($1,851,070), Alternative 2C ($1,696,670), Alternative 3B ($1,658,970), Alternative 2B ($1,543,370) to Alternative 1 ($0) as detailed on Table 5.1. The difference in transportation and disposal costs between Alternatives 2B and 3B, and 2C and 3C is the amount of soil included for on-Site consolidation in the Soil Remedial Alternative 2-Series, which is very low in comparison to overall volume of soil targeted for excavation.

The cost estimates assume that institutional control implementation costs would be the same for all alternatives. Engineering costs were based on 10 percent of the construction costs for each alternative and; therefore, vary with Soil Remedial Alternatives 3A and 3D requiring the most engineering efforts to complete. Construction oversight was based on 15 percent of the construction costs. Construction oversight for the longer duration (eight to 11 months) alternatives (Soil Remedial Alternatives 3A and 3D) were significantly higher than those

alternatives (Soil Remedial Alternatives 2B/3B and 2C/3C) with the shorter duration (four to five months). The estimated cost for construction oversight decreases as follows: Alternative 3A ($596,900), Alternative 3D ($465,400), Alternative 2C ($306,700), Alternative 3C ($305,700), Alternative 3B ($273,000), Alternative 2B ($272,500), and Alternative 1 ($0), respectively.

Operations, maintenance and monitoring costs were estimated assuming limited monitoring of on-Site engineering controls such as concrete slabs, pavement or soil cover. Soil Remedial Alternative 3A assumes the cleanup effort has achieved the PRGs for the Site without requiring physical controls that would require monitoring. OM&M would be limited to that associated with deed restrictions for groundwater. Soil Remedial Alternatives 3B and 3C assumes the cleanup effort has achieved the PRGs for the Site without requiring physical controls that would require monitoring beyond the concrete slabs of the existing buildings. Limited OM&M will be conducted for the Site for Soil Remedial Alternatives 3B and 3C. Soil Remedial Alternatives 2B and 2C include the same reliance on the concrete building slabs as Alternatives 3B and 3C and also include the liner over the consolidated soils in Commercial Area 4 as an additional engineering control. OM&M would require monitoring of the consolidation area and the concrete building slabs for Alternatives 2B and 2C which yields the greatest OM&M costs out of the seven alternatives.

5.4 Summary

A summary of the comparative analysis of alternatives is presented in Table 5.3.

Based on the detailed and comparative analysis of the remedial alternatives, Soil Remedial Alternative 3B meets the remediation goals based on comparison criteria evaluated and is the most cost effective remedial alternative.

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