

# REMEDIAL ACTION WORK PLAN

## MINERAL BUILDING TORCH LAKE AREA OF CONCERN HOUGHTON COUNTY, MICHIGAN

*Prepared for:*

U.S. Environmental Protection Agency's Great Lakes National Program  
Office and Honeywell International Inc.



*Prepared by:*



Wood Environment & Infrastructure Solutions, Inc.  
Novi, Michigan

September 2019

Project 3293191842

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## LIST OF ACRONYMS

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$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
ACM	Asbestos Containing Materials
AOC	Administrative Settlement Agreement and Order on Consent
C&H	Calumet and Hecla
cyd	cubic yards
f/cc	fiber per cubic centimeter
FSP	Field Sampling Plan
HASP	Health and Safety Plan
Honeywell	Honeywell International, Inc.
JHA	Job Hazard Analysis
MTU	Michigan Technological University
NIOSH	National Institute for Occupational Safety and Health
PAMP	Perimeter Air Monitoring Plan
PCI	Peninsula Coppers Industries
PM10	Particulate Matter 10
PPE	Personal Protective Equipment
QAPP	Quality Assurance Plan
RAWP	Remedial Action Work Plan
SESC	Soil Erosion and Sedimentation Control Plan
SHSO	Site Health and Safety Officer
Silver Shore site	Silver Shore Enterprise, Inc. Mineral Building Site
TCLP	Toxicity Characteristic Leaching Procedure
TEM	Transmission Electron Microscopy
UOP	Universal Oil Products
USEPA	United States Environmental Protection Agency
Wood	Wood Environment & Infrastructure Solutions

## **1.0 INTRODUCTION**

This Remedial Action Work Plan (RAWP) was prepared by Wood Environment and Infrastructure Solutions, Inc. (Wood) on behalf of Honeywell International Inc. and the United States Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO) to outline activities that will be performed during removal of contaminant source material located on the Mineral Building (site) of Torch Lake Area of Concern (AOC), Houghton County, Michigan, as shown on Figure 1.

The objective of this scope of work is to prevent further or renewed contamination of sediment in Torch Lake.

This Work Plan is organized as follows:

- Section 1.0 describes the project overview and Work Plan objectives.
- Section 2.0 presents a summary description and history of the site and remedial investigation activities performed to date.
- Section 3.0 describes the preparation and/or updates to site plans.
- Section 4.0 describes the proposed activities to manage and remove the contaminant source material.
- Section 5.0 presents the routes of entry and access points planned at the site.
- Section 6.0 presents project organization responsibilities, reporting relationships and duties of the project team.
- Section 7.0 presents the proposed project schedule.
- Section 8.0 outlines additional reports.
- Section 9.0 outlines the references used during the preparation of this work plan.

## **2.0 BACKGROUND**

### **2.1 Site Description**

The Torch Lake Area of Concern (AOC) is located in the Keweenaw Peninsula in Houghton County, in Upper Peninsula Michigan. The Mineral Building occupies approximately 9.3 acres and lies on the western shoreline of Torch Lake. Numerous debris and waste piles (Figure 2) have come to be located on the property, primarily between 1986 and 2010 (Tetra Tech, 2018).

### **2.2 Site History**

The region, known as Copper Country, is associated with mining native copper ore and related industrial processing performed from the 1840s to the late 1960s. The processing operations left waste material known as stamp sands surrounding much of the Torch Lake AOC and within the lakebed of Torch Lake. In addition to native ore, scrap materials, wire and previously processed stamp sand material were processed or re-processed in the 1900s for copper.

The Mineral Building was part of the C&H smelter facility and served as a storage location for furnace feed material. The feed material originally consisted of mined copper. From about 1943, the Mineral Building also received copper reclaimed from scrap materials. Historical records show that during World War II and the Korean War, under contract with the U.S. Government to perform war-related operations, C&H processed scrap materials that were treated at the reclamation facility and/or “smelting works” (Tidwell, 1948). Processed scrap material included insulated cables, scrap ammunition, automobiles, refrigerators, vacuum cleaner motors, radiators, transformers, and generators. The scrap material was transported by ship and rail to the smelter and unloaded at the coal dock. It was then sorted into different lots and either ignited to burn off waste plastics and oils, leached in vats of ammonia at the leaching plant in Lake Linden, or sent directly to the Mineral Building prior to the smelter’s furnaces.

The Mineral Building was also used for storage of by-product, e.g. copper oxide from ammonia leaching, copper oxychloride sulphate, fly ash, etc. The Mineral Building was in operation until 1968 when the smelting operations ceased, shortly after C&H and Universal Oil Products (UOP) merged. The smelter was demolished in the late 1970s. In 1982, UOP donated 75 acres (including the site) to Michigan Technological University (MTU). Piles of soil/debris were placed on the site after the property was donated to MTU.

It appears that soil/debris piles originated from various sources as noted below:

- Mining era waste
- Demolition debris, and waste associated with road work (gravel, asphalt, and concrete).
- The demolition of the stacks associated with the former smelter.
- Peninsula Copper Industries (PCI) leased the property next door beginning in 1982 for recovery of copper from circuit boards to make copper sulfate as a fungicide for the wood preservative industry and to make other specialty copper compounds. As noted in the report, An Integrated Assessment of Torch Lake Area of Concern, “during its initial years, PCI produced fiberglass waste piles on adjacent property from electric circuit boards utilized to recover copper,” (Urban et al., 2018).

## **2.3 Remedial Investigation Results**

A total of 35 waste piles and stack debris are located on the site. Remedial investigation completed to date at the site estimated a total volume of 8,307 cubic yards [cyd] of stockpiled waste material (Tetra Tech, Inc., 2018).

Based on sample characterization results, the waste piles were classified as follows:

- 1,957 cyd of non-regulated material, i.e., woody debris, concrete, asphalt, clay pipe, and scrap metal, as illustrated on Figure 3
- 2,293 cyd of characteristically non-hazardous waste as illustrated on Figure 4
- 4,057 cyd characteristically hazardous waste as illustrated in Figure 5

Asbestos containing material (ACM) was also identified within some of the waste piles, as illustrated on Figure 6.

### **3.0 PLAN PREPARATION**

In addition to this RAWP, the following plans are being prepared to support the planned remedial activities:

- Site-specific Health and Safety Plan (HASP)
- Perimeter Air Monitoring Plan
- Soil Erosion and Sedimentation Control (SESC) Plan

#### **3.1 Site-Specific Health and Safety Plan**

The HASP has been prepared for the planned site activities according to Occupational Safety and Health Administration regulation under 29 CFR Part 1910.120 and consistent with the USEPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). The HASP outlines the health and safety protocols required during the performance of the various tasks on site to ensure the health and safety of workers and the public during performance of the work. HASP information includes: required personal protective equipment (PPE), worker personal air monitoring requirements, action levels, decontamination procedures, and Job Hazard Analyses (JHAs) for the various tasks planned at the site. The HASP will be modified as necessary during the duration of the project in the event that site conditions or activities change.

#### **3.2 Perimeter Air Monitoring Plan**

The Perimeter Air Monitoring Plan (PAMP) is included in Appendix I of the HASP and discussed in Section 4.7.3 of this RAWP. The perimeter air monitoring describes the sampling locations and methods and action levels to monitor airborne concentrations of lead, asbestos, and particulate matter.

#### **3.3 Soil Erosion and Sedimentation Control Plan**

The SESC plan will be completed by the subcontractor and will describe the methods and best management practices used to comply with the requirements of the SESC Permit.



## **4.0 PLANNED REMEDIAL ACTIVITIES**

This section describes the work planned for the removal and disposal of the waste piles at the site.

### **4.1 Mobilization and Site Preparation**

Mobilization to the site will include setup of temporary facilities and utilities including construction equipment, offices, traffic barriers, and temporary fencing. No modifications will be made to the site entrance. A self-contained decontamination pad will be constructed. Wood will coordinate with Michigan American Water Company to provide water from a metered hydrant in Laurium. Water will be labeled as “non-potable” for use on site. The waste piles will be surveyed and marked by Wood’s subcontractor with Wood supervision. The piles will be marked with their assigned categories (i.e. characteristic hazardous, characteristic non-hazardous, non-regulated, etc.).

Excavation work will be performed with wet methods to achieve no visible emissions. All decontamination water will be containerized and properly disposed of in accordance with local, state, and federal regulations.

### **4.2 Overall Waste Management**

The following procedures will apply to all waste piles, regardless of category. Waste piles will be surveyed and delineated and then marked with paint and wooden stakes based on their defined waste stream: green for non-regulated, yellow for non-hazardous, red for characteristically hazardous, and black for ACM. Each waste pile will be given a unique number. Daily tailgate meetings will be conducted to discuss work activities, including the specific waste piles being removed, segregated, or stabilized. Wood personnel will monitor the waste piles to confirm waste piles are managed appropriately for their waste stream. Wood personnel will track/document waste manifests using electronic forms.

Transportation to landfills will be completed in accordance with Department of Transportation regulations for the material transported. This would include lined (for friable asbestos material) and covered truck beds, weight restrictions, placards, etc. Figures 7 and 8 show the truck routes to K&W Landfill and US Ecology Landfill, respectively.

### **4.3 ACM Management and Removal**

The following work will be performed on waste piles that contain ACM and are also categorized as characteristic non-hazardous waste (Figure 6). Solid pieces of concrete/debris, larger than 2-feet by 2-feet, will be removed from the waste pile(s), decontaminated on the decontamination pad, and staged as non-regulated waste. Next, the ACM waste piles will be directly-loaded into lined trucks and transported to K&W Landfill in Ontonagon, Michigan. ACM removal will not be performed in waste piles that are categorized as hazardous waste.

#### **4.4 Characteristic Non-hazardous Waste Management and Removal**

Waste piles that have been categorized as characteristic non-hazardous waste (Figure 4) will be staged, loaded, and transported to K&W Landfill in Ontonagon, Michigan.

#### **4.5 Characteristic Hazardous Waste Management and Removal**

Soil stabilization will be performed on the characteristic hazardous waste piles (Figure 5). Waste piles will be segregated into smaller piles of approximately 400 cyd for soil blending. Enviroblend SP (or approved equal) will be mixed into the 400-cyd sections at an application rate of approximately 5 percent by weight. This mixing rate has been determined based on results of previously completed bench scale tests. A trackhoe, backhoe, or similar equipment (with a bucket) will be used to blend the amendment into the waste pile. Waste piles and amendment will be blended until homogenous or to the extent practicable.

Soil blending will be accomplished with wet methods to achieve no visible emissions. Soil blending will be conducted in compliance with 40 CFR Subpart M and P.A. 135 of 1986, as amended.

Once blending is complete, Wood personnel will collect and submit samples under chain of custody procedures for toxicity characteristic leaching procedure (TCLP) analysis performed by an accredited laboratory. If the results of TCLP analysis show that the blended soil meets the requirements for disposal as characteristic non-hazardous waste, the blended soil will be staged, loaded, and transported to K&W Landfill in Ontonagon, Michigan for disposal as non-hazardous waste. If the results of TCLP analysis show that the blended soil does not meet the requirements for disposal as characteristic non-hazardous waste, soil blending and TCLP analysis will be repeated.

If, after two attempts at stabilization, the blended soils fail to meet the TCLP requirements for non-hazardous disposal, a third stabilization may be attempted, at Honeywell's discretion. If a third stabilization is not attempted, or if the third stabilization also fails to achieve TCLP requirements for non-hazardous disposal, labeled pile(s) will be staged, loaded, and transported for disposal as characteristic hazardous waste at a qualified landfill.

#### **4.6 Non-regulated Waste Management and Removal**

Non-regulated (concrete, clay pipe asphalt, woody debris, etc.) waste piles (Figure 3) and the decontaminated large solid pieces of concrete removed from the ACM management waste piles, will be consolidated and placed along the retaining wall southwest of the Mineral Building. Then the site will be restored per Section 4.6 of the RAWP. The consolidation area is identified on Figure 3.

#### **4.7 Site Restoration**

Once the soil stabilization, removal, and onsite consolidation activities are completed, general site restoration will be performed over the entire property, excluding areas that are covered by above grade foundations and/or structures.

Site restoration will include:

- a) Removal of contractor lay-down, decontamination pad, and staging areas, removal of temporary facilities
- b) Rough and final grading contouring to meet existing grade.
- c) Installing a demarcation layer consisting of GEOTEX® 601 or DND, or approved equivalent to differentiate between the existing soil and the clean cover material
- d) A grading plan will be developed and submitted to USEPA for approval prior to placement of the cover. The grading plan will include the existing topography, final grade contours and the proposed aggregate. Imported fill will be placed over the demarcation layer and graded, and compacted to promote positive surface drainage. Upon completion of site grading, 6-inches of aggregate will be applied to graded site and existing driveways. The aggregate used will meet the same performance requirements as a vegetated cover including mitigation of contaminant runoff, mitigation of wind erosion of impacted media, promotion of positive drainage, and soil erosion and sedimentation control.
- e) Once site restoration is complete, a topographic survey of the finished grade will be completed.

## **4.8 Air Monitoring**

Total dust monitoring will be performed during work activities with the potential to generate fugitive dust. Personal air monitoring for worker exposure to potential asbestos will be performed during waste pile excavation, staging, and loading, and during site restoration. Air monitoring procedures are described further in the following sections.

### **4.8.1 Total Dust Monitoring**

Dust monitoring will be conducted using a respirable dust or aerosol meter and visual observations on a daily basis. Dust monitoring will be required for work that will likely cause a significant ground disturbance (i.e., earthwork, demolition, bulk soil handling, rotary drilling, etc.). Prior to starting each work task, workers will verify with the Site Health and Safety Officer (SHSO) if the task qualifies for dust monitoring.

The dust meter will be kept at or near the breathing zone and calibration checked at the beginning of each work day prior to the commencement of work. Maintenance and calibration of the sampling equipment will be done in accordance with manufactures specifications. Dust monitoring will be conducted continuously during initial work activity and if screening results allow, reduced to two observations per hour for each work task. For major earthwork, dust meter observations will be made continuously in the immediate work area (i.e., hot zone) and two observations per hour at each perimeter monitoring location during work activity.

All major earthwork and will be conducted using dust suppression methods (i.e., water). Dust monitor observations will be compared to Site-specific action levels ( $0.09 \text{ mg/m}^3$ ) based on the known concentrations of lead in near surface soils. If dust monitor observations exceed action levels, work will cease and dust suppression methods evaluated and upgraded before re-commencing activities. If dust suppression methods do not reduce dust monitor observations below action levels workers will need to upgrade to Level C Personal Protective Equipment (PPE) and begin personal air monitoring for lead. If dust meter levels are greater than or equal to  $0.9 \text{ mg/m}^3$  workers will need to upgrade to level B PPE.

#### **4.8.2 Personal Air Monitoring**

Personal air monitoring of employees will be performed during site activities to characterize potential worker exposure to asbestos and lead. Sampling will be representative of a full shift (at least 7 hours) and will include at least one sample for each job classification in each work area. Sampling and analysis will be done in accordance with NIOSH methodology, and is detailed in the HASPs written by Wood and the subcontractor. Wood will provide the results of the analyses for worker review within 5 working days of their receipt.

#### **4.8.3 Perimeter Air Monitoring**

Perimeter air monitoring will be performed during site activities to characterize potential emissions of asbestos, arsenic, and lead. Wood will collect six simultaneous air samples with dedicated portable air sampling pumps during periods of site activity (i.e., soil blending, soil removal, soil staging, soil loading). The air samples will be collected at six stationary locations along the site perimeter. Four sampling locations will be positioned in a 180 degree arc in the down wind direction from the site activities and one upwind, as outlined in USEPA SOP #2015 Rev. #0.0 Asbestos Sampling, November 1994. Two additional air sampling devices will be positioned daily along the site perimeter near receptors that are in close proximity to the site in the downwind direction. The receptors of primary concern include residences across M-26 to the northwest and commercial property immediately to the southwest.

Wood will record each sampling location with a GPS unit for future reference. Weather data for the site (i.e. wind speed, wind direction, temperature, and barometric pressure) will be recorded hourly from an on-site portable weather station and an on-site wind sock. If the prevailing wind direction changes during the day, the potential receptors will be re-evaluated, and the air sampling devices adjusted accordingly.

Each sample pump will be calibrated to 2.0 LPM flow rate prior to use each day and collect air sample continuously for eight hours. Each sample cassette will consist of 25-millimeter MCE filters with a pore space of 0.8 microns encased in PVC outer shell. Each cassette will be properly labeled for identification and location, placed into a sealable baggie, and submitted under chain of custody to a contract laboratory accredited for the referenced analyses. The calculated sample volume for each air sample cassette will be included on the chain-of-custody. Each cassette will be analyzed for asbestos fibers via transmission electron microscopy (TEM) using National Institute for Occupational Safety and Health (NIOSH)

Method 7402; for lead via NIOSH Method 7300, Inductively Coupled Plasma; and for particulate matter (PM10) via USEPA Method 201A. In addition to the air sample cassettes, one unused sample cassette (field blank) will be prepared at the site and submitted to the analytical laboratory for TEM analysis for quality assurance/quality control purposes.

The anticipated laboratory analysis turn-around time is 5 days. Perimeter air monitoring is performed to document concentrations of these analytes during remedial actions. However, response level exceedances are not expected based on the personal air monitoring conducted for the health and safety of site workers.

The site-specific lead response level for ug of dust per m3 of air based on the Regional Screening Level of 0.15 ug of lead per m3 of air is 12.1 ug of site dust per m3 air. The mass balance calculations to determine the site-specific response levels are included in Appendix C. The site-specific response levels for site soil in air are as follows:

Arsenic: 70.3 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of dust in air

Lead: 12.1  $\mu\text{g}/\text{m}^3$  of dust in air

Asbestos: 0.01 fiber per cubic centimeter (f/cc)

PM10: 150  $\mu\text{g}/\text{m}^3$

The lowest site-specific response level is for lead at 12.1  $\mu\text{g}/\text{m}^3$ . Should analysis show that perimeter air samples exceed 12.1  $\mu\text{g}/\text{m}^3$ , the lowest of the response levels, work will be suspended to evaluate means and methods to reduce airborne contaminant emissions.

## **5.0 ACCESS**

The site is currently owned by Silver Shore. Honeywell is in the process of getting access to the site from Silver Shore.

The work to be conducted on the site does not currently include any offsite activities. However, should access to additional private or public properties be required, access to public property will be obtained by requesting right-of-way permits through Torch Lake Township. Access to the Coal Dock property has not been obtained and, if needed, will be coordinated with the Department of Environment, Great Lakes & Energy (EGLE).

The USEPA will be informed of access-related issues, should they arise.

### **5.1 Routes of Entry**

One point of entry has been currently established for the site. Entry point will be the driveway from M-26 along the northwest side of the site.

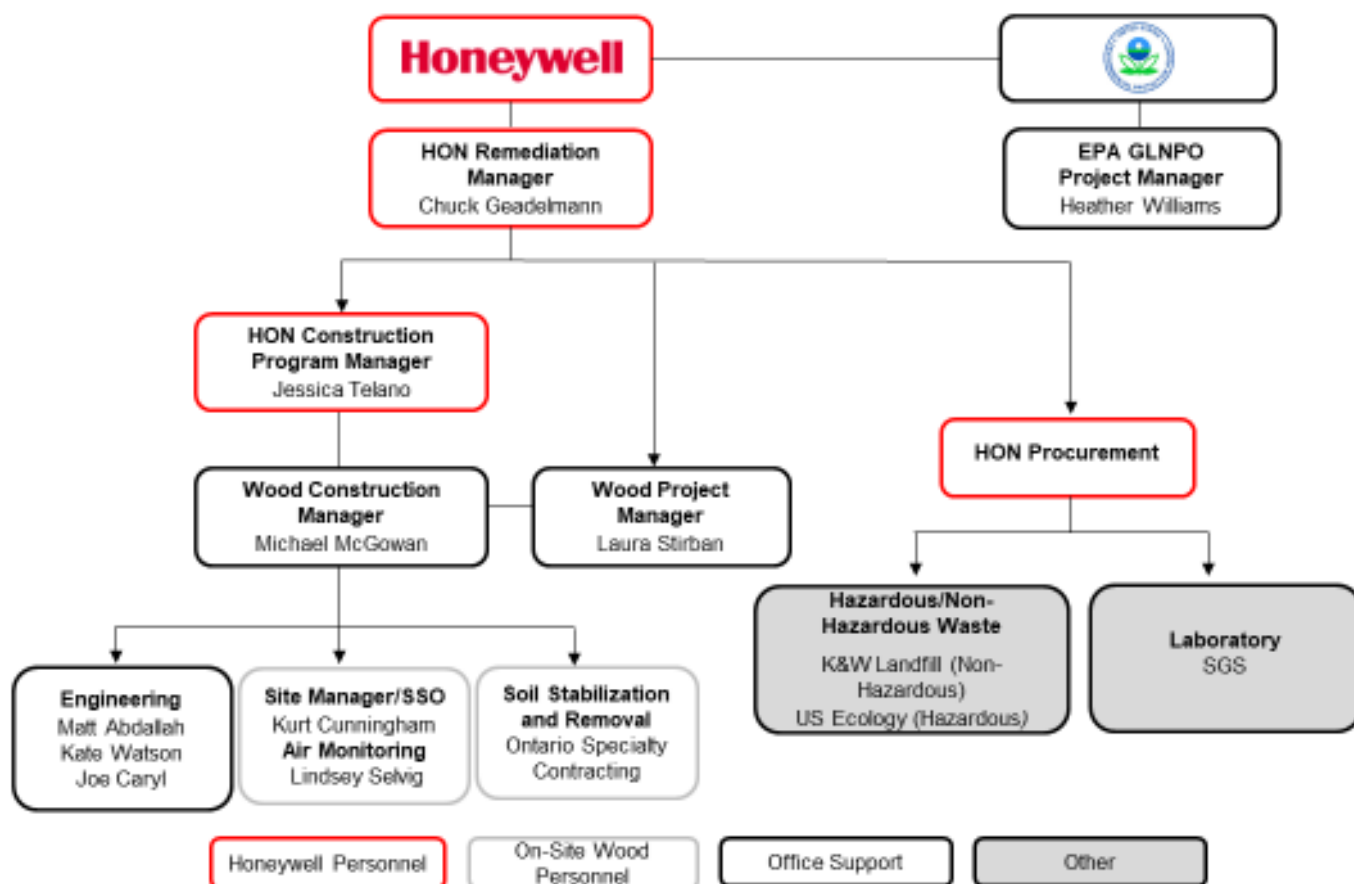
During site work conducted by Honeywell, regular security inspections will be conducted by the SHSO to verify that there are no unauthorized points of entry.

### **5.2 Site Access**

The access entry point will be kept closed unless used by onsite workers and will be secured with locks at the end of each day. Only authorized personnel will be allowed to enter. While site activities are in progress, entrance to the site will be documented with sign-in and sign-out sheets.

## 6.0 PROJECT ORGANIZATION RESPONSIBILITIES

The following presents a project organization, reporting relationships and a description of the duties of Honeywell's project team.



## **6.1 Project Team**

### **6.1.1 United States Environmental GLNPO**

A U.S. EPA GLNPO Project Manager will be responsible for monitoring all project activities and provide concurrence of the project plans and environmental actions conducted at the site.

### **6.1.2 Honeywell**

Mr. Chuck Geadelmann is Honeywell's Remediation Manager for this project and Mr. Chris French is the Honeywell Construction Manager. Honeywell is responsible for implementing activities presented in this RAWP. Correspondence should be sent to the following address:

Mr. Chuck Geadelmann  
Corporate Remediation Manager  
1985 Douglas Drive North MN 10-191B  
Golden Valley, Minnesota 55422  
Chuck.Geadelmann@Honeywell.com  
763-954-5418

### **6.1.3 Wood Project/Construction Manager**

Honeywell has retained Wood to implement the remedial action. Ms. Laura Stirban will serve as Project Manager and Mr. Mike McGowan will serve as the Construction Manager for the Wood project team. Reports, notices, or other project related correspondence are to be provided to Ms. Stirban and Mr. McGowan at the following address:

Wood Environment & Infrastructure Solutions, Inc.  
46850 Magellan Drive, Ste. 190  
Novi, Michigan 48377  
laura.stirban@woodplc.com  
248-313-3704

Other Wood team members will report to Ms. Stirban and Mr. McGowan.

### **6.1.4 Field Team Leader**

A Field Team Leader will be assigned for the remedial activities, reporting to the Project/Construction Manager. The Field Team Leader will be responsible for coordination and implementation of the remedial activities. The Field Team Leader



will coordinate and supervise all field personnel, data collection, and field QA/QC measures.

The Field Team Leader may also be the Site Health and Safety Officer (SHSO). The SHSO will be responsible for matters related to health and safety, including implementation of the HASP, conducting Site safety meetings and Site-specific training of personnel, investigation of health and safety-related incidents at the site, and updating and modifying the HASP, as necessary, if site or environmental conditions change.

## **6.2 Subcontractor**

The Honeywell team will procure subcontractors to perform soil stabilization, transportation, and site restoration services.

## **7.0 SCHEDULE**

The proposed schedule is included in Appendix A. Tasks will be performed simultaneously whenever possible to expedite site activities. The schedule may be adjusted based on field conditions or other conditions encountered during site activities. Due to the nature of site activities and unforeseeable weather conditions, the exact duration of individual tasks can not be predicted. The exact start date of a successor task is contingent upon completion of a predecessor task and actual start dates may differ from the dates shown.

## **8.0 REPORTING**

Following completion of site activities, a construction report will be prepared to document completed activities.

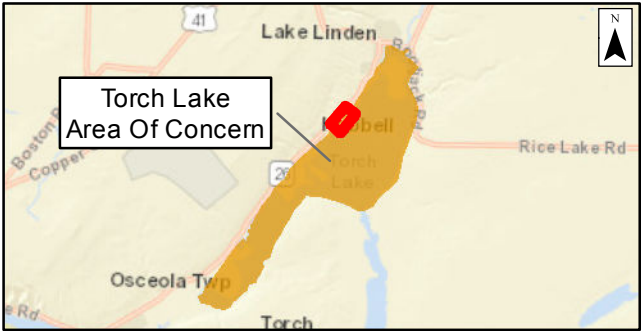
## **9.0 REFERENCES**

- Tetra Tech, Inc., 2018, "Removal Assessment Report for C&H Mineral Building – RS Site 52986 Highway M-26, Hubbell, Houghton County, Michigan", January 29, 2018
- Urban, N. R., MacLennan C. A., Perlinger, J. A., 2018, "An Integrated Assessment of Torch Lake Area of Concern", 2018
- William P. Tidwell, 1948, "Copper Procurement and Stockpiling, 1941-1945: A Synthesis of Activities of Metals Reserve Company (A Subsidiary of Reconstruction Finance Corporation)," unpublished draft history, in Record Group 234 Records of the Reconstruction Finance Corporation, Entry 26, Administrative Histories of the Reconstruction Finance Corporation's Wartime Programs, Box 4, held at the National Archives, College Park, Maryland. [Official Histories/ 1948 Tidwell MRC Copper Program History Excerpts]."
- Wood, 2019, Technical Memorandum, Calumet and Hecla Mineral Building, Torch Lake Township, Michigan. Prepared for Honeywell Specialty Materials, LLC and Silver Shore Enterprise, Inc. Prepared by Wood Environment & Infrastructures Solutions. May 2019.

## **FIGURES**

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**Legend**  
□ Property Boundary

Mineral Building Torch Lake Area of Concern		
SITE LOCATION MAP		
<b>Honeywell</b>		<b>EPA</b>
Prepared by: DCM 8/14/2019	<b>wood.</b>	FIGURE <b>1</b>
Checked by: MJM 8/14/2019		
Project Number: 3293181784		



G:\Honeywell\1\_MXD\Torch Lake Remedial Action Work Plan\Fig. 2 Site Features - 180706.mxd 8/12/2019 10:10:58 AM



- Legend**
- Property Boundary
  - Fence
  - Access Gate
  - Mineral Building
  - Stack Debris
  - Waste Pile Boundary

Source: Tetra Tech Removal  
Assessment Report, January 2018  
Base Map Source: ESRI Imagery  
Basemap

Mineral Building Torch Lake Area of Concern	
SITE FEATURES	
	
Prepared by: DCM 8/12/2019	
Checked by: MJM 8/12/2019	
Project Number: 3293181784	
FIGURE 2	



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**Legend**

- Non-Regulated Waste Piles
- Property Boundary
- Fence
- Access Gate
- Mineral Building
- Contractor Laydown Area
- Non-Regulated Waste Pile Consolidation Area

Notes:  
Source: Tetra Tech Removal  
Assessment Report, January 2018  
  
Base Map Source: ESRI Imagery  
Basemap

Mineral Building Torch Lake Area of Concern		
NON-REGULATED WASTE PILES		
 		
Prepared by: DCM 9/12/2019		FIGURE 3
Checked by: MJM 9/12/2019		
Project Number: 3293181784		





- Legend**
- Characteristic Non Hazardous Waste Piles
  - Property Boundary
  - Fence
  - Access Gate
  - Mineral Building
  - Contractor Laydown Area

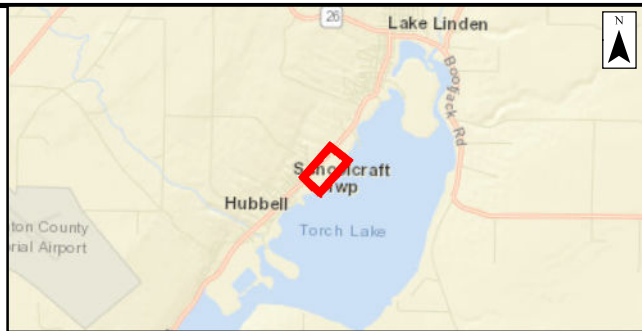
Notes:  
Source: Tetra Tech Removal  
Assessment Report, January 2018  
  
Base Map Source: ESRI Imagery  
Basemap

Mineral Building Torch Lake Area of Concern		
RCRA CHARACTERISTIC NON-HAZARDOUS WASTE PILES		
Honeywell		EPA
Prepared by: DCM 8/12/2019	wood.	FIGURE 4
Checked by: MJM 8/12/2019		
Project Number: 3293181784		





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**Legend**

- Characteristic Hazardous Waste Piles
- Access Gate
- Fence
- Contractor Laydown Area
- Mineral Building
- Property Boundary

Notes:  
Source: Tetra Tech Removal  
Assessment Report, January 2018  
  
Base Map Source: ESRI Imagery  
Basemap

Mineral Building Torch Lake Area of Concern		
RCRA CHARACTERISTIC HAZARDOUS WASTE PILES		
<div>Honeywell</div> <div>EPA</div>		
Prepared by: DCM 8/12/2019	<div>wood.</div>	FIGURE 5
Checked by: MUM 8/12/2019		
Project Number: 3293181784		



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**Legend**

- ACM Waste Piles
- Property Boundary
- Fence
- Access Gate
- Mineral Building
- Contractor Laydown Area

Source: Tetra Tech Removal  
Assessment Report, January 2018

Base Map Source: ESRI Imagery  
Basemap

Mineral Building  
Torch Lake  
Area of Concern

**ACM WASTE PILES**

**Honeywell**



Prepared by:  
DCM 9/12/2019

Checked by:  
MJM 9/12/2019

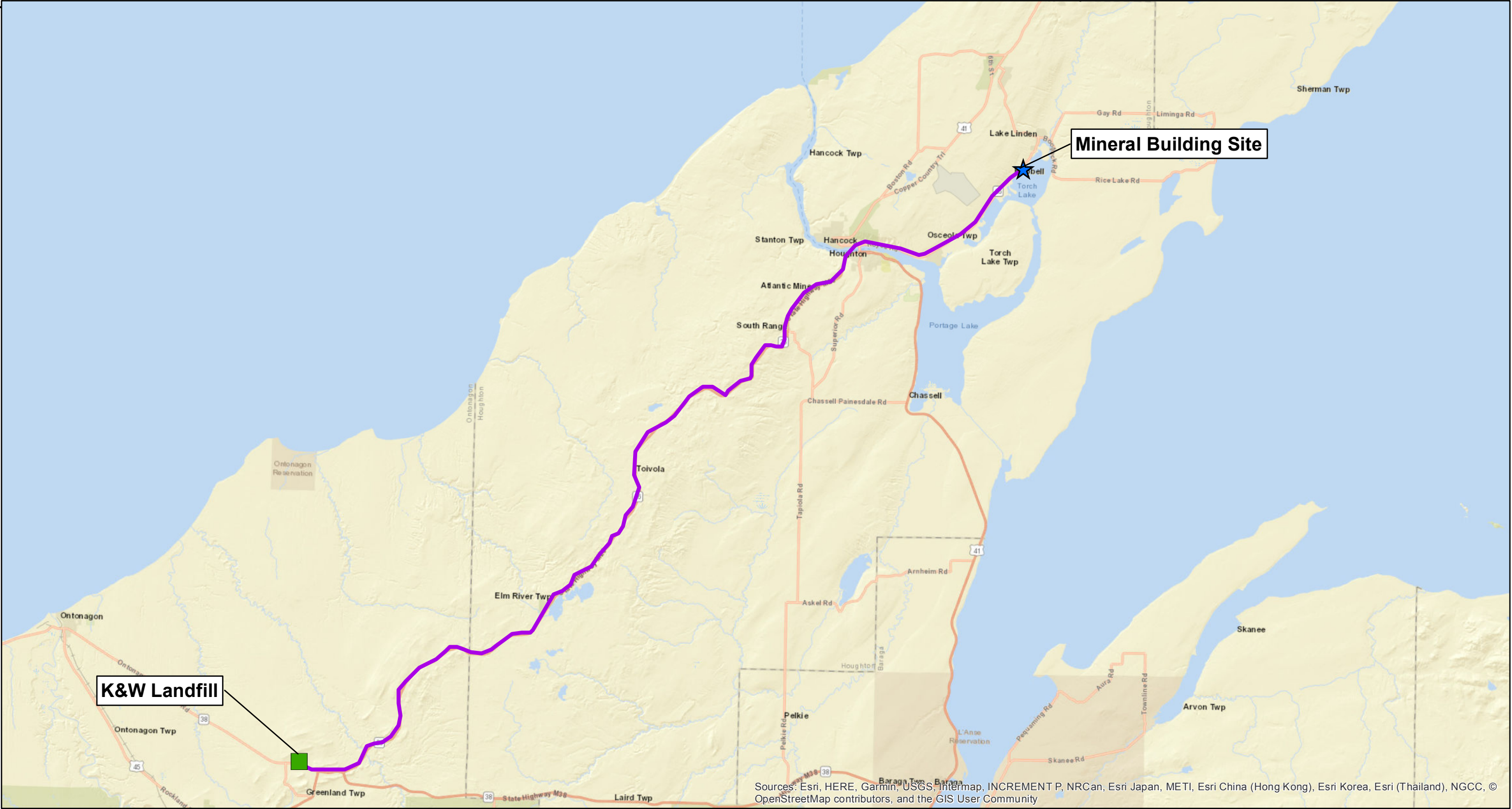
Project Number:  
3293181784

**wood.**

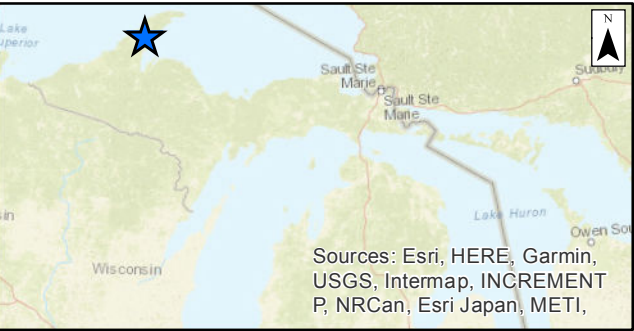
**FIGURE  
6**



Document Path: G:\Honeywell\la\_MXD\Torch Lake\RemedialActionWorkPlan\Fig7\_TruckRouteToLandfill\_resave.mxd  
G:\Honeywell\la\_MXD\Torch Lake\RemedialActionWorkPlan\Fig7\_TruckRouteToLandfill\_resave.mxd 9/12/2019 4:01:43 PM






Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community






Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,

**Legend**

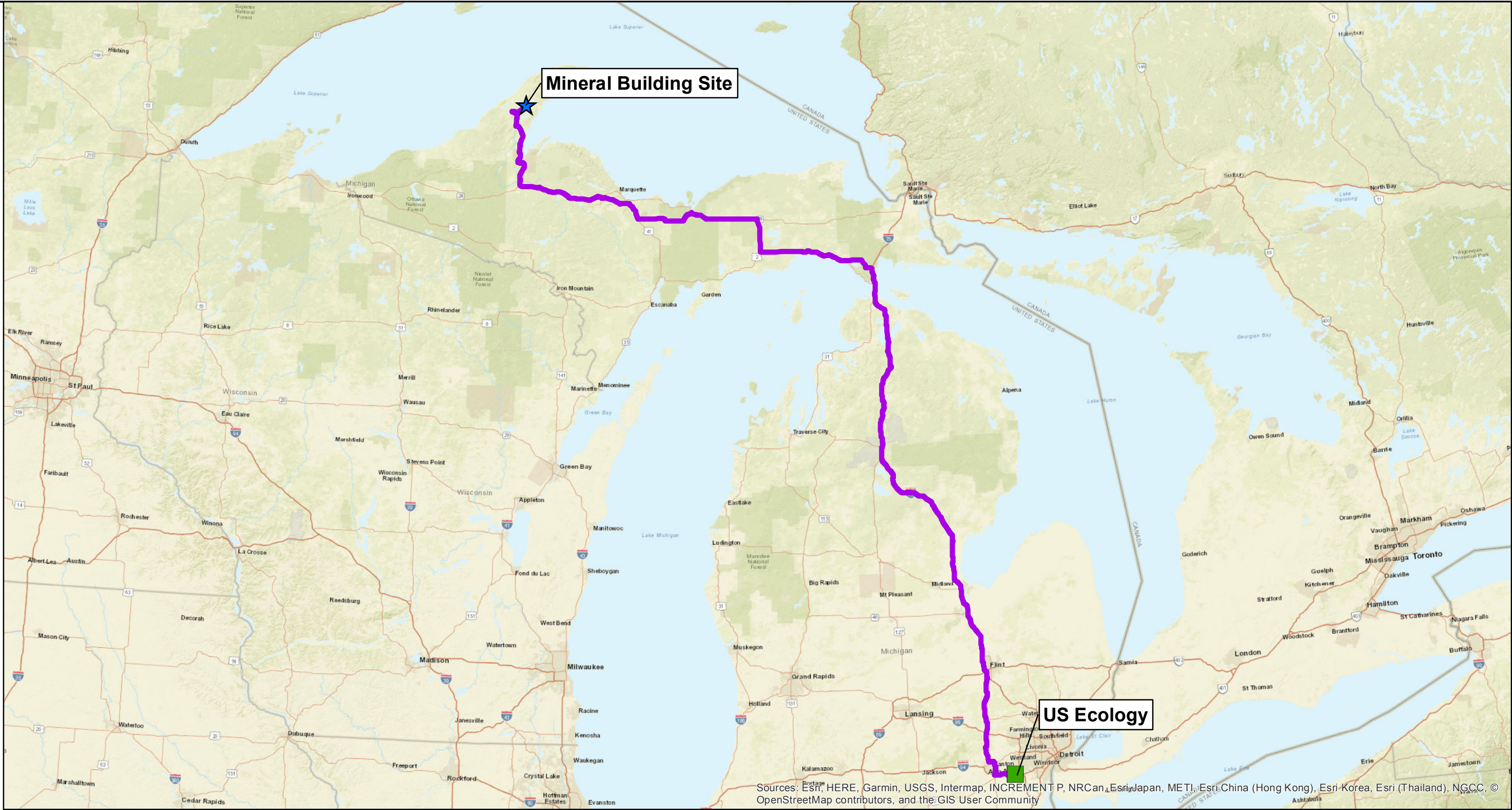
-  LandFill Location
-  Mineral Building Site
-  Route to Landfill

**Directions**

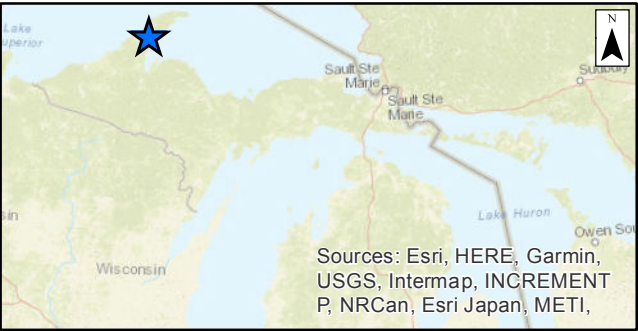
- Turn left on M-26 from site
- M-26 ends at M-38, continue straight on M-38 West to landfill 11877 M38, Ontonagon, MI

Mineral Building Torch Lake Area of Concern		
TRUCK ROUTE TO K&W LANDFILL		
		
Prepared by: DCM 9/12/2019		FIGURE 7
Checked by: MJM 9/12/2019		
Project Number: 3293181784		





Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community






Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,

Legend

- ★ Mineral Building Site
- US Ecology Location
- Route to US Ecology

Directions

- Turn left on M-26 from site
- Turn left on US-41
- Turn left on M-94
- Turn right on M-77 S
- Turn left on US-2
- Turn left on M-123
- Turn right on I-75
- Merge on US-23
- Merge on I-94 East
- 49350 N I94 Service Drive, Belleville, MI

Mineral Building Torch Lake Area of Concern		
TRUCK ROUTE TO US ECOLOGY		
		
Prepared by: DCM 9/12/2019		FIGURE 8
Checked by: MJM 9/12/2019		
Project Number: 3293181784		





















## **APPENDIX A: Schedule**

---

Project Schedule  
Design and Removal of Upland Contaminated Source Material at Mineral Building Site  
Torch Lake Area of Concern, Houghton County, Michigan

ID	Task Name	Duration	Start	Finish																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
					28, '19	Aug 11, '19	Aug 25, '19	Sep 8, '19	Sep 22, '19	Oct 6, '19	Oct 20, '19	Nov 3, '19	Nov 17, '19	Dec 1, '19	Dec 15, '19	Dec 29, '19	Jan 12, '20	Jan 26, '20	Feb																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
1	Signed GLNPO Agreement	1 day	Tue 8/20/19	Tue 8/20/19	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F	T	S	W	S	T	M	F

Draft Project Schedule 9-11-19 Wed 9/11/19	Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
	Split		External Tasks		Inactive Summary		Manual Summary		Progress	
	Milestone		External Milestone		Manual Task		Start-only			
	Summary		Inactive Task		Duration-only		Finish-only			

## **APPENDIX B: Treatability Study Analysis and Results**

---



The results set forth herein are provided by SGS North America Inc.

*e-Hardcopy 2.0*  
*Automated Report*

## Technical Report for

**Ramboll US Corporation**

**Honeywell-Lake Linden Sampling Event, Lake Linden, MI**

**3293191842.410001**

**SGS Job Number: JC91254**

**Sampling Date: 07/02/19**



### Report to:

**Ramboll US Corporation**  
**3600 Green Court Suite 750**  
**Ann Arbor, MI 48105**  
**DAmber@Ramboll.com; NMartin@Ramboll.com**  
  
**ATTN: Danielle Amber**

**Total number of pages in report: 76**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.



**Mike Earp**  
**General Manager**

**Client Service contact: Rocus Peters 732-329-0200**

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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Test results relate only to samples analyzed.

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## Sample Summary

Ramboll US Corporation

Job No: JC91254

Honeywell-Lake Linden Sampling Event, Lake Linden, MI  
Project No: 3293191842.410001

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC91254-1	07/02/19	08:40	JH	07/06/19	SO	Soil	CHMB02-TS01(0)-WP02-0702
JC91254-2	07/02/19	08:50	JH	07/06/19	SO	Soil	CHMB02-TS02(3)-WP02-0702
JC91254-3	07/02/19	09:00	JH	07/06/19	SO	Soil	CHMB02-TS03(5)-WP02-0702
JC91254-4	07/02/19	09:10	JH	07/06/19	SO	Soil	CHMB02-TS04(10)-WP02-0702
JC91254-5	07/02/19	09:20	JH	07/06/19	SO	Soil	CHMB02-TS05(15)-WP02-0702
JC91254-6	07/02/19	09:25	JH	07/06/19	SO	Soil	CHMB02-TS06(0)-WP48SS09-0702
JC91254-7	07/02/19	09:30	JH	07/06/19	SO	Soil	CHMB02-TS07(3)-WP48SS09-0702
JC91254-8	07/02/19	09:40	JH	07/06/19	SO	Soil	CHMB02-TS08(5)-WP48SS09-0702
JC91254-9	07/02/19	09:50	JH	07/06/19	SO	Soil	CHMB02-TS09(10)-WP48SS09-0702
JC91254-10	07/02/19	10:00	JH	07/06/19	SO	Soil	CHMB02-TS10(15)-WP48SS09-0702
JC91254-11	07/02/19	10:05	JH	07/06/19	SO	Soil	CHMB02-TS11(0)-WP48SS11-0702
JC91254-12	07/02/19	10:10	JH	07/06/19	SO	Soil	CHMB02-TS12(3)-WP48SS11-0702
JC91254-13	07/02/19	10:20	JH	07/06/19	SO	Soil	CHMB02-TS13(5)-WP48SS11-0702

---

Soil samples reported on a dry weight basis unless otherwise indicated on result page.



**Sample Summary**  
(continued)

Ramboll US Corporation

**Job No:** JC91254

Honeywell-Lake Linden Sampling Event, Lake Linden, MI  
Project No: 3293191842.410001

Sample Number	Collected		Matrix Code Type	Received	Soil	Client Sample ID
	Date	Time By				
JC91254-14	07/02/19	10:30 JH	07/06/19	SO	Soil	CHMB02-TS14(10)-WP48SS11-0702
JC91254-15	07/02/19	10:40 JH	07/06/19	SO	Soil	CHMB02-TS12(15)-WP48SS11-0702

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

## Summary of Hits

**Job Number:** JC91254  
**Account:** Ramboll US Corporation  
**Project:** Honeywell-Lake Linden Sampling Event, Lake Linden, MI  
**Collected:** 07/02/19

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC91254-1	CHMB02-TS01(0)-WP02-0702					
pH		8.07			su	SW846 9045D
Lead		20.8	0.50	0.0090	mg/l	SW846 6010D
JC91254-2	CHMB02-TS02(3)-WP02-0702					
pH		10.08			su	SW846 9045D
Lead		3.3	0.50	0.0090	mg/l	SW846 6010D
JC91254-3	CHMB02-TS03(5)-WP02-0702					
pH		10.07			su	SW846 9045D
Lead		0.11 B	0.50	0.0090	mg/l	SW846 6010D
JC91254-4	CHMB02-TS04(10)-WP02-0702					
pH		11.27			su	SW846 9045D
Lead		0.018 B	0.50	0.0090	mg/l	SW846 6010D
JC91254-5	CHMB02-TS05(15)-WP02-0702					
pH		10.43			su	SW846 9045D
Lead		5.0	0.50	0.0090	mg/l	SW846 6010D
JC91254-6	CHMB02-TS06(0)-WP48SS09-0702					
pH		8.49			su	SW846 9045D
Lead		545	10	0.18	mg/l	SW846 6010D
JC91254-7	CHMB02-TS07(3)-WP48SS09-0702					
pH		10.16			su	SW846 9045D
Lead		29.8	0.50	0.0090	mg/l	SW846 6010D
JC91254-8	CHMB02-TS08(5)-WP48SS09-0702					
pH		10.38			su	SW846 9045D
Lead		0.025 B	0.50	0.0090	mg/l	SW846 6010D
JC91254-9	CHMB02-TS09(10)-WP48SS09-0702					
pH		10.35			su	SW846 9045D
Lead		0.025 B	0.50	0.0090	mg/l	SW846 6010D

## Summary of Hits

Page 2 of 2

**Job Number:** JC91254  
**Account:** Ramboll US Corporation  
**Project:** Honeywell-Lake Linden Sampling Event, Lake Linden, MI  
**Collected:** 07/02/19

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC91254-10	CHMB02-TS10(15)-WP48SS09-0702					
pH		10.46			su	SW846 9045D
Lead		2.7	0.50	0.0090	mg/l	SW846 6010D
JC91254-11	CHMB02-TS11(0)-WP48SS11-0702					
pH		7.90			su	SW846 9045D
Lead		332	10	0.18	mg/l	SW846 6010D
JC91254-12	CHMB02-TS12(3)-WP48SS11-0702					
pH		10.23			su	SW846 9045D
Lead		30.3	0.50	0.0090	mg/l	SW846 6010D
JC91254-13	CHMB02-TS13(5)-WP48SS11-0702					
pH		10.26			su	SW846 9045D
JC91254-14	CHMB02-TS14(10)-WP48SS11-0702					
pH		10.36			su	SW846 9045D
JC91254-15	CHMB02-TS12(15)-WP48SS11-0702					
pH		10.45			su	SW846 9045D
Lead		0.032 B	0.50	0.0090	mg/l	SW846 6010D

## Sample Results

## Report of Analysis

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS01(0)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-1	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	78.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	20.8	D008	5.0	0.50	0.0090	mg/l	5	07/11/19	07/13/19 ND	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47089  
(2) Prep QC Batch: MP16354

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL



Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS01(0)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-1	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	78.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	78.9		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	8.07		su	1	07/17/19 15:05	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS02(3)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-2	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	79.4
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	3.3	D008	5.0	0.50	0.0090	mg/l	5	07/11/19	07/13/19 ND	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47089  
(2) Prep QC Batch: MP16354

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS02(3)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-2	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	79.4
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	79.4		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.08		su	1	07/17/19 15:25	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS03(5)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-3	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	90.7
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.11 B	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit                      MDL = Method Detection Limit    U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11)                      B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS03(5)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-3	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	90.7
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	90.7		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.07		su	1	07/17/19 15:26	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS04(10)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-4	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	80.0
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.018 B	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS04(10)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-4	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	80.0
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	80		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	11.27		su	1	07/17/19 15:32	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS05(15)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-5	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	90.2
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	5.0	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL



Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS05(15)-WP02-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-5	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	90.2
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	90.2		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.43		su	1	07/17/19 15:34	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS06(0)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-6	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	81.6
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	545	D008	5.0	10	0.18	mg/l	100	07/13/19	07/18/19 ND	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47128  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS06(0)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-6	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	81.6
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	81.6		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	8.49		su	1	07/17/19 15:36	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS07(3)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-7	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	93.0
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	29.8	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS07(3)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-7	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	93.0
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	93		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.16		su	1	07/17/19 15:37	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS08(5)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-8	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	95.0
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.025 B	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS08(5)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-8	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	95.0
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	95		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.38		su	1	07/17/19 15:38	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS09(10)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-9	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	96.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.025 B	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL



Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS09(10)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-9	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	96.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	96.9		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.35		su	1	07/17/19 15:39	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS10(15)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-10	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	83.3
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	2.7	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

- (1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS10(15)-WP48SS09-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-10	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	83.3
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	83.3		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.46		su	1	07/17/19 15:08	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS11(0)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-11	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	94.8
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	332	D008	5.0	10	0.18	mg/l	100	07/13/19	07/18/19 ND	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47128  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS11(0)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-11	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	94.8
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	94.8		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	7.90		su	1	07/17/19 15:11	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS12(3)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-12	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	93.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	30.3	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS12(3)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-12	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	93.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	93.9		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.23		su	1	07/17/19 15:18	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS13(5)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-13	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	95.2
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0090 U	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47098  
(2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL



Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS13(5)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-13	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	95.2
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	95.2		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.26		su	1	07/17/19 15:19	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS14(10)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-14	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	95.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0090 U	D008	5.0	0.50	0.0090	mg/l	5	07/13/19	07/16/19 GT	SW846 6010D <sup>1</sup>

- (1) Instrument QC Batch: MA47098
- (2) Prep QC Batch: MP16380

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS14(10)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-14	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	95.9
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	95.9		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.36		su	1	07/17/19 15:20	MS	SW846 9045D

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS12(15)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-15	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	96.1
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

Metals Analysis, TCLP Leachate SW846 1311

Analyte	Result	HW#	MCL	RL	MDL	Units	DF	Prep	Analyzed By	Method
Lead	0.032 B	D008	5.0	0.50	0.0090	mg/l	5	07/15/19	07/17/19 ND	SW846 6010D <sup>1</sup>

(1) Instrument QC Batch: MA47106  
(2) Prep QC Batch: MP16388

RL = Reporting Limit MDL = Method Detection Limit U = Indicates a result < MDL  
MCL = Maximum Contamination Level (40 CFR 261 7/1/11) B = Indicates a result > = MDL but < RL

Report of Analysis

<b>Client Sample ID:</b>	CHMB02-TS12(15)-WP48SS11-0702	<b>Date Sampled:</b>	07/02/19
<b>Lab Sample ID:</b>	JC91254-15	<b>Date Received:</b>	07/06/19
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	96.1
<b>Project:</b>	Honeywell-Lake Linden Sampling Event, Lake Linden, MI		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	96.1		%	1	07/11/19 15:55	BG	SM2540 G 18TH ED MOD
pH	10.45		su	1	07/17/19 15:21	MS	SW846 9045D

RL = Reporting Limit

## Misc. Forms

### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



**SGS North America Inc. - Dayton**  
2235 Route 130, Dayton, NJ 08810  
TEL 732-329-0200 FAX: 732-329-3499/3480  
[www.sgs.com/ehsusa](http://www.sgs.com/ehsusa)

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## 4.4.1

SGS



## SGS Sample Receipt Summary

Job Number: JC91254

Client: WOOD

Project: HW LAKE LINDEN

Date / Time Received: 7/6/2019 10:00:00 AM

Delivery Method: FedEx

Airbill #s:

Cooler Temps (Raw Measured) °C: Cooler 1: (2.3);

Cooler Temps (Corrected) °C: Cooler 1: (2.0);

### Cooler Security

Y or N

- |                           |                                     |                          |                       |                                     |                          |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present:       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact:  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Cooler Temperature

Y or N

- |                              |                                     |                          |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved:   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | IR Gun                              |                          |
| 3. Cooler media:             | Ice (Bag)                           |                          |
| 4. No. Coolers:              | 1                                   |                          |

### Quality Control Preservation

Y or N N/A

- |                                 |                                     |                                     |                                     |
|---------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 2. Trip Blank listed on COC:    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Samples preserved properly:  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 4. VOCs headspace free:         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

### Sample Integrity - Documentation

Y or N

- |  |                                     |                          |
|--|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles:   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete:        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Sample Integrity - Condition

Y or N

- |                                  |                                     |                          |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT:       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample:          | Intact                              |                          |

### Sample Integrity - Instructions

Y or N N/A

- |   |                                     |                                     |                                     |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear:           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 2. Bottles received for unspecified tests | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                     |
| 3. Sufficient volume recvd for analysis:  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 4. Compositing instructions clear:        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear:          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Test Strip Lot #s: pH 1-12: 229517 pH 12+: 208717 Other: (Specify)

Comments Samples may contain Asbestos. Please open in fume hood.

SM089-03  
Rev. Date 12/7/17

JC91254: Chain of Custody

Page 2 of 3

Response:

Response: Proceed with analysis

4.1  
4

## Metals Analysis

5

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/11/19

Metal	RL	IDL	MDL	MB raw	final
Aluminum	1.0	.067	.23		
Antimony	0.50	.0055	.024		
Arsenic	0.50	.006	.014		
Barium	1.0	.001	.067		
Beryllium	0.010	.0005	.0025		
Bismuth	0.10	.009	.02		
Boron	0.50	.006	.31		
Cadmium	0.020	.001	.005		
Calcium	25	.019	.5		
Chromium	0.050	.002	.01		
Cobalt	0.25	.0015	.013		
Copper	0.050	.005	.03		
Iron	0.50	.012	.16		
Lead	0.50	.0075	.009	-0.00050	<0.50
Lithium	0.25	.0075	.037		
Magnesium	25	.085	.7		
Manganese	0.075	.0005	.007		
Molybdenum	0.10	.0015	.018		
Nickel	0.050	.0015	.0085		
Phosphorus	0.25	.01	.089		
Potassium	50	.2	1		
Selenium	0.50	.009	.025		
Silicon	1.0	.0045	.51		
Silver	0.050	.0025	.0095		
Strontium	0.050	.001	.005		
Sulfur	0.25	.018	.23		
Thallium	0.50	.008	.009		
Tin	0.050	.003	.019		
Titanium	0.050	.003	.013		
Tungsten	0.25	.0055	.2		
Vanadium	0.25	.002	.009		
Zinc	0.10	.001	.035		
Zirconium	0.050	.001	.021		

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/11/19

Metal	RL	IDL	MDL	MB raw	final
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Associated samples MP16354: JC91254-1, JC91254-2

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

5.1.1

5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/11/19

Metal	JC90830-16A Original MS	Spikelot MPSPK2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Bismuth				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron				
Lead	0.0	2.1	2.0	105.0 75-125
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Strontium				
Sulfur				
Thallium				
Tin				
Titanium				
Tungsten				
Vanadium				
Zinc	anr			
Zirconium				

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/11/19

Metal	JC90830-16A Original MS	Spikelet MPSPK2	% Rec	QC Limits
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Associated samples MP16354: JC91254-1, JC91254-2

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.1.2

5



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date:

07/11/19

07/11/19

Metal	JC90830-16A Original	MSD	Spikelot MPSPK2	% Rec	MSD RPD	QC Limit	JC90830-16A Original	DUP	RPD	QC Limits
Aluminum										
Antimony										
Arsenic	anr									
Barium	anr									
Beryllium										
Bismuth										
Boron										
Cadmium	anr									
Calcium										
Chromium	anr									
Cobalt										
Copper	anr									
Iron										
Lead	0.0	2.1	2.0	105.0	0.0	20	0.0	0.0	NC	0-20
Lithium										
Magnesium										
Manganese										
Molybdenum										
Nickel	anr									
Phosphorus										
Potassium										
Selenium	anr									
Silicon										
Silver	anr									
Strontium										
Sulfur										
Thallium										
Tin										
Titanium										
Tungsten										
Vanadium										
Zinc	anr									
Zirconium										

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/11/19 07/11/19

Metal	JC90830-16A Original MSD	Spikelot MPSPK2	% Rec	MSD RPD	QC Limit	JC90830-16A Original DUP	RPD	QC Limits
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Associated samples MP16354: JC91254-1, JC91254-2

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254

Account: RAMEMIAA - Ramboll US Corporation

Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
Matrix Type: LEACHATEMethods: SW846 6010D  
Units: mg/l

Prep Date: 07/11/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Bismuth				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron				
Lead	2.1	2.0	105.0	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Strontium				
Sulfur				
Thallium				
Tin				
Titanium				
Tungsten				
Vanadium				
Zinc	anr			
Zirconium				

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254

Account: RAMEMIAA - Ramboll US Corporation

Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354

Methods: SW846 6010D

Matrix Type: LEACHATE

Units: mg/l

Prep Date:

07/11/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits
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Associated samples MP16354: JC91254-1, JC91254-2

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 07/11/19

Metal		JC90830-16A Original SDL 5:25 %DIF		QC Limits	
Aluminum					
Antimony					
Arsenic	anr				
Barium	anr				
Beryllium					
Bismuth					
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt					
Copper	anr				
Iron					
Lead	0.00	0.00	NC	0-10	
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel	anr				
Phosphorus					
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Sulfur					
Thallium					
Tin					
Titanium					
Tungsten					
Vanadium					
Zinc	anr				



SERIAL DILUTION RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16354  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 07/11/19

Metal	JC90830-16A Original SDL 5:25 %DIF	QC Limits
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Zirconium

Associated samples MP16354: JC91254-1, JC91254-2

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

5.1.4

5

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/13/19 07/13/19

Metal	RL	IDL	MDL	MB raw	final	MB raw	final
Aluminum	1.0	.067	.23				
Antimony	0.50	.0055	.024				
Arsenic	0.50	.006	.014				
Barium	1.0	.001	.067				
Beryllium	0.010	.0005	.0025				
Bismuth	0.10	.009	.02				
Boron	0.50	.006	.31				
Cadmium	0.020	.001	.005				
Calcium	25	.019	.5				
Chromium	0.050	.002	.01				
Cobalt	0.25	.0015	.013				
Copper	0.050	.005	.03				
Iron	0.50	.012	.16				
Lead	0.50	.0075	.009	-0.0017	<0.50	0.00040	<0.50
Lithium	0.25	.0075	.037				
Magnesium	25	.085	.7				
Manganese	0.075	.0005	.007				
Molybdenum	0.10	.0015	.018				
Nickel	0.050	.0015	.0085				
Phosphorus	0.25	.01	.089				
Potassium	50	.2	1				
Selenium	0.50	.009	.025				
Silicon	1.0	.0045	.51				
Silver	0.050	.0025	.0095				
Sodium	50	.065	2.8				
Strontium	0.050	.001	.005				
Sulfur	0.25	.018	.23				
Thallium	0.50	.008	.009				
Tin	0.050	.003	.019				
Titanium	0.050	.003	.013				
Tungsten	0.25	.0055	.2				
Vanadium	0.25	.002	.009				
Zinc	0.10	.001	.035				

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/13/19 07/13/19

Metal	RL	IDL	MDL	MB raw	final	MB raw	final
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Zirconium 0.050 .001 .021

Associated samples MP16380: JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19

Metal	JC91230-3 Original MS	Spikelot MPSPK2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Bismuth				
Boron	anr			
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper				
Iron				
Lead	0.027	2.1	2.0	103.7 75-125
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Strontium				
Sulfur				
Thallium				
Tin				
Titanium				
Tungsten				
Vanadium				
Zinc				
Zirconium				

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19

Metal	JC91230-3	Spikelot	QC	
	Original MS	MPSPK2	% Rec	Limits

Associated samples MP16380: JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19

Metal	JC91230-3 Original	MSD	Spikelot MPSPK2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	anr					
Beryllium						
Bismuth						
Boron	anr					
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt						
Copper						
Iron						
Lead	0.027	2.3	2.0	113.7	9.1	20
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel	anr					
Phosphorus						
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Strontium						
Sulfur						
Thallium						
Tin						
Titanium						
Tungsten						
Vanadium						
Zinc						
Zirconium						



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19

Metal	JC91230-3 Original MSD	Spikelot MPSPK2	% Rec	MSD RPD	QC Limit
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Associated samples MP16380: JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19 07/13/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits	BSD Result	Spikelot MPSPK2	% Rec	BSD RPD	QC Limit
Aluminum									
Antimony									
Arsenic	anr								
Barium	anr								
Beryllium									
Bismuth									
Boron	anr								
Cadmium	anr								
Calcium									
Chromium	anr								
Cobalt									
Copper									
Iron									
Lead	2.2	2.0	110.0	80-120	2.2	2.0	110.0	9.5	20
Lithium									
Magnesium									
Manganese									
Molybdenum									
Nickel	anr								
Phosphorus									
Potassium									
Selenium	anr								
Silicon									
Silver	anr								
Sodium									
Strontium									
Sulfur									
Thallium									
Tin									
Titanium									
Tungsten									
Vanadium									
Zinc									

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19 07/13/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits	BSD Result	Spikelot MPSPK2	% Rec	BSD RPD	QC Limit
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Zirconium

Associated samples MP16380: JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254

Account: RAMEMIAA - Ramboll US Corporation

Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
Matrix Type: LEACHATEMethods: SW846 6010D  
Units: mg/l

Prep Date: 07/13/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Bismuth				
Boron	anr			
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper				
Iron				
Lead	2.0	2.0	100.0	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Sulfur				
Thallium				
Tin				
Titanium				
Tungsten				
Vanadium				
Zinc				

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/13/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits
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Zirconium

Associated samples MP16380: JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 07/13/19

Metal		JC91230-3 Original SDL 5:25 %DIF		QC Limits	
Aluminum					
Antimony					
Arsenic	anr				
Barium	anr				
Beryllium					
Bismuth					
Boron	anr				
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt					
Copper					
Iron					
Lead	26.8	0.00	100.0(a)	0-10	
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel	anr				
Phosphorus					
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Sulfur					
Thallium					
Tin					
Titanium					
Tungsten					
Vanadium					
Zinc					



# SERIAL DILUTION RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16380  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 07/13/19

	JC91230-3	QC
Metal	Original SDL 5:25 %DIF	Limits

Zirconium

Associated samples MP16380: JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/15/19

Metal	RL	IDL	MDL	MB raw	final
Aluminum	1.0	.067	.23		
Antimony	0.50	.0055	.024		
Arsenic	0.50	.006	.014		
Barium	1.0	.001	.067		
Beryllium	0.010	.0005	.0025		
Bismuth	0.10	.009	.02		
Boron	0.50	.006	.31		
Cadmium	0.020	.001	.005		
Calcium	25	.019	.5		
Chromium	0.050	.002	.01		
Cobalt	0.25	.0015	.013		
Copper	0.050	.005	.03		
Iron	0.50	.012	.16		
Lead	0.50	.0075	.009	-0.00050	<0.50
Lithium	0.25	.0075	.037		
Magnesium	25	.085	.7		
Manganese	0.075	.0005	.007		
Molybdenum	0.10	.0015	.018		
Nickel	0.050	.0015	.0085		
Phosphorus	0.25	.01	.089		
Potassium	50	.2	1		
Selenium	0.50	.009	.025		
Silicon	1.0	.0045	.51		
Silver	0.050	.0025	.0095		
Strontium	0.050	.001	.005		
Sulfur	0.25	.018	.23		
Thallium	0.50	.008	.009		
Tin	0.050	.003	.019		
Titanium	0.050	.003	.013		
Tungsten	0.25	.0055	.2		
Vanadium	0.25	.002	.009		
Zinc	0.10	.001	.035		
Zirconium	0.050	.001	.021		

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/15/19

Metal	RL	IDL	MDL	MB raw	final
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Associated samples MP16388: JC91254-15

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/15/19

Metal	JC91579-5A Original MS	Spikelot MPSPK2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Bismuth				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper				
Iron				
Lead	1.4	3.6	2.0	110.0 75-125
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Strontium				
Sulfur				
Thallium				
Tin				
Titanium				
Tungsten				
Vanadium				
Zinc				
Zirconium				

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/15/19

Metal	JC91579-5A Original MS	Spikelet MPSPK2	% Rec	QC Limits
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Associated samples MP16388: JC91254-15

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/15/19

Metal	JC91579-5A Original	MSD	Spikelot MPSPK2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	anr					
Beryllium						
Bismuth						
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt						
Copper						
Iron						
Lead	1.4	3.5	2.0	105.0	2.8	20
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Strontium						
Sulfur						
Thallium						
Tin						
Titanium						
Tungsten						
Vanadium						
Zinc						
Zirconium						



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: mg/l

Prep Date: 07/15/19

Metal	JC91579-5A Original MSD	Spikelot MPSPK2	% Rec	MSD RPD	QC Limit
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Associated samples MP16388: JC91254-15

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.3.2

5

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254

Account: RAMEMIAA - Ramboll US Corporation

Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
Matrix Type: LEACHATEMethods: SW846 6010D  
Units: mg/l

Prep Date: 07/15/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Bismuth				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper				
Iron				
Lead	2.2	2.0	110.0	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Strontium				
Sulfur				
Thallium				
Tin				
Titanium				
Tungsten				
Vanadium				
Zinc				
Zirconium				

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC91254

Account: RAMEMIAA - Ramboll US Corporation

Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: mg/l

Prep Date: 07/15/19

Metal	BSP Result	Spikelot MPSPK2	% Rec	QC Limits
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Associated samples MP16388: JC91254-15

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: JC91254  
 Account: RAMEMIAA - Ramboll US Corporation  
 Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
 Matrix Type: LEACHATE

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 07/15/19

Metal		JC91579-5A Original SDL 5:25 %DIF		QC Limits	
Aluminum					
Antimony					
Arsenic	anr				
Barium	anr				
Beryllium					
Bismuth					
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt					
Copper					
Iron					
Lead	1350	1400	3.8	0-10	
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Sulfur					
Thallium					
Tin					
Titanium					
Tungsten					
Vanadium					
Zinc					

SERIAL DILUTION RESULTS SUMMARY

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

QC Batch ID: MP16388  
Matrix Type: LEACHATE

Methods: SW846 6010D  
Units: ug/l

Prep Date: 07/15/19

Metal	JC91579-5A Original SDL 5:25 %DIF	QC Limits
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Zirconium

Associated samples MP16388: JC91254-15

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

5.3.4

5

## General Chemistry

### QC Data Summaries

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Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries



DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: JC91254  
Account: RAMEMIAA - Ramboll US Corporation  
Project: Honeywell-Lake Linden Sampling Event, Lake Linden, MI

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Moisture, Percent	GN97432	JC91269-1	%	24.7	24.5	0.8	0-5%
Solids, Percent	GN97428	JC91207-37	%	83.8	83.6	0.2	0-5%
Solids, Percent	GN97432	JC91269-1	%	75.3	75.5	0.3	0-5%
pH	GN97643	JC91263-1	su	7.69	7.43	2.7	0-5%

Associated Samples:

Batch GN97428: JC91254-1

Batch GN97432: JC91254-2, JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14, JC91254-15

Batch GN97643: JC91254-1, JC91254-2, JC91254-3, JC91254-4, JC91254-5, JC91254-6, JC91254-7, JC91254-8, JC91254-9, JC91254-10, JC91254-11, JC91254-12, JC91254-13, JC91254-14, JC91254-15

(\*) Outside of QC limits

Table 1  
Treatability Study Results  
Mineral Building  
Torch Lake AOC, Michigan

% of Enviroblend (SP)	Waste Pile 02					Waste Pile 48									
	0%	3%	5%	10%	15%	0%	3%	5%	10%	15%	0%	3%	5%	10%	15%
TCLP Lead Results Compared to Maximum Contamination Level (Lead) per 40 CFR 261 7/1/2011 with respective Enviroblend (SP) percentage by weight Honeywell - Lake Linden Sampling Event Lake Linden, MI Sampling Date 07/02/2019 3293191842.410001	CHMB02-TS01(0)-WP02-0702	CHMB02-TS02(3)-WP02-0702	CHMB02-TS03(5)-WP02-0702	CHMB02-TS04(10)-WP02-0702	CHMB02-TS05(15)-WP02-0702	CHMB02-TS06(0)-WP48SS09-0702	CHMB02-TS07(3)-WP48SS09-0702	CHMB02-TS08(5)-WP48SS09-0702	CHMB02-TS09(10)-WP48SS09-0702	CHMB02-TS010(15)-WP48SS09-0702	CHMB02-TS11(0)-WP48SS11-0702	CHMB02-TS12(3)-WP48SS11-0702	CHMB02-TS13(5)-WP48SS11-0702	CHMB02-TS14(10)-WP48SS11-0702	CHMB02-TS15(15)-WP48SS11-0702
TCLP Lead - Maximum Allowable Concentration 5.0 mg/L for Characteristic Non-Hazardous Waste	20.8	3.3	0.11	0.018	5.0	545	29.8	0.025	0.025	2.7	332	30.3	0.0090	0.0090	0.032
pH	8.07	10.08	10.07	11.27	10.43	8.49	10.16	10.38	10.35	10.46	7.90	10.23	10.26	10.36	10.45

Notes:

- 1.) Results reported in mg/L
- 2.) Red denotes RCRA Characteristic hazardous for Lead
- 3.) Green denotes RCRA Characteristic Non-Hazardous for Lead

\* § 40 CFR 261.21

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in §260.11 of this chapter.

## **APPENDIX C: Perimeter Air Monitoring Site-Specific Response Level Calculations**

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Analyte	RSL	Days <sup>1</sup>	Hours <sup>2</sup>	C <sub>max</sub>	RL
	( $\mu\text{g}_{\text{analyte}}/\text{m}^3_{\text{air}}$ )			( $\text{mg}_{\text{analyte}}/\text{kg}_{\text{soil}}$ )	( $\mu\text{g}_{\text{site soil}}/\text{m}^3_{\text{air}}$ )
Lead	0.15	90	10	121,000	12.1
Arsenic	0.016	90	10	2,220	70.2

Prepared/Date: KPW 09/13/2019Checked/Date: KRC 09/13/2019Notes:

RSL = United States Environmental Protection Agency Residential Regional

Screening Level for concentration of subject analyte in air with a total carcinogenic risk of  $1 \times 10^{-6}$  and noncancer child hazard index of 1.0.

RSL is based on a 365 days per year, 24 hours per day exposure scenario.

1 - Expected duration of soil disturbance work in days

2 - Expected hours per day worked

C<sub>max</sub> = Maximum concentration of analyte detected in soil onsite

RL = Site-specific response level concentration of site dust in air

mg = milligrams

kg = kilograms

 $\mu\text{g}$  = micrograms $\text{m}^3$  = cubic meters

Calculation:

$$\text{RL} = \text{RSL} * (24 \text{ hours/Hours}^2) * (365/\text{Days}^1) / (\text{C}_{\text{max}}) * (1 \times 10^6)$$

## **APPENDIX D: SESC Permit**

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# HOUGHTON COUNTY DRAIN COMMISSIONER

401 E. HOUGHTON AVENUE  
HOUGHTON, MI 49931  
Phone (906) 482-4491 FAX (906) 482-7238  
jpekkala@houghtoncounty.net

September 11, 2019

Michael J. McGowan, PE  
Wood E&IS  
46850 Magellan Dr., Suite 190  
Novi, MI 48377

RE: Soil Erosion and Sedimentation Control Permit No. 19-155-SE

Dear Mr. McGowan:

Enclosed is a Soil Erosion and Sedimentation Control (SESC) Permit for the proposed earth change at the location specified on the permit. The SESC Site Plan that was submitted has been approved and is on file at the Houghton County Drain Commissioner's Office. Please notify my office 48 hours prior to commencing the earth change.

If you have any questions, feel free to contact me.

Sincerely,



John Pekkala, Drain Commissioner  
County Enforcing Agent for  
Soil Erosion and Sedimentation Control

(issued under the authority of part 91, Soil Erosion and Sedimentation Control,  
of the Natural Resources and Environmental Protection Act,  
1994 PA 451, as amended)

Permit No.: 19-155-SE  
 Issued: 09-11-19  
 Expires: 09-11-20  
 Extended: \_\_\_\_\_

**THIS PERMIT MUST BE POSTED AT THE PROJECT SITE.**



Permit Number: 19-155-SE

## General Conditions:

In accordance with rule 1709 promulgated under the authority of part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and in addition to the information on the attached plan(s) and special conditions, the following general conditions apply to the earth change authorized by this permit:

- Design, construct, and complete the earth change in a manner that limits the exposed area of disturbed land for the shortest period of time.
- Remove sediment caused by accelerated soil erosion from runoff water before it leaves the site of the earth change.
- Temporary or permanent control measures shall be designed and installed to convey water around, through, or from the earth change at a non-erosive velocity.
- Install temporary soil erosion and sedimentation control measures before or upon commencement of the earth change activity and maintain the measures on a daily basis. Remove temporary soil erosion and sedimentation control measures after permanent soil erosion measures are in place and the area is stabilized. (Stabilized means the establishment of vegetation or the proper placement, grading; or covering of soil to ensure its resistance to soil erosion, sliding, or other earth movement.)
- Complete permanent soil erosion control measures for the earth change within five calendar days after final grading or upon completion of the final earth change. If it is not possible to permanently stabilize the earth changes, then maintain temporary soil erosion and sedimentation control measures until permanent soil erosion control measures are in place and the area is stabilized.

## SPECIFIC CONDITIONS

48 hours notice prior to earth change

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# SOIL EROSION AND SEDIMENTATION POLLUTION CONTROL APPLICATION

Part 91, P.A. 451 of 1994

Houghton County Drain Commissioner

401 E. Houghton Avenue

Houghton, MI 49931

(906) 482-4491

Permit Number	19-155-SE
Date Issued	9-11-19
Expiration Date	9-11-20
Permit Fee \$	440.00

For Questions, please call: John Pekkala -Office (906) 482-4491

Home (906) 482-0765

Receipt # 886598

<b>1. APPLICANT</b> (Please check if the applicant is the landowner or designated agent*) ( ) Landowner (X) Designated Agent						
Name Wood E&IS				Address 46850 Magellan Dr. Ste: 190		
City Novi				State MI	Zip 48377	Area Code/Telephone (248)926-4008
<b>2. LOCATION</b>	Section 7	Town 55	Range 32	Lot No(s) 2 & 3	Township Torch Lake	Street Address: 52986 M-26
City/Village				Property ID # or Attach Property Legal Description: 31-014-307-001-75		
<b>3. PROPOSED EARTH CHANGE</b>		Project Type: ( ) Residential ( ) Multi-Family ( ) Commercial ( ) Industrial ( ) Land Balancing (X) Other				
Describe Project Soil stabilization, transportation, and site restoration						Size of Earth Change (Acres or Square Feet) 6.9 acres
Distance to Nearest Lake, Stream or Dam 138 ft.		Watercourse(s) Affected: Torch Lake		Project Start Date: 9/23/19		Project Complete Date: 11/25/19
<b>4. SOIL EROSION AND SEDIMENT POLLUTION CONTROL PLAN</b> (Note: Two (2) sets of complete plans must be attached.)						
Estimated Cost of Erosion & Sedimentation Control \$ 10,000			Plan Preparer's Name and Telephone Number: Area Code Cody Kurzer (248) 533-4992			
<b>5. PARTIES RESPONSIBLE FOR EARTH CHANGE:</b> Property Owner of Record (If not provided in Box No.1 above) NAME: Bill Siler (Silver Shores Enterprise LLC)						
Address 45505 Champlon Street			City South Range	State MI	Zip 49963	Area Code/Telephone (906) 482-8517
<b>6. Name of Individual "On Site" Responsible for Earth Change</b>				Company Name Wood E&IS		
Address 46850 Magellan Dr. Ste: 190			City Novi	State MI	Zip 48377	Area Code/Telephone (248)926-4008

I (we) affirm that the above information is accurate and that I (we) will conduct the above described earth change in accordance with Part 91, Soil Erosion and Sedimentation Control, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended, applicable local ordinances, and the documents accompanying this application.

Landowner's Signature *William H. Siler*

Date: 9-10-19

Designated Agents Signature *William H. Siler*

Date: 9-10-19

\* Designated agent must have a written statement from landowner authorizing him/her to secure a permit in the landowner's name.

**HOUGHTON COUNTY DRAIN COMMISSIONER  
SOIL EROSION/SEDIMENTATION CONTROL**

401 E. Houghton Avenue  
Houghton, MI 49931  
Phone (906)482-4491 FAX (906)482-7238

**LETTER OF AUTHORIZATION**

(Note: Complete this form only if the permit applicant or primary contact person is not the landowner of record.)

Type of Project: Environmental Remediation

Location of Project: 52986 Highway M-26

Township/City: Torch Lake, MI

Property Tax ID#: 31-014-307-001-75

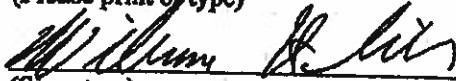
As landowner of the property described above, I authorize the person indicated below to act on my behalf for the purposes of this application for a Soil Erosion and Sediment Control Permit pursuant to Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, Act No. 451 of the Public Acts of 1994, as amended. I understand that I am responsible for all earth changes related to this project and understand that Part 91, Act 451 may be enforced against me in the event of any violation of that Act.

**LANDOWNER:**

Silver Shores Enterprise LLC

contact person: Bill Siler

(Please print or type)

  
(Signature)

45505 Champion Street, South Range, MI 49963 (906) 482-8517

(Address and Phone Number)

**LANDOWNER'S AUTHORIZED AGENT:**

Wood E&IS

(Please print or type)



# Houghton County Building Department

Address: 401 E. Houghton Ave.

Houghton, MI 49931

Phone: 906.482.2260

Website: <http://www.houghtoncounty.net/>

(Customer Copy)

(Sale)

Name: Paulette Denson

Address:

Amount: \$440.00

Svc Fee: \$13.20

Total: \$453.20

Card: MasterCard ....1549

Card: xxxx1549

Invoice: M7042 C7043

Billing Trans ID: M281749395

Service Fee Trans ID: C281749405

Reference: Houghton County Soil Erosion Permit/

Trans Date: 9/4/2019 10:23:51 AM

NOTE:

RECEIPT	date	9	/	4	/	19	No.	886598
	received from	Paulette Denson						440.00
	amount							
	for payment of	Bill Siber S/E Permit						
	<input type="radio"/> cash	<input type="radio"/> money order	<input checked="" type="radio"/> credit card	<input type="radio"/> check #				
amount due				from		to		
amount paid				signature	T. Shick			
balance				SC1152WS				