

## Site Closure Plan



**Former Vulcan Iron Works  
217 2<sup>nd</sup> Street SW  
Mason City, Iowa 50401**

*Prepared for:*

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## **1.0 INTRODUCTION**

Impact7G, Inc. (Impact7G) was retained by Eagle to prepare a Site Closure Plan (SCP) for the former Vulcan Iron Works located along 2<sup>nd</sup> Street SW in Mason City, Iowa (the Property). The Property is approximately 3.3 acres of land located in the vicinity of 217 2<sup>nd</sup> Street SW and is located within the SE ¼ and NE ¼ of Section 9, Township 96 North, Range 20 West (see Figure 1, Appendix B). The surrounding properties include residential and commercial development to the north across 2<sup>nd</sup> Street SW and wooded land and tree-covered grassland followed by Willow Creek to the east, south and west.

It is the intention of Eagle to make the Property suitable for residential development. This SCP includes risk evaluations and response actions. Response actions discussed in this SCP include excavation and disposal of contaminated soils, soil contact barriers, environmental covenants, and management of contaminated groundwater during dewatering procedures.

## **2.0 SUMMARY OF PROPERTY HISTORY**

According to previous reports, the Property was an iron works facility from circa 1900s to 1939 and a machine shop from circa 1939 to 1980s. Most recently, a building on the Property was occupied by a cap and gown rental business and the southern portion of the building was used by the Mason City Redemption Center. By 2015 all buildings on the Property were demolished and the Property was in its current state.

### **2.1 Summary of Previous Assessments**

Several phases of environmental assessments and investigations have been conducted on the Property since 2007. This section provides a summary of the work performed and significant findings. See Figures 4.1-4.4 (in Appendix B) which show polycyclic aromatic hydrocarbon (PAH) and Resource Conservation and Recovery Act (RCRA) metal concentrations in soil on the Property from sampling conducted in 2022 and 2007-2008.

#### ***Brownfield Site Specific Assessment – September 11, 2007***

On March 15 and 28, 2007, IDNR personnel completed field work at the Property. Six shallow soil samples were collected from five areas during the initial visit. Nine borings were advanced to depths of 4 to 16 feet below ground surface (bgs) on the subsequent visit. Two of the borings were converted to temporary monitoring wells. The IDNR identified the following regarding the Property:

- Bedrock was encountered at 4.5 to 6 feet bgs.
- Groundwater in the monitoring wells was encountered at 6 to 7 feet bgs.
- Concentrations of metal and semivolatile organic compound (SVOC) contaminants in soils exceed their respective Statewide Standards (SWS) at several of the sample locations on-site.
- Most elevated contaminant concentrations seem to be in surface and near surface soil, 0 to 3 feet bgs.
- These soils are encountered in areas associated with the primary foundry activities – under and around the concrete footprint of what is believed to be the original foundry.
- The soil samples with the highest concentrations of metals and SVOC contaminants were collected from granular material, assumed to be foundry waste/slag and foundry sand placed in the basement/crawlspace of the old building footprint.

- Other limited areas of impacted soils were found where the waste/slag material was apparently used as fill.
- TEH contamination was also detected, although at concentrations below Iowa Tier 1 standards.
- Contaminants in groundwater have been detected at concentrations that exceed their respective Statewide Standard.
- Shallow groundwater is not currently accessible at the site and provisions should be made to prohibit future groundwater access.
- Aside from prohibiting future groundwater access, current data suggests that groundwater remediation would not be required at this time.

***Site Assessment Report – February 21, 2008***

On November 27 and 28, 2007, December 6, 2007, and January 3, 2008, Terracon completed 14 soil borings at the Property. Three soil borings were completed as permanent monitoring wells. An additional monitoring well which had been previously installed as a temporary monitoring well was completed as a permanent monitoring well. Terracon identified the following regarding the Property:

- Monitoring wells were completed to an average depth and refusal at approximately 11 feet.
- The initial groundwater horizon was encountered between 4.5 to 10 feet bgs.
- Based on field observations, the initial groundwater horizon was encountered within the highly weathered limestone.
- Volatile organic compounds (VOCs) were detected in soil samples of four of the borings and in the groundwater samples of two of the monitoring wells, but none exceeded the SWS.
- SVOC contaminants exceeded the SWSs in both Range 1 and Range 2 soil samples.
- An SVOC contaminant was detected in one groundwater sample above the laboratory detection limit; however, it was below the associated SWS.
- TEH constituents were detected above laboratory detection limits in soil and groundwater samples; however, the values were below associated SWSs where applicable.
- RCRA metals arsenic and lead were detected in several soil samples above the SWSs. A TCLP extraction analysis was conducted for lead, arsenic, and chromium on one soil sample and concentrations were below laboratory detection limits, which indicate the RCRA metals are not leachable.
- RCRA metals were detected in groundwater samples above laboratory detection limits but did not exceed SWSs.
- Both the cancer and non-cancer risks were estimated to be unacceptable cumulative risks for site residents and site workers at the Property.
- Estimated direction of groundwater flow in the shallow water table system is generally south to southeast toward Willow Creek for the Property.
- The monitoring wells did not calculate K values (hydraulic conductivity, or the capacity of the soil to transmit water) exceeding 0.44 meters/day. This indicates the Property would be classified as having a non-protected groundwater source.

***Additional Soil Sampling Report – April 18, 2008***

On March 26, 2008, Terracon advanced 3 soil borings at the Property. Terracon identified the following regarding the Property:

- Metal and PAH contaminants were detected above laboratory detection limits in all three borings.
- One PAH contaminant was detected above the SWS.
- Other detectable concentrations of RCRA metals and PAHs were below SWSs.

***Additional Soil Sampling Report – April 24, 2009***

On March 23, 2009, Terracon advanced 2 soil borings at the Property. Terracon identified the following regarding the Property:

- Metal and PAHs above laboratory detection limits were determined in all three borings.
- One PAH contaminant was detected above the SWS.
- Metal and PAH contaminants were detected above laboratory detection limits in all three borings.

***IDNR Additional Soil Sampling Response Letter – June 8, 2009***

The IDNR provided a letter in response to Terracon's April 24, 2009 Additional Soil Sampling Report. The IDNR stated that while the detected concentration of a PAH contaminant exceeds the Statewide Standard in the soil samples collected, the Department considers that the horizontal extent of PAH contamination to the east and southeast has been defined. The IDNR requested that the existing condition be addressed during the development of a Response Action (RA) plan.

***IDNR Soil Disposal Letter – 7/9/2012***

The IDNR provided a letter to the City of Mason City regarding PAH contaminated soil at the Property. The IDNR recommended contacting the local landfill to see if they would accept the material. The IDNR also pointed out there is an issue with metals (lead and arsenic) at the Property which may well require a test for toxicity characteristic leaching potential (TCLP), a test that determines whether a solid waste is a hazardous waste.

Additional investigation was conducted in 2022 to characterize and define the extent of soil and soil vapor contamination. The Site Investigation Report (SIR) findings from March 2022 are incorporated into this SCP.

### **3.0 CURRENT SITE CONDITIONS**

#### ***3.1 Site Development***

The Site is located two blocks west of the central business district of Mason City in a primarily residential/commercial area and consists of current grass and tree-covered parcels situated on approximately 3.3 acres of land. The Property is located within the SE ¼ of the NE ¼ of Section 9, Township 96 North, Range 20 West in Mason City, Iowa, and is further located at approximately 43° 08' 58" North and 93° 12' 18" West. Identified soil contamination is shown on Figures 4.1-4.4.

### **3.2 Site Investigation Report**

Impact7G completed 14 soil borings and three soil vapor borings at the Property between January 24 and February 15, 2022. Soil samples were analyzed for VOCs, PAHs, and RCRA metals, and toxicity characteristic leaching procedures (TCLP) of RCRA metals arsenic and lead and VOCs. Soil vapor samples were analyzed for VOCs.

#### **Findings**

RCRA Metals and PAHs are present in soil exceeding Iowa Department of Natural Resources (IDNR) SWS. The 2022 SIR is presented in Appendix D.

#### **Soil**

Concentrations of PAHs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected in soil exceeding the IDNR SWS in a handful of borings both at the surface (0-2' bgs) and near surface (2-4' bgs). Additionally, concentrations of RCRA metals arsenic and lead were detected in soil exceeding the IDNR SWS in borings and depths across the Property.

Concentrations of RCRA metals arsenic and lead analyzed via TCLP did not exceed the Environmental Protection Agency's (EPA's) regulatory level. This indicates the RCRA metals are not leachable from the soil such that the soil would be considered hazardous waste. Additionally, concentrations of VOCs did not exceed the IDNR SWS and no concentrations were detected above laboratory reporting limits for TCLP analysis of VOCs.

#### **Soil Vapor**

Multiple VOCs were detected in the soil vapor samples. The detected contaminant concentrations were entered into the EPA Vapor Intrusion Screening Levels (VISL) calculator spreadsheet. The exposure scenario selected was residential and the vapor risk screening levels were calculated by selecting a carcinogenic target risk of  $1.00 \times 10^{-4}$ , a non-carcinogenic target hazard of 1.0, and an attenuation factor of 0.03 for sub-slab vapor beneath residential or small commercial buildings. All concentrations were below their respective target sub-slab and near-source soil gas VISLs for residential properties.

#### **Recommendations**

Based on the recommendations presented in the 2022 SIR report, results of the SIR indicate the degree and extent of contamination has been adequately investigated, characterized, and sufficiently defined. The SIR recommended completing a SCP and Soil Management Plan (SMP) to address the identified contaminants' potential impact to the Property's proposed residential development and to mitigate risk to associated receptors and pathways to human contact (i.e., direct contact, ingestion, water main and water service lines, vapor intrusion to sanitary sewers and enclosed space basement receptors).

## **4.0 PROPOSED REDEVELOPMENT PLANS**

### **4.1 Proposed Land Use Changes**

Eagle intends to develop the Property into an approximate 20,412 basal square foot multi-family residential building. The existing plan also includes 119 concrete pavement parking

spaces and a stormwater detention pond. All existing asphalt and concrete will be removed.

## 5.0 RISK EVALUATION

While this site is not formally enrolled in Iowa's Land Recycling Program (LRP) at 567 IAC 137, sections of that regulation are being used to assess contaminant exposure risk on the site. Subrule 567 IAC 137.10(7) specifies cumulative risk criteria that are being considered in order to develop a response action that removes contaminant exposure pathways thus eliminating risk. Cumulative risk is the summation of cancer and non-cancer risks, determined separately, and based on exposure to multiple contaminants from the same medium and exposure of the same individual to contaminants in multiple media. Evaluation of cumulative risk is conducted using the cumulative risk calculator on the IDNR Contaminated Sites Section website. The cumulative risk calculator assesses risk to potentially exposed parties, based on three standard exposure scenarios, from multiple contaminants and multiple media (i.e., groundwater, soil, and air).

To evaluate compliance with the acceptable risk criteria, the cumulative concentrations of contaminants must meet standards limiting increased cancer and non-cancer health risk. The cumulative risk criteria are as follows:

- Cumulative cancer risk shall not exceed 1 in 10,000.
- Non-cancer health risk to the same target organ shall not exceed a cumulative Hazard Quotient of 1.

Determination of exposure point concentrations for the risk calculation can be accomplished using one of the following methods.

- The maximum value for each contaminant in each medium from multiple samples of each medium of concern.
- The 95% Upper Confidence Limit (95% UCL) of the mean contaminant concentration in each medium.

For the purposes of this evaluation, the maximum contaminant concentration in soil from the 2022 Site Investigation Report was used to evaluate risk associated with the potential exposure pathways using the site resident exposure scenario based on the proposed use of the Property. The maximum contaminant concentrations were from the 0-2' bgs interval.

### **Soil**

According to the Cumulative Risk Calculator, the cumulative cancer risk for exposure to the constituents detected in soils on the Property is 28.92 for the Site Resident scenario. A cumulative cancer risk of  $\leq 1$  represents an acceptable risk. Therefore, the cumulative cancer risk for the soil is considered unacceptable.

For the Site Resident scenario, the hazard quotient of specific target organs (heart, kidney, skin, development, and gastrointestinal) was  $>1$ . A sum value for each target organ must be  $\leq 1$  to be considered acceptable for non-cancer health risk. Therefore, the risk is considered unacceptable. The unacceptable risks to the heart were due to the arsenic

concentration in SB-9 0-2' and the lead concentration in SB-14 0-2'; the unacceptable risk to the kidney were due to the benzo(g,h,i) perylene concentration in SB-2 0-2' and the lead concentration in SB-14 0-2'; the unacceptable risk to the skin was due to the arsenic concentration detected in SB-9 0-2'; the unacceptable risks to development were due to the benzo(a)pyrene concentration detected in SB-2 0-2' and the lead concentration in SB-14 0-2'; and the unacceptable risk to the gastrointestinal were due to the benzo(a)pyrene concentration detected in SB-2 0-2'.

Therefore, the risk under both scenarios is considered unacceptable and the contaminants in the soil represent a human health risk. The Cumulative Risk Calculator results are summarized in Appendix E.

### ***Groundwater***

Groundwater concentrations were not entered into the Cumulative Risk Calculator as an environmental covenant will be submitted to the Cerro Gordo County Recorder's office prohibiting the construction of water supply wells on the Property. There will be no exposure pathway on the Property to the underlying groundwater.

## **6.0 RESPONSE ACTION PLAN**

### ***6.1 Soil Excavation, Management and Disposal***

Based upon the risk evaluation, a response action is required for managing contaminated soil on the Property. According to the risk calculations, the unacceptable risks for site residents are mainly located in the vicinity of the original foundry on the north side of the Property. The proposed response action will include transporting soils excavated with contaminant levels above the applicable statewide standards to the Landfill of North Iowa and disposing as solid waste. However, the Landfill of North Iowa will not accept the soil from the 0-2' bgs range at SB-2 due to the detected concentrations of PAHs. Soil from this range/boring will be disposed of at SKB Lansing Landfill near Austin, Minnesota. As the soil will not be disposed of within the State of Iowa, the soil can be disposed of at the SKB Lansing Landfill without any waste flow documentation or authorization from the Iowa Department of Natural Resources (IDNR). No documentation is needed from the State of Minnesota for the SKB Lansing Landfill to accept the PAH-contaminated soil.

It should be noted that the arsenic soil background concentration in this part of Cerro Gordo County of 13 mg/kg at shallow depths (0-8"), based on information presented in the 2010 Iowa Statewide Trace Element Soil Sampling Project, was utilized to discern what soils to classify as solid waste and what soils could be reused at the Property. Arsenic concentrations above 13 mg/kg are deemed solid waste and soils below the background concentration can be reused at the Property. This response action was selected as the best option to meet the primary goal of reducing and prevent the potential risk to human health and/or the environmental from exposure to contaminated soils on the Property. Disturbed soil solid waste removal areas identified by depths (0-2' and 2-4' bgs) are depicted on Figure 2 in Appendix B. Disturbed soil not within the designated soil solid waste removal areas or removal depths will be allowed to be reused as fill on the Property.

Confirmation soil samples will be collected from ten locations after soil cutting has been completed to discern the extent of residual soil contamination on the Property, if any. The ten locations have been selected to get a snapshot of designated solid waste removal

areas and include locations which were previously identified as having the highest concentrations of contaminants. Confirmation soil sample locations are included on Figure 3 in Appendix B. Soil samples will be containerized, labeled, preserved, and shipped with chain-of-custody to the laboratory for the following analyses:

- RCRA metals by EPA Methods 6020A and 7471B
- PAHs by EPA Method 8270E SIM

An estimated 3,570 cubic yards (cy) of contaminated soil is anticipated to be cut during the construction of building foundations, utility trenches, and stormwater detention pond. While cut soil is planned to be used for construction on the Property, it is estimated there will be an excess of approximately 3,000 cy of cut soil to be disposed of off-site. Again, deferring to procedures in Iowa Administrative Code (IAC) Chapter 137, a minimum of 12 confirmation samples are required to be collected based on a volume of less than or equal to 3,000 cubic yards of soil to be disposed. Sampling already conducted at the Property will be used to the extent practicable to meet IAC Chapter 137 confirmation sampling requirements.

The majority of the soil to be disposed of off-site will be loaded and transported directly to the Landfill of North Iowa located at 15942 Kildeer Avenue, Clear Lake, Iowa for regulated disposal. PAH-contaminated soil from the 0-2' bgs range at SB-2 will be disposed of at the SKB Lansing Landfill located at 52906 243<sup>rd</sup> St, Austin, Minnesota. The waste materials must be tracked using bills of lading for each shipment. Any deviations from the original landfill waste profile data that could prevent the soil from being used as cover or fill material at the landfill will be reported to the Director at the Landfill of North Iowa. If additional soil samples are required to be collected for the Landfill of North Iowa, samples will be containerized, labeled, preserved, and shipped with chain-of-custody to the laboratory for the following analyses:

- Arsenic and Lead TCLP by EPA Method 6010
- PAHs by EPA Method 8270E SIM

### **6.2 Soil Contact Barrier**

Standard duty asphalt concrete composite pavement, as indicated on Figure C3.0 in Appendix C, will be covered with 7" aggregate base course and 3.5" asphalt concrete. Non-reinforced Portland cement concrete pavement, as indicated on Figure C3.0 in Appendix C, will be covered with 4" gravel cushion and 6" Portland cement concrete. These materials provide a demarcation and additional physical barrier for direct contact with soil. Landscaped areas adjacent to the building will be capped with a geotextile fabric barrier, 18" of clean compacted clay, and an additional minimum of 6" of topsoil prior to seeding or planting. The fabric in the landscape areas adjacent to the building serves as demarcation between the clean top dressing and underlying contaminated soil. The remaining landscaped areas will be capped with 18" of clean compacted clay and an additional minimum of 6" of topsoil prior to seeding or planting.

### **6.3 Environmental Covenant and Continuing Obligations**

While contaminants (cadmium and lead) were detected above the non-protected groundwater source (NPGS) SWS in groundwater from one boring in 2007, the IDNR provided comment that "Shallow groundwater is not currently accessed at the site and provisions should be made to prohibit future access. Aside from prohibiting future access,

current data suggests that groundwater remediation would not be required at this time.” The City of Mason City has established an institutional control (Ordinance 09-06) which prohibits the construction of private drinking water wells if public water is available within 200 feet. The engineering department has authority over the ordinance.

It is recommended that an environmental covenant (EC) be drafted and submitted to the Cerro Gordo County Recorder’s office prohibiting the construction of water supply wells on the Property. The EC should also detail closure conditions related to soil contamination that are to be maintained on the Property. Examples of closure conditions may include no soil disturbance unless within landscape areas and disturbances must not occur below the geotextile fabric barrier on the Property with the exception for utility maintenance or repair.

#### **6.4 Residual Groundwater Contamination and Management**

Groundwater was not encountered during the 2022 Site Investigation though groundwater was encountered at 6 to 7 feet bgs during 2007 sampling and 4.5 to 10 feet bgs during 2008 sampling. Dewatering operations are not expected, but there is possibility that groundwater may be encountered during construction.

Dewatering groundwater encountered during construction will need to be captured on-site and trucked to the City of Mason City wastewater reclamation facility. As RCRA metal contaminants were detected in groundwater above the NPGS SWS in 2007, the City wastewater reclamation facility will require sampling of the groundwater for RCRA metal and PAH contaminants prior determining whether they will accept the groundwater.

A previous Site Assessment Report dated February 21, 2008 identified three permanent monitoring wells on the Property. No additional information regarding the permanent monitoring wells was found. Any permanent monitoring wells encountered prior to or during construction will be closed in accordance with Chapter 567-39.8 of the IAC.

**7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS**



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