# 2024 Data Gap Investigation Work Plan: Sub-Areas B/C and D

## Crawford Creek and Tributary Remediation and Restoration Project – Superior, Wisconsin

May 7, 2024

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**Crawford Creek and Tributary Remediation and Restoration Project – Superior, Wisconsin**

May 7, 2024

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**Our Ref:**
30211022

# Contents



# Tables



# Figures

# Appendices

**A – December 18, 2023 and February 2, 2024 Meeting Notes**

**B – 2024 Data Gap Investigation Quality Assurance Project Plan**

**C – Example Gas-Powered Core Sampler Cut Sheet**

# Acronyms and Abbreviations

| | |
|---|---|
| Arcadis | Arcadis U.S., Inc. |
| Beazer | Beazer East, Inc. |
| bgs | below ground surface |
| CH2M | CH2M HILL, Inc. |
| DGI | data gap investigation |
| DGTM | Data Gap Technical Memorandum |
| FFS | Focused Feasibility Study |
| GLLA | Great Lakes Legacy Act |
| GLNPO | Great Lakes National Program Office |
| Jacobs | Jacobs Engineering Group, Inc. |
| NAPL | non-aqueous phase liquid |
| PAHs | polycyclic aromatic hydrocarbons |
| QAPP | Quality Assurance Project Plan |
| USEPA | United States Environmental Protection Agency |
| WDNR | Wisconsin Department of Natural Resources |

# 1 Introduction

On behalf of Beazer East, Inc. (Beazer) and the United States Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO), Arcadis U.S., Inc. (Arcadis) has prepared this 2024 Data Gap Investigation Work Plan – Sub-Areas B/C and D (2024 DGI Work Plan) to present the scope of work and procedures for supplemental data gap investigation (DGI) activities to be conducted for the Great Lakes Legacy Act (GLLA) Crawford Creek and Tributary Remediation and Restoration Project Area located in Superior, Wisconsin (the Project Area; **Figure 1**). The Project Area is located downstream of the Former Koppers Inc. Wood-Treating Facility, and has been divided into four sub-areas as shown on **Figure 2**:

- Sub-Area A – Tributary to Crawford Creek upstream of the Crawford Creek floodplain;
- Sub-Area B – Tributary to Crawford Creek within the Crawford Creek floodplain;
- Sub-Area C – Crawford Creek from the Tributary to the Soo Line railroad embankment; and
- Sub-Area D – Crawford Creek from the Soo Line railroad embankment to the Nemadji River.

Supplemental DGI activities outlined in this 2024 DGI Work Plan are focused on Sub-Areas B/C and D.

The DGI activities outlined in this 2024 DGI Work Plan will be implemented by Arcadis, with oversight provided by Jacobs Engineering Group, Inc. (Jacobs), on behalf of USEPA.

# 2 Background

In May 2018, Beazer and USEPA GLNPO signed a Project Agreement to complete a GLLA Focused Feasibility Study (FFS) for the Project Area. As an initial task in the overall GLLA FFS project, USEPA's contractor (CH2M HILL, Inc. [CH2M] a wholly owned subsidiary of Jacobs) conducted an evaluation of the existing data set (generated during prior investigations conducted between 1996 and 2016) for the Project Area to identify any data gaps that would need to be filled prior to preparing the FFS. On July 10, 2019, CH2M issued a final *Crawford Creek and Tributary Data Gap Technical Memorandum* (DGTM; CH2M 2019), which summarized the results of the data gap evaluation, and provided recommendations for additional data collection efforts.

Following the DGTM, supplemental DGI activities were completed in 2020 in accordance with the following:

- *Supplemental Data Gap Investigation Work Plan* (Arcadis 2019a);
- *Supplemental Data Gap Investigation Quality Assurance Project Plan, Crawford Creek and Tributary Remediation and Restoration Project* (Arcadis 2019b);
- A July 21, 2020 email from David Bessingpas of Arcadis documenting the scope of work for step-out borings/samples along the Tributary to Crawford Creek in Sub-Area A, as discussed during a project team conference call on July 20, 2020 (Arcadis 2020a); and
- *Addendum to the September 2019 Supplemental Data Gap Investigation Work Plan* (Arcadis 2020b).

The 2020 supplemental DGI activities included the following:

- Collection of sediment cores for visual assessment and surface/subsurface sediment samples for laboratory analysis;

- Advancement of borings for visual assessment and collection of surface/subsurface floodplain material samples for laboratory analysis;
- Collection of surface water samples for laboratory analysis; and
- Installation of temporary groundwater monitoring wells for slug testing and collection and groundwater samples for laboratory analysis.

The 2020 supplemental DGI results were summarized in a draft *Supplemental Data Gap Investigation Summary Report* (Arcadis and Anchor QEA 2021), which also included comprehensive data summary tables and figures for the 2020 and prior investigations[1]. The 2020 DGI data, along with data from pre-2020 investigations, were subsequently used to develop the *Draft Focused Feasibility Study* (2022 Draft FFS; CH2M, Arcadis and Anchor QEA 2022).

Following completion of the 2022 Draft FFS, USEPA, Beazer and the Wisconsin Department of Natural Resources [WDNR]) decided to proceed with development of a stand-alone FFS for Sub-Area A, and collection of additional DGI data for Sub-Areas B/C and D to support a revised FFS for those areas. Beazer and USEPA subsequently developed a proposed scope of work for supplemental DGI activities, which was presented to WDNR during virtual meetings on October 31 and November 14, 2023, and an in-person meeting in Eau Claire, Wisconsin on December 18, 2023. The initially proposed scope of work included 82 hand auger floodplain borings to 4 feet below ground surface (bgs) in Sub-Areas B/C and 27 hand auger borings to 4 feet bgs in Sub-Area D (with visual assessment/characterization of floodplain materials, and collection of samples for laboratory analysis). Six additional 4-foot hand auger floodplain boring locations in Sub-Area C were agreed to during the December 18, 2023 meeting (USEPA 2024a), and an additional six 4-foot hand auger floodplain boring locations in Sub-Area C were agreed to during/following a virtual meeting on February 2, 2024 (USEPA 2024b, WDNR 2024). The final scope of work presented in this 2024 DGI Work Plan includes 94 floodplain borings in Sub-Areas B/C and 27 floodplain borings in Sub-Area D. Copies of meeting notes from the December 18, 2023 and February 2, 2024 meetings are provided in **Appendix A**.

Based on the collaborative efforts between USEPA, Beazer and WDNR, including the four meetings discussed above, this 2024 DGI Work Plan represents an approach to generate additional information to compete the revised FFS. It is acknowledged that pre-design investigations may be necessary in the future to refine the remedial approach once a remedy has been selected.

# 3 Objectives

The overall objective of the DGI activities presented in this 2024 DGI Work Plan (as outlined during the October 31 and November 14, 2023 virtual meetings and December 18, 2023 in-person meeting) is to collect additional floodplain visual characterization and analytical data in the 0- to 4-foot depth interval to enhance the data set to be used for developing and evaluating floodplain remedial alternatives in a revised FFS for Sub-Areas B/C and D. As discussed during the meetings outlined in Section 2 (refer to meeting notes in **Appendix A**), Thiessen polygons were used to assist in selecting the DGI boring locations. Additional location-specific objectives/rationale for the proposed Sub-Area B/C and D DGI scopes of work are discussed in Sections 6 and 7, respectively.

[1] The draft *Supplemental Data Gap Investigation Summary Report* (Arcadis and Anchor QEA 2021) was never finalized. Relevant information/data from that report will be included in the comprehensive data summary report to be prepared following implementation of this 2024 DGI Work Plan, as further discussed in Section 8.

# 4 Overview

In summary, based on the collaborative efforts discussed in Section 2, the proposed investigations include the following:

- Advancement of 94 floodplain borings in Sub-Areas B/C for visual assessment and collection of floodplain material samples for laboratory analysis; and
- Advancement of 27 floodplain borings in Sub-Area D for visual assessment and collection of floodplain material samples for laboratory analysis.

**Tables 1 and 2** summarize the proposed DGI scope of work/rationale, and the proposed DGI locations are shown on **Figures 3 and 4**.

The remainder of this 2024 DGI Work Plan is organized into the following sections:

- Section 5 discusses general field activities/procedures;
- Sections 6 presents the proposed investigation scope of work for Sub-Areas B/C;
- Sections 7 presents the proposed investigation scope of work for Sub-Area D;
- Section 8 discusses the data review and reporting activities;
- Section 9 outlines the anticipated schedule for field investigation, data review, and reporting activities; and
- Section 10 provides a list of documents referenced throughout this DGI Work Plan.

Quality assurance/quality control procedures associated with the implementation of this 2024 DGI Work Plan, including field, laboratory, and data review/validation procedures, are outlined in the *2024 Data Gap Investigation Quality Assurance Project Plan* (2024 QAPP; Arcadis 2024), which is provided in **Appendix B**.

# 5 General Field Activities

## 5.1 Property Access

Implementation of the field investigation activities described in this 2024 DGI Work Plan will require access to the following non-Beazer-owned properties:

| Parcel ID | Sub-Area |
|---|---|
| TS-030-01324-00 | B, C |
| TS-030-01309-00 | C |
| TS-030-01336-00 | D |
| TS-030-01332-00 | D |

Beazer/Arcadis will execute access agreements with the property owners prior to mobilization. Assistance from USEPA and/or WDNR will be requested if necessary.

## 5.2 Utility Clearance

Prior to mobilization, Wisconsin One Call (i.e., Diggers Hotline) will be contacted to mark public utilities located within the investigation areas. In accordance with Arcadis standard policies, a minimum of three lines of evidence will be utilized for locating subsurface utilities. The lines of evidence anticipated to be used for this project include contacting Diggers Hotline, conducting an inspection of each location, reviewing available utility maps, discussing utility locations with property owners, and “soft digging” with a hand auger.

## 5.3 Survey

All investigation locations will be marked with a flag or stake and surveyed. Surveyed elevations will be referenced to the North American Vertical Datum of 1988 and surveyed horizontal coordinates will be referenced to the State Plane North American Datum of 1983 – Wisconsin North Zone. Locations will be surveyed to the nearest 0.01 foot (horizontal and vertical).

If necessary, proposed investigation locations may be modified slightly (10 to 15 feet) based on observed field conditions/obstructions (e.g., trees). Beazer and USEPA will discuss with WDNR any locations that require modification of more than 15 feet.

## 5.4 Equipment Cleaning

Non-dedicated/non-disposable sampling equipment will be cleaned prior to use at each sample location and between each sample interval, using the following procedure:

- Scrub with a brush and distilled/deionized water to remove large particles;
- Rinse with distilled/deionized water;
- Scrub with a brush and Alconox™ detergent wash;
- Rinse with distilled/deionized water;
- Rinse with solvent (e.g., hexane); and
- Rinse with distilled/deionized water.

## 5.5 Waste Management

Waste materials, including, but not limited to, equipment cleaning fluids, used personal protective equipment, disposable sampling equipment, and excess cuttings from the floodplain borings, will be removed from the floodplain at the end of each day and placed into 55-gallon drums. The drums will be staged in a designated area for subsequent characterization (if required) and disposal by Beazer.

## 5.6 Floodplain Boring Procedures

The floodplain borings proposed in this 2024 DGI Work Plan will be completed to a targeted depth of 4 feet bgs using a hand auger.[2] If refusal is encountered before reaching the targeted depth, up to two additional attempts will be made at nearby locations (i.e., within 5 to 10 feet of the initial boring location). A portable gas-powered core sampler will be available for use at locations where a hand auger is unable to reach the targeted depth of 4 feet bgs. A cut sheet for an example gas-powered core sampler is provided in **Appendix C**. If both the hand auger and gas-powered core sampler are unable to reach the targeted depth of 4 feet bgs at certain locations, USEPA, Beazer, and WDNR will discuss alternate approaches for completing these borings.

All floodplain boring locations and recovered soils will be photographed.

All boreholes will be properly abandoned in accordance with NR 141.25 requirements.

## 5.7 Visual Observations

Recovered floodplain materials will be described in detail in accordance with the procedures outlined in *TGI – Soil Description* included in Appendix A of 2024 QAPP (**Appendix B**), including the following as a function of depth:

- Principal component with descriptors (including angularity for very coarse sand and larger particles, plasticity for silt and clay, and dilatancy for silt and silt-sand mixtures);
- Amount and identification of minor component(s) with descriptors;
- Moisture;
- Consistency/density;
- Color; and
- Additional description or comments, such as odor; structure; bedding planes; presence of roots, root holes, organic material, man-made materials, minerals, etc.; mineralogy; cementation; presence of visual impacts such as non-aqueous phase liquid [NAPL], staining, or sheens; etc.

Visual impacts will be classified using the following descriptions used by Beazer during prior investigations:

- Type 1 – Visibly impacted with creosote-like product (e.g., NAPL, free-phase product);
- Type 2 – Visibly impacted with staining or sheens, or exhibits creosote-like odor, but does not contain visible product; and
- Type 3 – No visible impacts (i.e., staining, sheens, product) or odor.

Note that a “black stained layer” has been observed in portions of the floodplain during prior investigations, generally located from approximately 2 to 4 feet bgs, beneath approximately 2 feet of visibly clean floodplain material. If encountered, this “black stained layer” will be documented in boring logs (it will be classified as “Type 2” per the descriptions listed above, or “Type 1” if it contains creosote-like product).

[2] Refer to the *Technical Guidance Instruction (TGI) – Soil Drilling and Sample Collection*, included in Appendix A of the 2024 QAPP (**Appendix B**) for detailed hand auger boring procedures.

# 6 Sub-Areas B and C Investigation Activities

The proposed investigations for Sub-Area B/C include the advancement of 94 floodplain borings for visual assessment and collection of floodplain material samples for laboratory analysis. **Table 1** summarizes the Sub-Area B/C DGI scope of work and location-specific rationale, and the proposed Sub-Area B/C floodplain boring/sample locations are shown on **Figure 3**.

As presented in **Table 1**, and as discussed during the October 31 and December 18, 2023 meetings, the proposed Sub-Area B/C DGI scope of work was developed based on the following location-specific objectives/rationale:

- Address Sub-Area B data gaps (limited existing analytical data; 2022 Draft FFS areas based largely on visual indicators only);
- Collect additional data in the "former tributary flow path" area of the floodplain;
- Collect additional data in/near the inside bends of creek meanders (limited existing analytical data; 2022 Draft FFS areas based largely on visual indicators only);
- Collect additional data in the "former beaver pond" area of the floodplain, including features that may hydraulically connect this and other low-lying areas to the creek;
- Collect additional data along transects extending across the floodplain to refine spatial coverage;
- Collect additional data at strategic locations (not necessarily along transects) to refine spatial coverage, including perimeter locations to determine if the site boundary can be defined with the 2-year floodplain elevation (instead of the 25-year floodplain elevation, as was assumed in the 2022 Draft FFS)[3].

As indicated in **Table 1**, certain of the proposed DGI boring/sample locations are to be collocated with 1999 and 2003 investigation locations. For those locations, **Table 1** proposes to off-set the DGI locations 5 to 10 feet from the surveyed coordinates of the historical location. Locations targeting a prior boring will be off-set approximately 5 feet, and locations targeting prior test pits in inside bends of creek meanders will be off-set approximately 10 feet (toward the creek) to avoid placing a boring in a previously disturbed area. Sample location coordinates are provided in Appendix E of the 2024 QAPP (**Appendix B**).

At each of the 94 locations (**Figure 3**), a hand auger boring will be completed to a targeted depth of 4 feet bgs. Floodplain materials will be visually characterized as outlined in Section 5.7, and samples will be collected from the following intervals for laboratory analyses:

- 0 to 0.5 feet;
- 0.5 to 1 foot;
- 1 to 2 feet; and
- 2 to 4 feet.

Note that sample intervals may be adjusted in the field to account for observed changes in visual impacts and lithology (i.e., each sample interval will target a single visual observation type and lithologic type, to the extent possible). For example, if the 2- to 3-foot portion of the 2- to 4-foot sampling interval has visual impacts (e.g.,

[3] The locations satisfying this objective/rationale are identified as under "General" category in **Table 1** and on **Figure 3**.

NAPL, staining, sheens) and such visual impacts are absent from the 3- to 4-foot portion of the 2- to 4-foot interval, the two portions of the 2- to 4-foot sampling interval would be analyzed separately.

All samples will be analyzed for polycyclic aromatic hydrocarbons (PAHs) and dioxins/furans. More detailed descriptions of the associated field and laboratory procedures are provided in the 2024 QAPP (**Appendix B**).

The full 4-foot interval will be visually assessed/characterized to select the appropriate sample intervals. Once the sample intervals are selected, the materials within those intervals will be mixed/homogenized and placed into laboratory supplied sample containers as described in *TGI – Soil Drilling and Sample Collection*, included in Appendix A of the 2024 QAPP (**Appendix B**).

If Type 1 materials (visually impacted with creosote-like product; refer to Section 5.7) or Type 2 materials (visibly impacted with staining or sheens, or exhibits creosote-like odor, but does not contain visible product; refer to Section 5.7) are observed in a boring located along the perimeter of the floodplain, an additional step-out boring will be advanced at a location approximately 10-20 feet[4] farther into the floodplain (i.e. away from the creek), with samples collected from 0 to 0.5 feet, 0.5 to 1 foot, 1 to 2 feet, 2 to 4 feet for analysis of PAHs and dioxins/furans.

# 7 Sub-Area D Investigation Activities

The proposed investigations for Sub-Area D include the advancement of 27 floodplain borings for visual assessment and collection of floodplain material samples for laboratory analysis. **Table 2** summarizes the Sub-Area D DGI scope of work and location-specific rationale, and the proposed Sub-Area D floodplain boring/sample locations are shown on **Figure 4**.

As presented in **Table 2**, and as discussed during a November 14 and December 18, 2023 meetings, the proposed Sub-Area D DGI scope of work was developed based on the following location-specific objectives/rationale:

- Complete sampling at select historical (2014 and 2020) locations where the full 0- to 4-foot depth interval was not previously sampled;
- Collect additional data at strategic locations to refine spatial coverage, focused on upstream portion of Sub-Area D; and
- Collect additional floodplain analytical data to confirm that the site boundary can be defined with the 2-year floodplain elevation (as was assumed in the 2022 Draft FFS).

As indicated in **Table 2**, certain of the proposed DGI boring/sample locations are to be collocated with 2014 investigation locations. For those locations, **Table 2** proposes to off-set the DGI locations 5 feet from the surveyed coordinates of the historical location. Sample location coordinates are provided in Appendix E of the 2024 QAPP (**Appendix B**).

At each of the 27 locations (**Figure 3**), a hand auger boring will be completed to a targeted depth of 4 feet bgs. Floodplain materials will be visually characterized as outlined in Section 5.7. Samples will be collected from one or more of the following intervals for laboratory analyses (refer to **Table 2** for a summary of proposed sample intervals for each boring location):

[4] Exact distance will be determined on a location-by-location basis, in consideration of site features/conditions present (e.g., wetlands, topography).

- 0 to 0.5 feet;
- 0.5 to 1 foot;
- 1 to 2 feet; and
- 2 to 4 feet.

Note that sample intervals may be adjusted in the field to account for observed changes in visual impacts and lithology (i.e., each sample interval will target a single visual observation type and lithologic type, to the extent possible). For example, if the 2- to 3-foot portion of the 2- to 4-foot sampling interval has visual impacts (e.g., NAPL, staining, sheens) and such visual impacts are absent from the 3- to 4-foot portion of the 2- to 4-foot interval, the two portions of the 2- to 4-foot sampling interval would be analyzed separately.

The full 4-foot interval will be visually assessed/characterized to select the appropriate sample intervals. Once the sample intervals are selected, the materials within those intervals will be mixed/homogenized and placed into laboratory supplied sample containers as described in *TGI – Soil Drilling and Sample Collection*, included in Appendix A of the 2024 QAPP (**Appendix B**).

All samples will be analyzed for PAHs and dioxins/furans. More detailed descriptions of the associated field and laboratory procedures are provided in the 2024 QAPP (**Appendix B**).

# 8 Reporting

Following completion of the field work and receipt/validation of the laboratory analytical data (per the 2024 QAPP), Beazer will prepare a report to summarize the scope and findings of the 2024 DGI activities. The report will include tables and boring logs summarizing the floodplain boring visual observations, tables summarizing the floodplain material sample analytical results, maps showing the surveyed boring locations, laboratory reports, data validation reports, and WDNR Forms 4400-122 (Soil Boring Log Information) and 3300-305 (Well/Drillhole/Boring Filling & Sealing Report). As discussed during the December 18, 2023 meeting (USEPA 2024a), the report will also include comprehensive data summary tables, figures (including updated Thiessen polygon figures) and cross-sections (that include both floodplain and sediment data) that present data for the 2024 and prior investigations (for Sub-Areas A through D). Excel files for analytical data summary tables and/or laboratory electronic data deliverables (EDDs) will also be provided with the report.

# 9 Schedule

A schedule for field work implementation will be prepared following review and approval of this 2024 DGI Work Plan by USEPA, Beazer and WDNR. Depending on the timing of work plan approvals and signed access agreements, it is anticipated that the field work will be initiated in May 2024. A summary report will be submitted within approximately 90 days following receipt and validation of all laboratory analytical data. Refer to QAPP Worksheet #16 (**Appendix B**) for additional schedule information.

# 10 References

Arcadis 2019a. Supplemental Data Gap Investigation Work Plan. September.

Arcadis 2019b. Supplemental Data Gap Investigation Quality Assurance Project Plan. September.

Arcadis 2020a. Email from David Bessingpas documenting the scope of work for step-out borings/samples along the Tributary to Crawford Creek in Sub-Area A. July 21.

Arcadis 2020b. Addendum to the September 2019 Supplemental Data Gap Investigation Work Plan. July.

Arcadis 2024. 2024 Data Gap Investigation Quality Assurance Project Plan. May.

Arcadis and Anchor QEA 2021. Draft Supplemental Data Gap Investigation Summary Report. April.

CH2M 2019. Crawford Creek and Tributary Data Gap Evaluation Technical Memorandum. July.

CH2M, Arcadis and Anchor QEA 2022. Draft Focused Feasibility Study. September.

USEPA 2024a. Email from Crawford White (including Summary of December 18, 2023 In-Person Meeting). January 5.

USEPA 2024b. Email from Crawford White (including Summary of February 2, 2024 Virtual Meeting). February 12.

WDNR 2024. Email from Joseph Graham (response to Crawford White's February 12 email). February 12.

# Tables

## Table 1 - Sub-Areas B/C Proposed DGI Locations and Rationale
## Crawford Creek and Tributary GLLA Project - Superior, WI

| Work Plan Boring ID [1,5] | Scoping Boring ID [2] | General | Floodplain Transect | Former Beaver Pond Area | Inside Bend Creek Meanders | Former Tributary Flow Path Area | Sub-Area B Data Gaps | New Location [3] | Historical Location ID [4] | Rationale | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SO-B03 | CC-FPDG-1 | | | | | | X | | FP17-25'R | Sub-Area B data gap; Co-locate with prior boring with visual impacts (no analytical data) | Co-locate with FP17-25'R, 1999 boring: 2.5-3: product in clay; Step out approximately 5ft from historical location |
| SO-B04 | CC-FPDG-2 | | | | | X | X | | | Sub-Area B data gap; Former tributary flow path area | |
| SO-B05 | CC-FPDG-T01-1 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B06 | CC-FPDG-T01-2 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B07 | CC-FPDG-T01-3 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B08 | CC-FPDG-T01-4 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B09 | CC-FPDG-T02-1 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-B10 | CC-FPDG-T02-2 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B11 | CC-FPDG-T02-3 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-B12 | CC-FPDG-T03-1 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-B13 | CC-FPDG-T03-2 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B14 | CC-FPDG-T03-3 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B15 | CC-FPDG-T03-4 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-B16 | CC-FPDG-T04-1 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B17 | CC-FPDG-T04-2 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B18 | CC-FPDG-T04-3 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B19 | CC-FPDG-T04-4 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect | |
| SO-B20 | CC-FPDG-T04-5 | | X | | | | X | | | Sub-Area B data gap; Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C13 | CC-FPDG-3 | | | | | X | | | | Former tributary flow path area | |
| SO-C14 | CC-FPDG-4 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C15 | CC-FPDG-5 | | | | | X | | | | Former tributary flow path area | |
| SO-C16 | CC-FPDG-6 | X | | | | | | | FP23-30'L | General-refine spatial coverage; Co-locate with prior boring with visual impacts (limited analytical data: 0.5-1' and 1-1.5') | Co-locate with FP23-30'L, 1999 boring: 1-1.5: product; Step out approximately 5ft from historical location |
| SO-C17 | CC-FPDG-7 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C18 | CC-FPDG-8 | | | | X | | | | S11-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with S11-1, 2003 test pit: 2.5-5: black stained layer; Step out approximately 10ft from historical location |
| SO-C19 | CC-FPDG-9 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C20 | CC-FPDG-10 | X | | | | | | | FP27-25'L | General-refine spatial coverage; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with FP27-25'L, 1999 sample: 1.5-2: black staining; Step out approximately 5ft from historical location |
| SO-C21 | CC-FPDG-11 | | | | X | | | | N9-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with N9-1, 2003 test pit: 2-3.5: black stained layer, 3.5-15: product in clay fractures; Step out approximately 10ft from historical location |
| SO-C22 | CC-FPDG-12 | X | | | | | | | FP29-30'L | General-refine spatial coverage; Co-locate with prior boring with visual impacts (limited analytical data: 0.5-1' and 1-1.5') | Co-locate with FP29-30'L, 1999 sample: 1-1.5 odor, staining or sheen; Step out approximately 5ft from historical location |
| SO-C23 | CC-FPDG-13 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C24 | CC-FPDG-14 | | | | X | | | | N7-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with N7-1, 2003 test pit: 2-3.5: black stained layer, 3.5-15: product in clay fractures; Step out approximately 10ft from historical location |
| SO-C25 | CC-FPDG-15 | | | | X | | | | S6-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with S6-1, 2003 test pit: 2-4: black stained layer; Step out approximately 10ft from historical location |
| SO-C26 | CC-FPDG-16 | | | | X | | | | N5-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with N5-1, 2003 test pit: 2-7: black stained layer; Step out approximately 10ft from historical location |
| SO-C27 | CC-FPDG-17 | | | | X | | | | S4-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with S4-1, 2003 test pit: 2.5-4: black stained layer; Step out approximately 10ft from historical location |

## Table 1 - Sub-Areas B/C Proposed DGI Locations and Rationale

## Crawford Creek and Tributary GLLA Project - Superior, WI

| Work Plan Boring ID [1,5] | Scoping Boring ID [2] | General | Floodplain Transect | Former Beaver Pond Area | Inside Bend Creek Meanders | Former Tributary Flow Path Area | Sub-Area B Data Gaps | New Location [3] | Historical Location ID [4] | Rationale | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SO-C28 | CC-FPDG-18 | X | | | | | | | S3-1 | General-refine spatial coverage; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with S3-1, 2003 test pit: 2-4: black stained layer; Step out approximately 10ft from historical location |
| SO-C29 | CC-FPDG-19 | | | | X | | | | FP34-5'L | Inside bend creek meanders; Co-locate with prior boring with visual impacts (limited analytical data: 1.5-2.5') | Co-locate with FP34-5'L, 1999 sample Co-locate: 1.5-2.5: product; Step out approximately 5ft from historical location |
| SO-C30 | CC-FPDG-20 | | | | X | | | | S2-1 | Inside bend creek meanders; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with S2-1, 2003 test pit: 1-2.5: black stained layer, 2.5-9: product in clay fractures; Step out approximately 10ft from historical location |
| SO-C31 | CC-FPDG-21 | | | X | | | | | N2-1 | Former beaver pond area; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with N2-1, 2003 test pit: 1-3.5: black stained layer, 3.5-7: product in clay fractures; Step out approximately 10ft from historical location |
| SO-C32 | CC-FPDG-22 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C33 | CC-FPDG-23 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C34 | CC-FPDG-24 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C35 | CC-FPDG-25 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C36 | CC-FPDG-26 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C37 | CC-FPDG-27 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C38 | CC-FPDG-28 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C39 | CC-FPDG-29 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C40 | CC-FPDG-30 | X | | | | | | | | General-refine spatial coverage; Lateral delineation near edge of floodplain | |
| SO-C41 | CC-FPDG-31 | | | X | | | | | | Drainage channel/hydraulic connection to creek | 15 feet upstream of Crawford Creek confluence |
| SO-C42 | CC-FPDG-32 | | | X | | | | | | Drainage channel/hydraulic connection to creek | 15 feet upstream of Crawford Creek confluence |
| SO-C43 | CC-FPDG-T05-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C44 | CC-FPDG-T05-2 | | X | | | | | | | Floodplain transect | |
| SO-C45 | CC-FPDG-T05-3 | | X | | | | | | | Floodplain transect | |
| SO-C46 | CC-FPDG-T05-4 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C47 | CC-FPDG-T06-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C48 | CC-FPDG-T06-2 | | X | | | | | | | Floodplain transect; Scrub-shrub wetland | |
| SO-C49 | CC-FPDG-T06-3 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C50 | CC-FPDG-T07-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C51 | CC-FPDG-T07-2 | | X | | | | | | | Floodplain transect; Scrub-shrub wetland | |
| SO-C52 | CC-FPDG-T07-3 | | X | | X | | | | N14-1 | Inside bend creek meanders; Floodplain transect; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with N14-1, 2003 test pit: 3-6: black stained layer; Step out approximately 10ft from historical location |
| SO-C53 | CC-FPDG-T07-4 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C54 | CC-FPDG-T08-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C55 | CC-FPDG-T08-2 | | X | | | | | | N11-1 | Floodplain transect; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with N11-1, 2003 test pit: 2.5-4: black stained layer; Step out approximately 10ft from historical location |
| SO-C56 | CC-FPDG-T08-3 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C57 | CC-FPDG-T09-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C58 | CC-FPDG-T09-2 | | X | | | | | | | Floodplain transect; Scrub-shrub wetland | |
| SO-C59 | CC-FPDG-T09-3 | | X | | X | | | | S8-1 | Inside bend creek meanders; Floodplain transect; Co-locate with prior test pit with visual impacts (no analytical data) | Co-locate with S8-1, 2003 test pit: 3-5: black stained layer; Step out approximately 10ft from historical location |
| SO-C60 | CC-FPDG-T09-4 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |

## Table 1 - Sub-Areas B/C Proposed DGI Locations and Rationale

## Crawford Creek and Tributary GLLA Project - Superior, WI

| Work Plan Boring ID [1,5] | Scoping Boring ID [2] | General | Floodplain Transect | Former Beaver Pond Area | Inside Bend Creek Meanders | Former Tributary Flow Path Area | Sub-Area B Data Gaps | New Location [3] | Historical Location ID [4] | Rationale | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SO-C61 | CC-FPDG-T10-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C62 | CC-FPDG-T10-2 | | X | | | | | | | Floodplain transect | |
| SO-C63 | CC-FPDG-T10-3 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C64 | CC-FPDG-T11-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C65 | CC-FPDG-T11-2 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Step out (to higher elevation) from location associated with drainage channel | |
| SO-C66 | CC-FPDG-T11-3 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Drainage channel/hydraulic connection to creek | |
| SO-C67 | CC-FPDG-T11-4 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Step out (to higher elevation) from location associated with drainage channel | |
| SO-C68 | CC-FPDG-T11-5 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C69 | CC-FPDG-T12-1 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C70 | CC-FPDG-T12-2 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Step out (to higher elevation) from location associated with drainage channel | |
| SO-C71 | CC-FPDG-T12-3 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Drainage channel/hydraulic connection to creek | |
| SO-C72 | CC-FPDG-T12-4 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Step out (to higher elevation) from location associated with drainage channel | |
| SO-C73 | CC-FPDG-T12-5 | | X | | | | | | | Floodplain transect; Lateral delineation near edge of floodplain | |
| SO-C74 | CC-FPDG-T13-1 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Step out (to higher elevation) from location associated with hydraulic feature | |
| SO-C75 | CC-FPDG-T13-2 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Drainage feature/hydraulic connection to creek | |
| SO-C76 | CC-FPDG-T13-3 | | X | X | | | | | | Floodplain transect; Former beaver pond area; Step out (to higher elevation) from location associated with hydraulic feature | |
| SO-C77 | CC-FPDG-33 | | | | | | | X | | Added during December 18, 2023 in-person meeting | |
| SO-C78 | CC-FPDG-34 | | | | | | | X | | Added during December 18, 2023 in-person meeting | |
| SO-C79 | CC-FPDG-T08b-1 | | | | | | | X | | Added during December 18, 2023 in-person meeting | |
| SO-C80 | CC-FPDG-T08b-2 | | | | | | | X | | Added during December 18, 2023 in-person meeting | |
| SO-C81 | CC-FPDG-T08b-3 | | | | | | | X | | Added during December 18, 2023 in-person meeting | |
| SO-C82 | CC-FPDG-35 | | | | | | | X | | Added during December 18, 2023 in-person meeting | |
| SO-C83 | -- | | | | | | | X | | Added during/following February 2, 2024 virtual meeting | |
| SO-C84 | -- | | | | | | | X | N18-1 | Added during/following February 2, 2024 virtual meeting | Co-locate with N18-1, 2003 test pit: 0-9ft, no visual indicators recorded; Step out approximately 10ft from historical location |
| SO-C85 | -- | | | | | | | X | S17-1 | Added during/following February 2, 2024 virtual meeting | Co-locate with S17-1, 2003 test pit: 0-10ft, no visual indicators recorded; Step out approximately 10ft from historical location |
| SO-C86 | -- | | | | | | | X | N16-1 | Added during/following February 2, 2024 virtual meeting | Co-locate with N16-1, 2003 test pit: 0-9ft, no visual indicators recorded; Step out approximately 10ft from historical location |
| SO-C87 | -- | | | | | | | X | S15-1 | Added during/following February 2, 2024 virtual meeting | Co-locate with S15-1, 2003 test pit: 0-9.5ft, no visual indicators recorded; Step out approximately 10ft from historical location |
| SO-C88 | -- | | | | | | | X | S13-1 | Added during/following February 2, 2024 virtual meeting | Co-locate with S13-1, 2003 test pit: 0-9.5ft, no visual indicators recorded; Step out approximately 10ft from historical location |

## Table 1 - Sub-Areas B/C Proposed DGI Locations and Rationale
## Crawford Creek and Tributary GLLA Project - Superior, WI

**Notes:**
1. Work Plan Boring IDs are a continuation of IDs used during the 2020 Data Gap Investigation.
2. Scoping Boring IDs are IDs use on tables and figures during October 31 and December 18, 2023 meetings.
3. New Locations include 6 locations added per discussions during a December 18, 2023 meeting, and an additional 6 locations added during/following a February 2, 2024 (virtual) meeting.
4. Historical Location IDs are identified for selected locations that are specifically targeting historical investigation locations.
5. Location coordinates are provided in Appendix E of the 2024 QAPP.

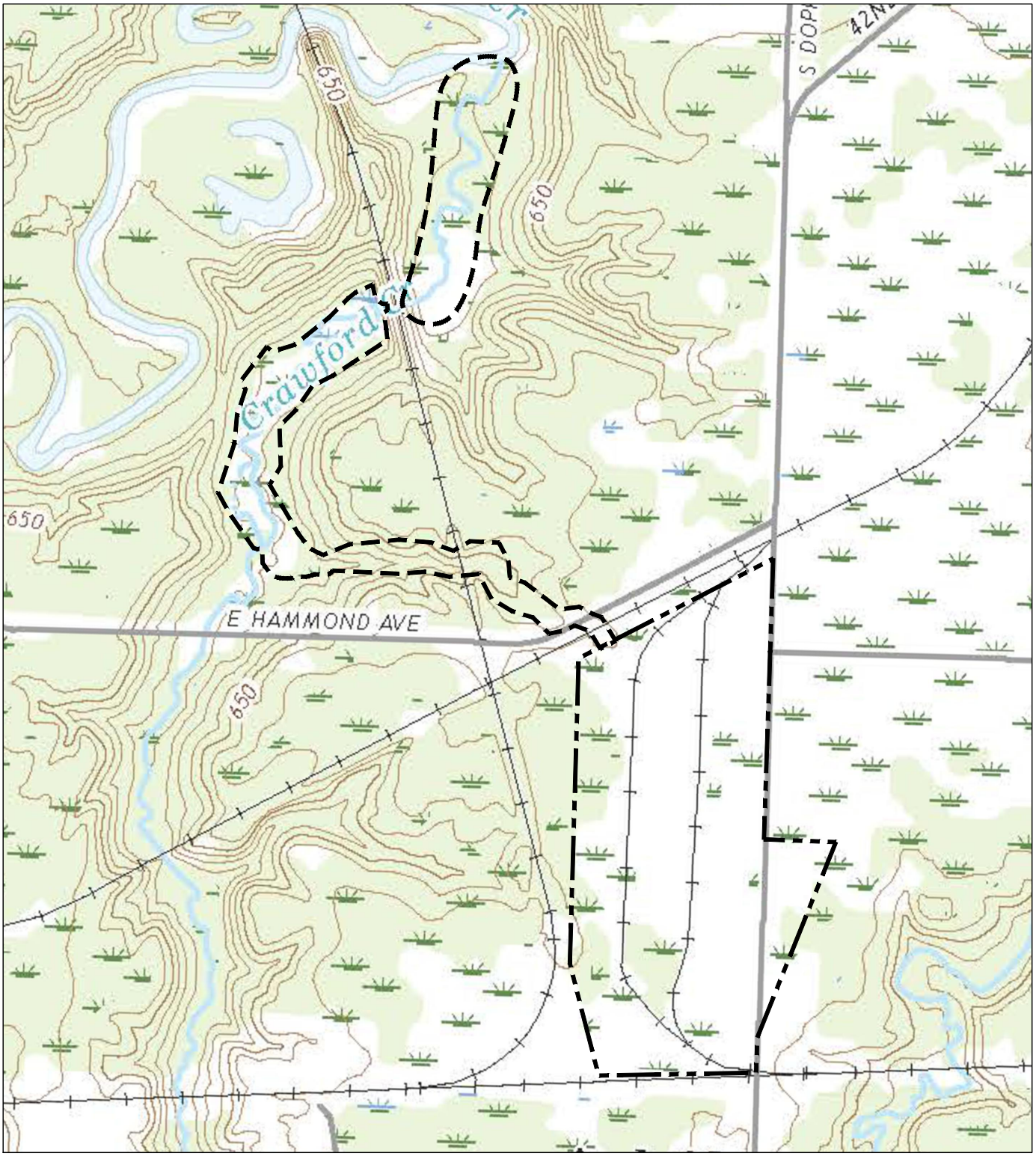
**Table 2 - Sub-Area D Proposed DGI Locations and Rationale**
**Crawford Creek and Tributary GLLA Project - Superior, WI**

| Work Plan Boring ID [1,4] | Scoping Boring ID [2] | Sample Depth (feet bgs) | | | | Historical Location ID [3] | Sampling Rationale | Notes |
|---|---|---|---|---|---|---|---|---|
| | | 0-0.5 | 0.5-1 | 1-2 | 2-4 | | | |
| CF-02-B-2024DGI | CC-FPDG-CF-02-B | Exist | Exist | Exist | New | CF-02-B | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-01-C-2024DGI | CC-FPDG-CF-01-C | Exist | New | New | New | CF-01-C | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-01-D-2024DGI | CC-FPDG-CF-01-D | Exist | Exist | New | New | CF-01-D | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| SO-D05-2024DGI | CC-FPDG-SO-D05 | Exist | Exist | Exist | New | SO-D05 | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| FP-01-2024DGI | CC-FPDG-FP-01 | Exist | Exist | New | New | FP-01 | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-03-A-2024DGI | CC-FPDG-CF-03-A | Exist | Exist | New | New | CF-03-A | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| SO-D04-2024DGI | CC-FPDG-SO-D04 | Exist | Exist | Exist | New | SO-D04 | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-05-B-2024DGI | CC-FPDG-CF-05-B | Exist | Exist | New | New | CF-05-B | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-05-C-2024DGI | CC-FPDG-CF-05-C | Exist | New | New | New | CF-05-C | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-06-B-2024DGI | CC-FPDG-CF-06-B | Exist | New | New | New | CF-06-B | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-07-B-2024DGI | CC-FPDG-CF-07-B | Exist | New | New | New | CF-07-B | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-07-A-2024DGI | CC-FPDG-CF-07-A | Exist | Exist | New | New | CF-07-A | Co-Located with historical sample which exceeds PRG at deepest interval analyzed | Step out ~5ft from historical location |
| CF-06-D-2024DGI | CC-FPDG-CF-06-D | Exist | Exist | New | New | CF-06-D | Characterize western floodplain concentrations | |
| SO-D09 | CC-FPDG-01D | New | New | New | New | | Characterize western floodplain boundary concentrations | |
| SO-D10 | CC-FPDG-02D | New | New | New | New | | Characterize western floodplain boundary concentrations | |
| SO-D11 | CC-FPDG-03D | New | New | New | New | | Characterize southern floodplain concentrations | |
| SO-D12 | CC-FPDG-04D | New | New | New | New | | Characterize southern floodplain concentrations | |
| SO-D13 | CC-FPDG-05D | New | New | New | New | | Characterize floodplain boundary concentrations | |
| SO-D14 | CC-FPDG-06D | New | New | New | New | | Characterize eastern floodplain concentrations | |
| SO-D15 | CC-FPDG-07D | New | New | New | New | | Characterize central floodplain concentrations | |
| SO-D16 | CC-FPDG-08D | New | New | New | New | | Characterize western floodplain concentrations | |
| SO-D17 | CC-FPDG-09D | New | New | New | New | | Characterize central floodplain concentrations | |
| SO-D18 | CC-FPDG-10D | New | New | New | New | | Characterize eastern floodplain concentrations | |
| SO-D19 | CC-FPDG-11D | New | New | New | New | | Characterize eastern floodplain boundary concentrations | |
| SO-D20 | CC-FPDG-12D | New | New | New | New | | Characterize eastern/downstream floodplain concentrations | |
| SO-D21 | CC-FPDG-13D | New | New | New | New | | Characterize southern floodplain boundary concentrations | |
| SO-D22 | CC-FPDG-14D | New | New | New | New | | Characterize eastern floodplain boundary concentrations | |

| | Counts | | | | Total |
|---|---|---|---|---|---|
| Existing: | 13 | 9 | 3 | 0 | 25 |
| New: | 14 | 18 | 24 | 27 | 83 |

**Notes:**
bgs = below ground surface
Exist = Analytical data exist for specified depth interval (use existing data, do not re-sample).
New = Additional analytical data to be collected for specified depth interval.
1. Work Plan Boring IDs are a continuation of IDs used during the 2020 Data Gap Investigation, except for those that are specifically targeting historical sample locations.
2. Scoping Boring IDs are IDs use on tables and figures during November 14 and December 18, 2023 meetings.
3. Historical Location IDs are identified for selected locations that are specifically targeting historical investigation locations.
4. Location coordinates are provided in Appendix E of the 2024 QAPP.

# Figures




REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., SUPERIOR, WI, MN, 2018.

0 1000' 2000'

Approximate Scale: 1 in. = 1000 ft.

LEGEND:

CRAWFORD CREEK AND TRIBUTARY PROJECT AREA

FORMER KOPPERS INC. FACILITY


WISCONSIN

CRAWFORD CREEK AND TRIBUTARY SITE
SUPERIOR, WISCONSIN
**2024 DATA GAP INVESTIGATION WORK PLAN**

# PROJECT AREA LOCATION MAP

ARCADIS

FIGURE
1

CRAWFORD CREEK

NEMADJI RIVER

TRIBUTARY TO CRAWFORD CREEK

HAMMOND AVENUE

FORMER KOPPERS INC. WOOD-TREATING FACILITY

COUNTY ROAD A

A

B

C

D

FLOW

FLOW

FLOW

**LEGEND:**

- SITE BOUNDARY – CRAWFORD CREEK AND TRIBUTARY SITE
- SUB-AREAS TO BE EVALUATED IN GREAT LAKES LEGACY ACT FOCUSED FEASIBILITY STUDY FOR CRAWFORD CREEK AND TRIBUTARY REMEDIATION AND RESTORATION
- CRAWFORD CREEK
- TRIBUTARY TO CRAWFORD CREEK

**NOTE:**

1. ESRI AERIAL DATED 2017..

0 250' 500'
GRAPHIC SCALE

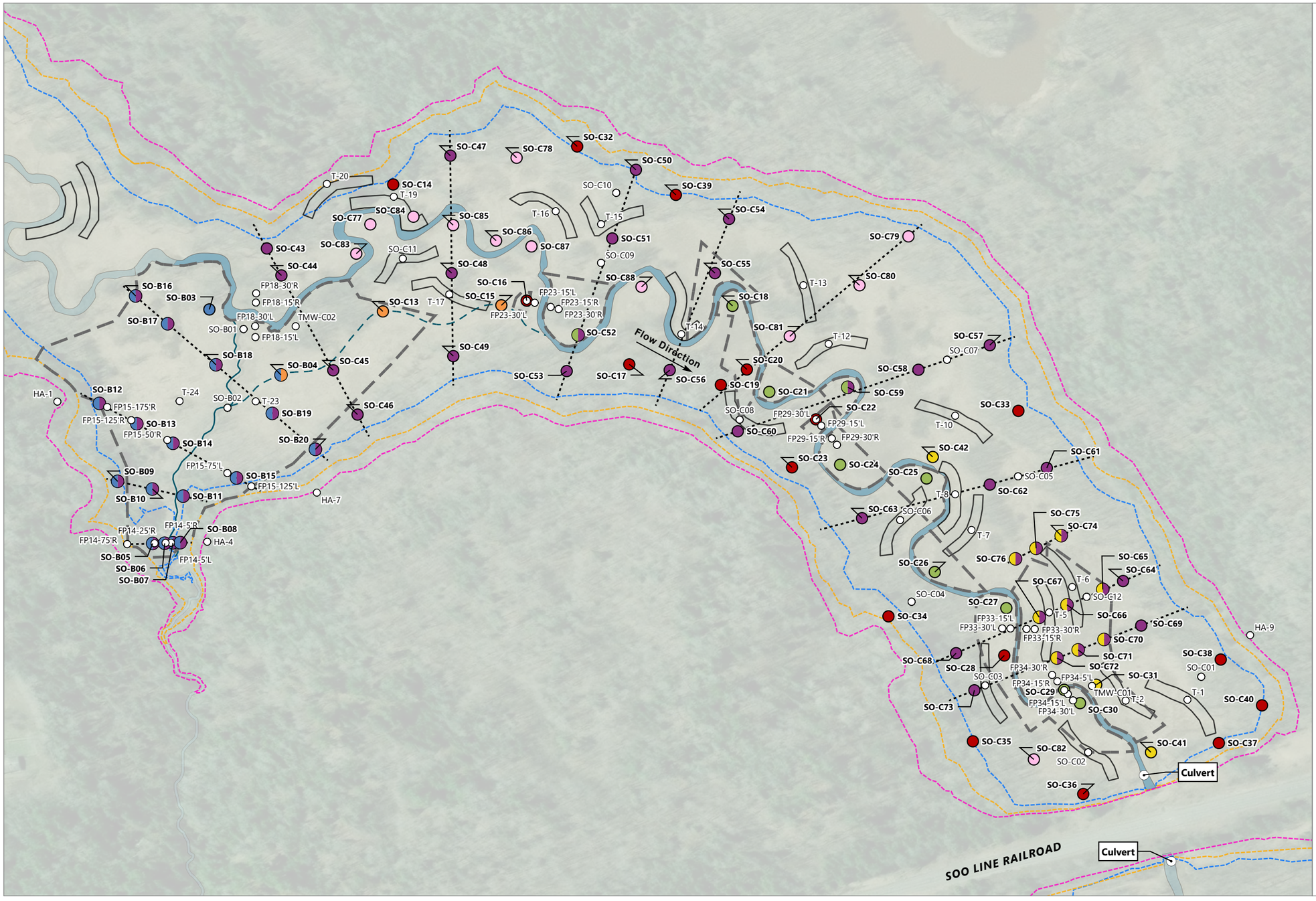
CRAWFORD CREEK AND TRIBUTARY SITE
SUPERIOR, WISCONSIN
**2024 DATA GAP INVESTIGATION WORK PLAN**

# PROJECT AREA PLAN

ARCADIS

FIGURE
**2**

DRAFT




**LEGEND:**

- Existing Sample Location
- Composite Sample Area
- Estimated Lateral Extent of Floodplain NAPL Indicator Area 0-4 Feet Depth
- Culvert
- Crawford Creek
- Tributary to Crawford Creek
- Former Tributary

**Floodplain Boundary (year)**

- 2
- 25
- 100

**Proposed DGI Sample Location**

- General
- Floodplain Transect
- Former Beaver Pond Area
- Inside Bend Creek Meanders
- Former Tributary Flow Path Area
- Sub-Area B Data Gaps
- New Location Added Following December 18, 2023 Meeting
- Proposed Sample Transect Line

**NOTES:**

1. Arrow indicates flow direction of creek/river.
2. Aerial Imagery: Esri Online Services.

0 300

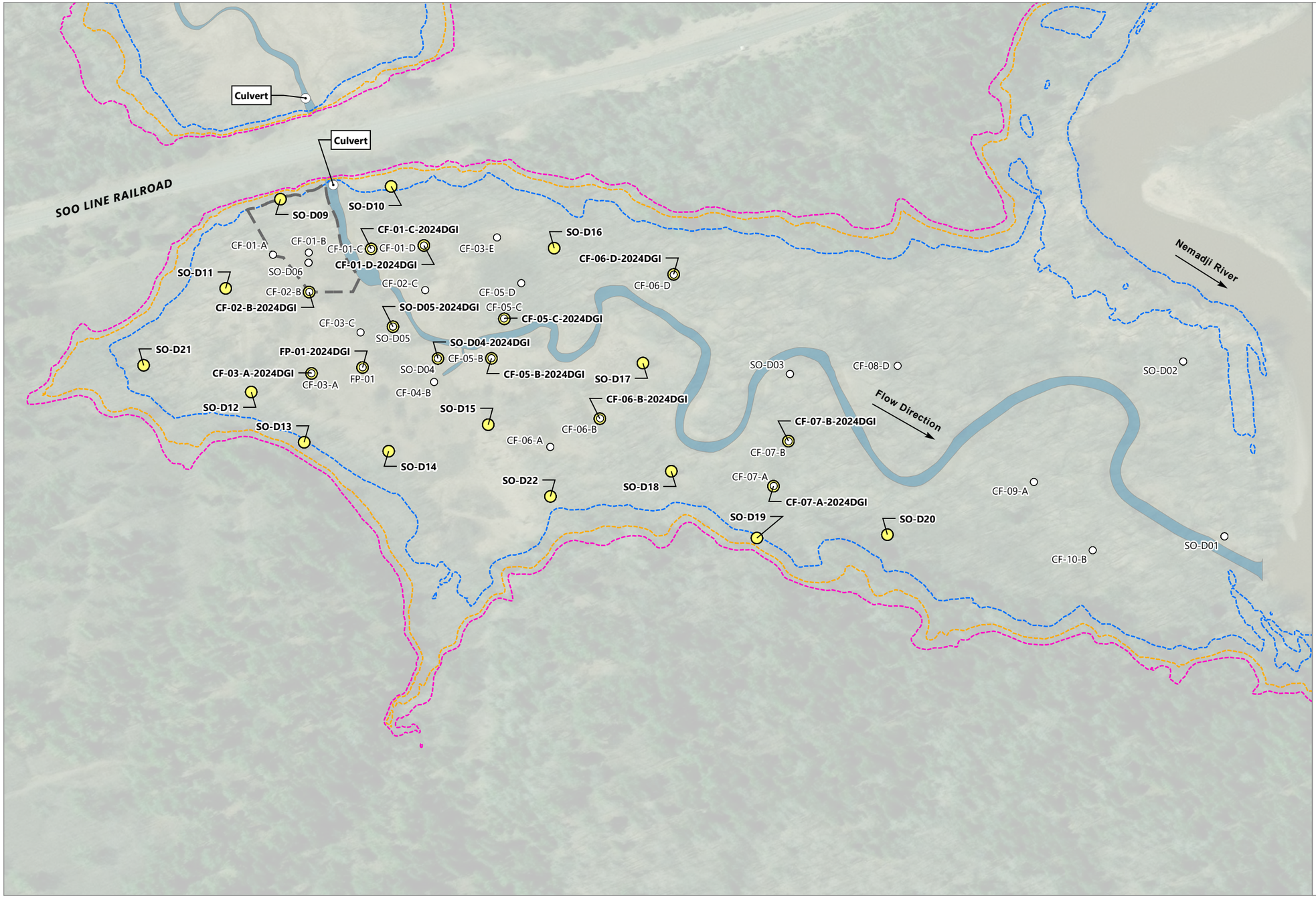
Feet

Publish Date: 2024/03/11, 4:00 PM | User: alesueur
Filepath: \\orcas\gis\Jobs\BeazerEast_0870\OffPropertyArea2019\Maps\DataGaps_Investigation\Beazer_DGI.aprx

ANCHOR QEA

**Figure 3**
**Sub-Areas B/C Proposed DGI Locations**
Crawford Creek and Tributary Site

DRAFT




**LEGEND:**

- Existing Sample Location
- Proposed DGI Sample Location
- Estimated Lateral Extent of Floodplain NAPL Indicator Area 0-4 Feet Depth
- Culvert
- Crawford Creek

**Floodplain Boundary (year)**

- 2
- 25
- 100

**NOTES:**

1. Arrow indicates flow direction of creek/river.
2. Aerial Imagery: Esri Online Services.

0 300

Feet

Publish Date: 2024/03/11, 4:00 PM | User: alesueur
Filepath: \\orcas\gis\Jobs\BeazerEast_0870\OffPropertyArea2019\Maps\DataGaps_Investigation\Beazer_DGI.aprx

ANCHOR QEA

**Figure 4**
**Sub-Area D Proposed DGI Locations**
Crawford Creek and Tributary Site

# Appendix A

## December 18, 2023 and February 2, 2024 Meeting Notes

**From:** White, Crawford <White.Crawford@epa.gov>
**Sent:** Friday, January 5, 2024 1:48 PM
**To:** Graham, Joseph R - DNR <joseph.graham@wisconsin.gov>; Sager, John E - DNR <John.Sager@wisconsin.gov>; Saari, Christopher A - DNR <Christopher.Saari@wisconsin.gov>; Endsley, Erin A - DNR <erin.endsley@wisconsin.gov>
**Cc:** Judy Fassbender <Judy.Fassbender@wisconsin.gov>; Steiger, Matthew B - DNR <Matthew.Steiger@wisconsin.gov>; Klatt, David/CHC <David.Klatt@jacobs.com>; Evanko, Hillary M (Pittsburgh) USA <Hillary.Evanko@Trmi.biz>; Patarcity, Jane M (Pittsburgh) USA <Jane.Patarcity@TRMI.Biz>; Seaman, Jennifer/CHC <jennifer.seaman@jacobs.com>; Anderson, Paul <Paul.Anderson@arcadis.com>; Pfeiffer, Danielle <Danielle.Pfeiffer@arcadis.com>; Stuart Messur <smessur@anchorqea.com>; Bessingpas, David <David.Bessingpas@arcadis.com>; Hagen, Cherie L - DNR <Cherie.Hagen@wisconsin.gov>; Cieniawski, Scott <cieniawski.scott@epa.gov>; Williams, Heather <williams.heather@epa.gov>
**Subject:** Crawford Creek GLLA PCT Meeting Notes (12/18/23 and 01/05/24)

Hi All,

Below is the summary of outcomes from our December 18th in-person meeting in Eau Claire, as discussed on our first Project Coordination Team (PCT) this morning. We ask that DNR respond with any revisions or clarifying questions. We did add the list of attendees to the end of the summary.

## Summary of December 18th, 2023 In-Person Meeting

**General/DGI Work Plan Scope:**

- EPA, Jacobs, and the Beazer Team greatly appreciate the productive meeting, and wish to continue the face-to-face meetings to keep the positive momentum.
- Group agreed to add 6 new sampling locations to Sub Area C to increase sampling density and reduce potential polygon decision unit size in several areas. Team to present revised set of figures and resulting polygons. Otherwise, general sampling approach outlined in prior Powerpoint presentations can be used to write the data gap investigation (DGI) work plan. (CMW post-call note – AQEA provided figures presented on call, attached)
- There was general agreement that the DGI approach, inclusive of the 6 new locations, will focus on the upper 4 feet bgs to establish nature and extent for FFS purposes, but there may be a need for more data during a future pre-design investigation (PDI) depending on the design needs for the remedy selected.
- There was agreement that the DGI does not need to include PCP analysis based on prior results.
- DGI Work Plan will outline a process for how boring step-outs will be conducted along the perimeter of the floodplain.
- DGI Work Plan will outline an approach and contingencies to allow samples to be collected for the full 4-foot proposed sample interval.
- DGI Work Plan will outline how the interval sampling process will be conducted and include contingencies for modifying or collecting additional data, especially the 2-4' interval. Will consider multiple samples to be collected between 2-4' especially if deeper clean layer is encountered. Also need to consider collecting consistent data set across depths and across the site, especially for dioxin analytical.
- For Sub Area D, the proposed DGI locations are sufficient for FFS purposes, but over-arching comments from B/C still apply (i.e. clarify step outs and sample interval approach).
- For Sub Area A, Beazer/EPA can move forward with the modeling effort. Anticipate conducting modeling in Jan/Feb, with a Draft tech memo (TM) submitted to WDNR in late March.

**DGI (Site Investigation) Reporting Expectations:**

- WDNR desires a standalone data summary report that is comprehensive and can be uploaded to BRRTS ahead of the FFS, so that the FFS can reference all site data from one document, satisfying an NR700 requirement for the FFS. Include 2021 DGI results. WDNR does not need/want all the lab reports and boring logs going back to 1999 (just reference location where this info is located). WDNR acknowledged that we have most of the elements now, to be supplemented with DGI-updated data and improved cross sections, and visualizations.
- Include Sub-Area A data in the comprehensive summary report. WDNR noted that it is not a problem to submit the Sub-Area A FFS prior to the complete Site Investigation report.
- WDNR desires cross sections that include the creek and floodplain together (soil and sediment) and more detailed cross-sections.
- We can proceed with updating Thiessen polygons and color-coding exceedances by depth. Update the "stick figures" with new data. Overall desire better/more clear data representation that can combine visual and analytical together. No requirement for EVS model or iso-concentration maps - just a consideration for visualization of the data.
- Report should show the culvert elevation relative to floodplain on figures and cross sections so that it is clear on how the data and culvert align vertically. However, WDNR acknowledges that culvert elevation is most relevant within the meanders of the creek where the creek could cut the banks due to erosion. Culvert elevation is less applicable to outer edges of floodplain and farther upstream near Sub-Area B.

**Schedule**

- Jan 5 - first recurring monthly call with WDNR. Discuss recap of 12/18 meeting and path forward.
- Beazer to begin access agreement process while planning for the field work.
- Submit DGI Work Plan/QAPP to WDNR in March for review/concurrence.
  Also Area A Modeling Tech Memo in March
- Next proposed face-to-face meeting is April 2/3 (likely in Milwaukee or Madison). Purpose will be to discuss DGI Work Plan/QAPP, and upcoming field work. Area A modeling results (Different group of people),
- Target to mobilize to field in May

**Attendees**

White, Crawford
Graham, Joseph R
Saari, Christopher A (virtual)
Sager, John E
Williams, Heather
Patarcity, Jane M
Klatt, David
Seaman, Jennifer
Bessingpas, David
Anderson, Paul
Stuart Messur
Fassbender, Judy L
Endsley, Erin A
Cieniawski, Scott
White, Patricia (virtual)
Winter, Douglas (virtual)

**From:** White, Crawford <White.Crawford@epa.gov>
**Sent:** Monday, February 12, 2024 9:41 AM
**To:** Graham, Joseph R - DNR; Sager, John E - DNR; Saari, Christopher A - DNR; Endsley, Erin A - DNR
**Cc:** Judy Fassbender; Steiger, Matthew B - DNR; Klatt, David/CHC; Evanko, Hillary M (Pittsburgh) USA; Patarcity, Jane M (Pittsburgh) USA; Seaman, Jennifer/CHC; Anderson, Paul; Pfeiffer, Danielle; Stuart Messur; Bessingpas, David; Hagen, Cherie L - DNR; Cieniawski, Scott; Williams, Heather
**Subject:** RE: Crawford Creek GLLA PCT Meeting Notes (12/18/23 and 01/05/24)
**Attachments:** Proposed DGI Locations - Sub-Areas B-C (updated 2-2-24).pdf

Hi All,

Below is the summary of our February 2nd PCT virtual meeting. We ask that DNR respond with any revisions or clarifying questions. I did highlight an important note in **red**.

Our next PCT call is set for Friday, March 1st. I will reach back out with an agenda when we have one, but that call may simply be a schedule/progress update.

## Summary of February 2nd, 2024 PCT Virtual Meeting

**Call**

- Heather reviews the agenda
- Joe requests an update on what team is doing in between calls
- Note – Crawford not on call, please confirm attendees. List and notes made by Dave K & Jennifer S.

**Discussion: Polygonal Shapes w/ Depth**

- Dave B showed the figures and reviewed the explanation of how polygons for the four depth intervals were overlain from the bottom up to develop the 4' excavation alternative in the 2022 draft FFS. This same approach would be used for development of removal alternatives in the revised FFS.
- WDNR appreciated the clarification on how polygons might be applied and they do not need the written explanation right now, but keep it on hand. Stu suggests that we include this explanation in the FFS and DNR agrees. Note that John Sager was thinking the polygons would be applied from the surface down, rather than the bottom up, so Dave B's description was very helpful.

**Discussion: Additional Area C inside creek bend locations**

- DNR requesting additional data on inside meander bends.
- Dave B reviews the "stick figure" showing visual data and the proposed sampling locations.
- Samples proposed for "inside creek bends" are where we have seen visual NAPL indicators but where we do not have analytical data.
- Dave B discusses site heterogeneity. Joe asks if the visual indicators were borings or test pits. Dave B would have to review the data behind the "stick figure" more but thinks that most are test pits. Joe's major concern was that if NAPL was in fractures or seams, is it possible that past test pits or borings on the inside bends missed NAPL zones.
- Joe requests that test pit info be added to the stick figure - depth, dimensions, orientation.

- Main area of concern to DNR is lack of data or proposed locations to the south of SO-C09. DNR would like to confirm the conceptual site model.
- DNR points out that we do not have chemistry data on the inside meanders, including for dioxin.
- Dave K suggests that rather than go back and forth with WDNR on sufficiency of test pit or boring observations, that we just agree now on one or two key locations to fill potential data gap.
- DNR requests 4 more sample locations - Dave B marks up agreed-upon locations on a map. **Post-call note – Based on discussions following the call, GLLA team proposes to add two additional inside creek bend sample locations (for a total of six new locations), as shown on the attached map. Pending WDNR's concurrence, these locations will be added to the DGI Work Plan.**
- John Sager brought up an interesting potential explanation for why there may not be NAPL in the central portion of Area C: He speculated that the former Tributary was actively flowing during a period where NAPL was deposited and that a section of the Crawford Creek in Area C was essentially bypassed during that time.

**Discussion: Written Summary of 12/18 Meeting**

- DNR does not have any changes or additions to the meeting notes.

**Open Discussion: Schedule, Progress, April Meeting**

- DGI work plan - we will use the existing QAPP and make note of any modifications required.
- Dave B had updates with modelers - well underway and making progress for Area A. Working toward an Area A Modeling Tech Memo, but not sure it can get done by April meeting.
- Plan to submit DGI Work Plan/QAPP to DNR in March for review.
- Stu suggests that if the Area A Modeling Tech Memo isn't completed by the April meeting, we can give an update on the progress.
- Beazer is working on access agreements. Will be reaching out to property owners in 2-3 weeks.
- Joe Graham states that Area A - OHWM would be critical information to have sooner than later.
- Perhaps WDNR can flag the OHWM in the spring so it can be surveyed by Beazer team in May during DGI.
- Place & time for 4/2-4/3 meeting - proposed in Milwaukee.
    1. Tues, 4/2 PM: DGI Work Plan
    2. Dinner on 4/2
    3. Wed, 4/3 AM (~2 hours, starting at 8:30 or 9 am): Area A - note that DNR modeler would not attend in-person, but possibly attend by video.
    4. Judy has confirmed meeting rooms booked. (We have confirmed meeting space in DNR's Milwaukee office located at 1027 St. Paul Avenue, Milwaukee. We will be in Room 107, the Harbor Room.)

**Attendees**

Graham, Joseph R
Sager, John E
Saari, Christopher A
Endsley, Erin A
Patarcity, Jane M
Evanko, Hillary M
Bessingpas, David

Stuart Messur
Anderson, Paul
Danielle Pfeiffer
Klatt, David
Seaman, Jennifer
Williams, Heather

Thanks All!

- GLLA Team.

Crawford White, Ph.D., PG
USEPA | Great Lakes National Program Office

# Appendix B

## 2024 Data Gap Investigation Quality Assurance Project Plan

**Provided in separate PDF**

# Appendix C

## Example Gas-Powered Core Sampler Cut Sheet

# Gas Powered Core Sampling Kit

## INTRODUCTION

Thank you for choosing AMS, Inc.

The Gas Powered Core Sampling Kit with the Gas Powered REDI Boss Hammer is ideal for obtaining core samples up to a depth of 8' (2.4m).


## APPLICATION

- Collect core samples to determine soil health.
- Minimal soil compaction.

## DESCRIPTION

The Gas Powered Core Sampling Kit's Lower & Upper Extensions have male/female (modified acme) heat treated threads. The 4' Gas Powered Slotted Sampler Tube allows the sampler to be used with or without a plastic liner. If a sample is collected without a plastic liner, the Cleanout Spoon may be used to eject the core sample from the slot.

Also included in the kit are two (2) Lower and two (2) Upper Gas Powered Extensions. Extensions give you the option of creating a 2' or 4' sampler. Upon assembly, you will notice two parallel knurl marks on each of the four (4) extensions. When creating a 2' sampler, the knurl marks should be at the top of the extension. When creating a 4' sampler, the knurl marks on both extensions should meet at the connection point in the middle of the sampler. Properly connecting your extensions with these knurl marks will ensure the proper timing of your plastic liner so there is minimal 'liner float' inside the sampler.

Whether you are running a 2' sampler or a 4' sampler, there will be times when you need to lower the sampler in an existing borehole in order to collect a core from a deeper interval. This is when you will use the Gas Powered Liner Retainer Coupler. The retainer coupler holds the plastic liner in place inside the 'lead' sampler and allows you to add additional sampler extension. After driving your sampler to depth, the Foot Jack is an ergonomic and easy way to remove your sampler. Simply slide the 2" Foot Jack Shackles over the drive head of the sampler and step on the foot pad of the Foot Jack. The Foot Jack Shackles will automatically fall lower on the sampler and grab each time you press down on the foot pad. Please note that if the soil is soft at the surface, it is beneficial to have additional stability underneath the footplate of the Foot Jack to keep it from sinking. Under hard packed soil conditions, sometimes it's necessary to use the JackJaw® or Big Foot Removal Jack as the two jacks have more leverage than the Foot Jack.

## IMPORTANT NOTE

- Stronger sample rods compared to typical hand sampling soil probes
- Ideal for taking 2 ft. & 4 ft. length continuous core samples by hand
- Designed from our AMS PowerProbe tooling design
- Solution for low overhead and remote access areas
- Can be used with or without a plastic liner
- No Power Necessary

## SKU: 360.01

## KIT WEIGHT: 162 lbs

## SPECIFICATIONS

- Heat Treated 4130 Steel

Agricultural
Geotechnical
Environmental
Groundwater

105 Harrison St.
American Falls, ID 83211

Toll Free: 800-635-7330
Office: 208-226-2017

ams@ams-samplers.com

www.facebook.com/amssampling
www.instagram.com/amsinc/
www.linkedin.com/company/ams-inc/
www.ams-samplers.com

## KIT INCLUDES

#213.93 - (1) Gas Powered REDI Boss Hammer w/ 3-1/8" Barrel
#61453 - (1) 4' Gas Powered Slotted Sampler Tube
#61448 - (2) Gas Powered Lower Extension
#61451 - (2) Gas Powered Upper Extension
#61450 - (1) Gas Powered Drive Tip
#61642 - (1) Gas Powered Liner Retainer Coupler
#61449 - (1) Gas Powered Drive Head Adapter
#14327 - (2) 14" Pipe Wrench
#57875 - (1) Cleanout Spoon
#61431 - (1) Foot Jack Only
#61568 - (1) 2" Foot Jack Shackles (1 set)
#5006.84 - (1) Steel Tee Handle, 3/8" Thread
#5009.20 - (1) 4' Rod For Accessories, 3/8" Thread
#5618.118 - (1) 3/8" X 3' Internal Rod w/ Coupler, 3/8" Thread
#5009.09 - (1) Brush for 2-1/8" or 2-3/8" Direct Push Extensions, 3/8" Thread
#405.41 - (1) 1-1/2"X 4' Plastic Liner
#405.40 - (1) 1-1/2" X 2' Plastic Liner
#61876 - (1) 1-1/2" Plastic Core Catcher
#418.08 - (4) 1-1/2" Plastic End Cap
#430.25 - (1) 3' Deluxe Carrying Case 1700 Black
#430.01 - (1) 4' Deluxe Carrying Case 1750 Black

## ACCESSORIES

#213.96 - (1) Cobra PRO Gas Breaker 1-1/4 X 6" Shankv
#213.97 - (1) Hammer Anvil Cobra Pro 1/4 X 6"
#213.95 - (1) Gas Powered REDI Boss Carrying Case
#24389 - (1) JackJaw® 534 (1-3/4" to 2-1/4")
#18253 - (1) Big Foot Removal Jack
#63335 - (1) Gas Powered 2" Pull Cap for Big Foot Removal Jack
#5006.423 - (1) 1-1/2" X 2' PVC Liner (Case of 96)
#5006.425 - (1) 1-1/2" X 4' PVC Liner (Case of 48)
#64520 - (1) Heavy Duty Gas Powered Drive Head Adapter
#62470 - (1) Gas Powered Clay Drive Tip

## GAS POWERED HAMMER SPECS

- BPM - 1720
- Joules - 26
- KW - 1.19 (1.6HP) at 7,000 rpm
- 4-stroke, overhead cam
- Trigger throttle with integrated stop button
- Spring isolated hand grips
- Fuel consumption 0.71 L/h at 7,000 rpm
- Meets strictest worldwide emission and noise req.
- Starting system recoil (pull start)
- Weight 35 lbs.
- Noise Level - >100dB hearing protection required

## FOOT JACK ASSEMBLY INSTRUCTIONS

**Step 1:** Attach Base Plate to Tower of Foot Jack. Use provided bolts and nuts to secure.

**Step 2:** Align desired hole on Foot Bar with Tower. Insert quick pin thru the Tower and Foot Bar hole.

**Note:** Additional holes on the Foot Bar allow the user to move the Jaw Assembly closer, or further away from the Base Plate. These holes also provide different amounts of torque on the tooling when removing from the ground.

**Step 3:** Align Jaw Assembly hole with designated Foot Bar hole. Insert quick pin to secure the Jaw Assembly to the Foot Bar.

**Note:** Different Jaw Assemblies can be interchanged with the Foot Jack base. This is to allow retrieval of different sizes of tooling.