Final Work Plan

Velsicol Chemical Company – Operable Unit 4 Additional Floodplain, Riverbank and In-Stream Soil/Sediment Sampling

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DATE:	September 30, 2021

Introduction

CH2M, Inc. (CH2M) prepared this *Velsicol Chemical Company – Operable Unit 4 (OU4), Additional Floodplain, Riverbank and In-Stream Sediment Sampling Technical Memorandum Work Plan* (work plan) for the U.S. Environmental Protection Agency (EPA) to further delineate the extent of dichlorodiphenyl-trichloroethane (DDT) and its metabolites, as well as hexabromobenzene (HBB) and polybrominated biphenyls (PBB) in floodplain and riverbank soils and in stream sediment located in OU4 of the Velsicol Chemical Company Superfund Site. The four Velsicol Chemical Company Superfund Site operable units are depicted on Figure 1. OU4 continues beyond the area depicted on Figure 1 to the confluence of the Pine, Chippewa and Tittabawassee Rivers in Midland, Michigan. However, all samples collected during this phase of the investigation will be collected within the area depicted on Figure 1 with the exception of Floodplain 4 which is located 2-3 miles beyond Redstone Road.

Soil samples have previously been collected from the "white" non-highlighted floodplains depicted on Figure 1. The "blue" highlighted floodplains depicted on Figure 1 were identified during a visual survey of the Pine River from Floodplain 1.2 to Redstone Road (approximately one-half mile past Potential New Floodplain 1.25-7) conducted in May 2021 and are proposed for additional sampling. Floodplain 2 was previously sampled in 2010 and is proposed to be re-sampled to assess temporal DDT concentration changes. This work plan is being submitted prior to receipt of access agreements for the potential floodplains proposed for sampling. Only floodplains and adjacent riverbank and in-stream sediment sample locations where access is granted will be sampled during this phase of the investigation. Sample location maps will be revised depicting floodplains where access was granted prior to the start of field activities.

The focus of this additional investigation work plan includes collecting floodplain and riverbank soil samples and in-stream sediment samples between Floodplain 1.6 and Redstone Road, to further delineate the extent of DDT, HBB and PBB in OU4. If access is granted, samples will also be collected

from Floodplain 4 located 2-3 miles further downstream from Redstone Road. Proposed approximate floodplain and riverbank soil and in-stream sediment locations are depicted on Figures 2, 3 and 4.

All work will be conducted in accordance with the approved *Project Management Plan – Velsicol Superfund Site, Operable Units 3 and 4* (CH2M – November 2020) and the *Final Uniform Federal Policy – Quality Assurance Project Plan (QAPP) – Velsicol Chemical Corporation, Operable Units 3 and 4* (CH2M – May 2021) including sample identification nomenclature, analytical parameters and field operating procedures. All soil and sediment samples will be analyzed for DDT, HBB, PBB and total organic carbon.

Floodplain Sample Collection

Soil samples will be collected from a minimum of 5 floodplain areas located in OU4 between Floodplain 1.6 and Redstone Road (Figure 1). Approximate sample locations within each floodplain, based on samples collected on a 100-foot grid, are depicted on Figures 2, 3, and 4.

A soil core will be collected at each floodplain sample location using a 2- or 3-inch-diameter Lexan tube driven to a depth of refusal or a maximum of 36 inches below ground surface (bgs). Up to 4 discrete soil samples will be collected from each core (from approximately 0 to 6, 6 to 12, 12 to 24, and 24 to 36 inches bgs). The soil core location will be documented by global positioning system (GPS). Detailed descriptions of the sample collection method, core processing and sample preparation are provided in the QAPP, field operation procedures #13, #14 and #16.

Riverbank Soil/Sediment Sampling

Riverbank soil samples will be collected at 5 locations (25 cores total) adjacent to each floodplain sampled during this phase of the investigation. The riverbank samples are being collected to further delineate the extent of DDT, HBB and PPB in riverbank soils and assess the relationship between floodplain and riverbank concentrations of DDT, HBB and PBB. Approximate riverbank sample locations adjacent to each floodplain are depicted on Figures 2, 3, and 4.

Soil samples will be collected at each riverbank location by advancing an acetate lined core barrel sampler. Up to 3 discrete soil samples will be collected at each location from approximately (0 to 2, 2 to 6 and 6 to 12 inches below the riverbank surface. Surface vegetation will be removed from the sample location and the core barrels will be driven perpendicular to the riverbank surface. The sample locations will be documented by GPS.

In-Stream Sediment Sampling

In-stream sediment samples will be collected at 5 locations (25 cores total) adjacent to the riverbank and floodplain samples. The samples will be collected between the toe of the riverbank to approximately 10 feet from the toe of the riverbank within the river. Samples will be biased towards areas with the thickest layer of soft sediment. The in-stream sediment samples are being collected to further delineate the extent of DDT, HBB and PPB within the Pine River sediment and assess the relationship between floodplain, riverbank and in-stream sediment concentrations of DDT, HBB, and PBB. Approximate in-stream sediment sample locations adjacent to each floodplain and riverbank sample are depicted on Figures 2, 3, and 4. Actual in-stream sediment sample locations will be recorded using GPS.

A sediment core will be collected at each in-stream sediment sample location using a 2- or 3-inch-diameter Lexan tube driven to a depth of refusal or a maximum of 24 inches below the riverbed. Up to 3

discrete soil samples will be collected from each core (from approximately 0 to 6, 6 to 12 and 12 to 24 inches below the riverbed surface. The sediment core location will be documented by GPS.

Data Evaluation/Technical Memorandum

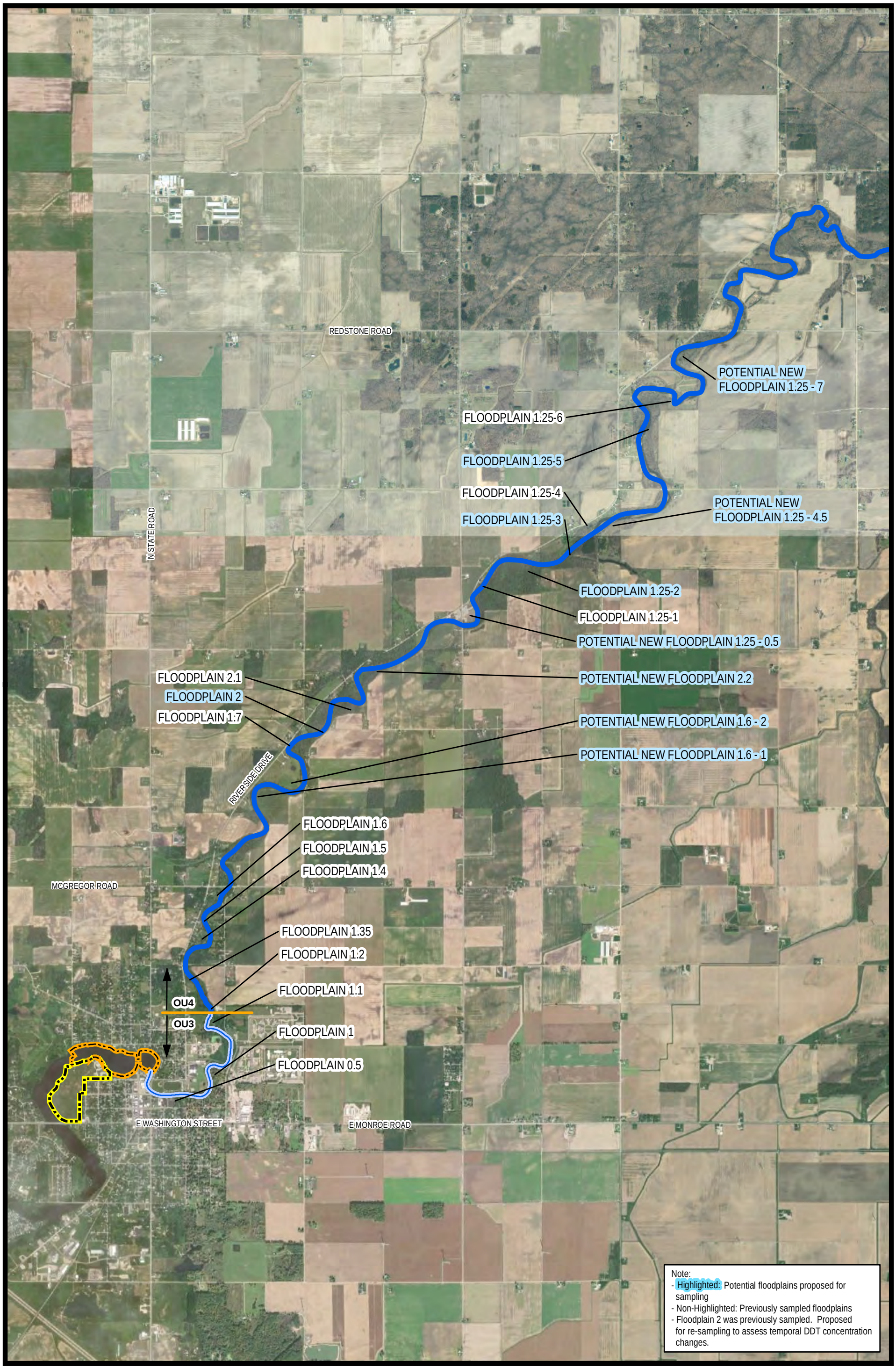
Data collected during this phase of the investigation will be evaluated to assess if additional investigation is necessary to further delineate the extent of DDT, HBB and PBB impacted floodplains, riverbanks and in-stream sediment or whether the remedial investigation report for OU4 can be prepared and subsequently the feasibility study. CH2M will prepare a technical memorandum summarizing the evaluation of data collected during this phase of the investigation and whether additional sample collection is recommended.

References

CH2M HILL, Inc (CH2M). 2020. *Project Management Plan – Velsicol Superfund Site, Operable Units 3 and 4*. November.

CH2M HILL, Inc (CH2M). 2021. *Final Uniform Federal Policy – Quality Assurance Project Plan (QAPP) – Velsicol Chemical Corporation, Operable Units 3 and 4.* May.

FIGURES



Legend

Former Plant Site (OU-1)

Pine River - St. Louis Impoundment (OU-2)

Pine River OU3

Pine River OU4

N

0 3,600

Feet

Figure 1
Floodplain Locations
Additional Investigation Work Plan
Velsicol Chemical Corporation Superfund Site
St. Louis, Michigan

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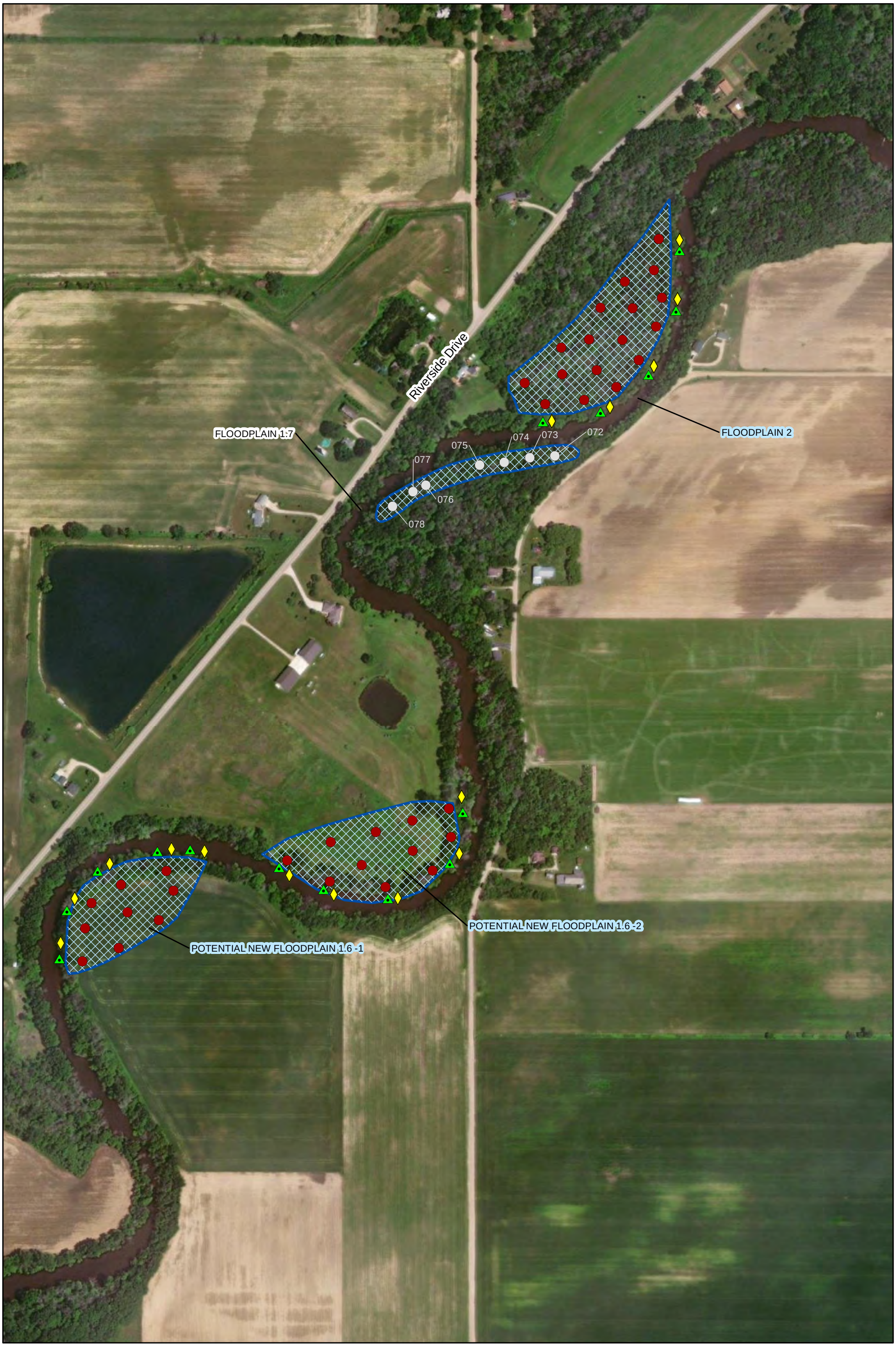

Legend

- Historic Flooplain Sampling Location
- 2021 Proposed Floodplain Sample Location
- 2021 Proposed Riverbank Sample Location
- 2021 Proposed Sediment Sample Location
- Floodplain Extent

N

0 175 350 Feet

Figure 2
Floodplain 1.6-1 through Floodplain 2
Additional Investigation Work Plan
Velsicol Chemical Corporation
St. Louis, Michigan

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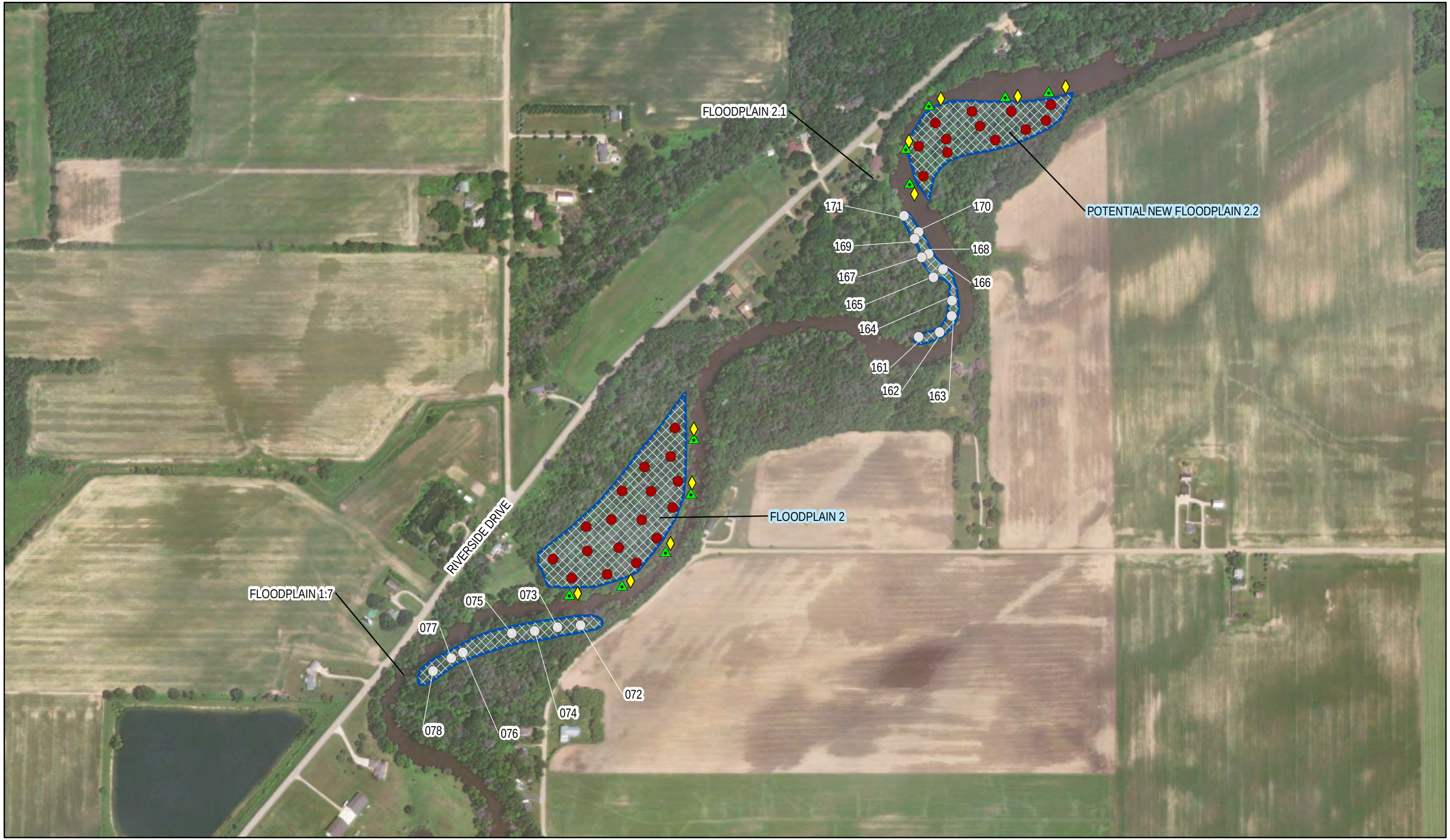

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- Historical Floodplain Sampling Location
- 2021 Proposed Floodplain Sample Location
- 2021 Proposed Riverbank Sample Location
- 2021 Proposed Sediment Sample Location
- Floodplain Extent

N

0 200 400 Feet

Figure 3
Floodplain 1.7 through Floodplain 2.2
Additional Investigation Work Plan
Velsicol Chemical Corporation Superfund Site
St. Louis, Michigan

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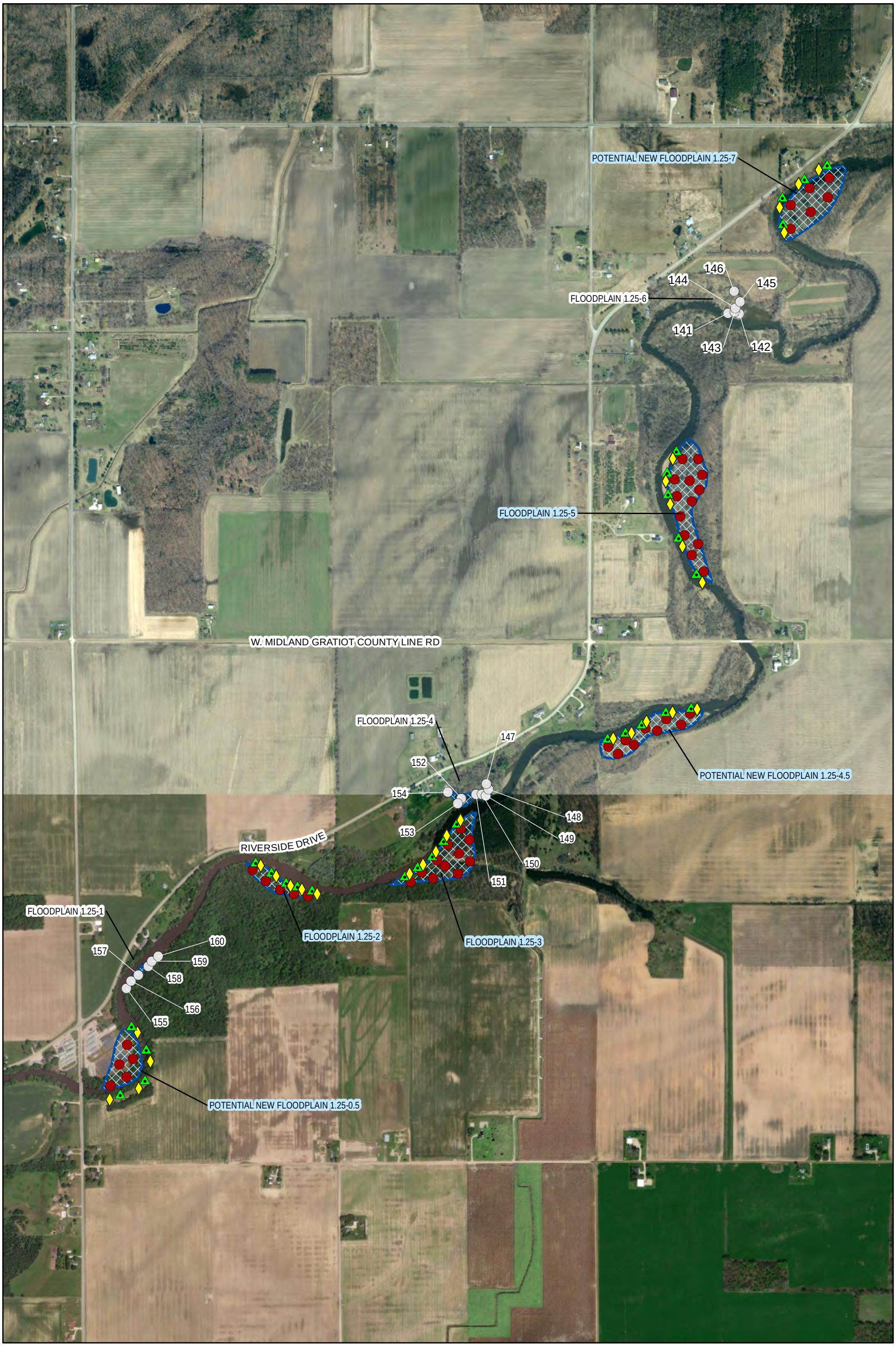

N

0 450 900 Feet

Legend

- Historical Floodplain Sampling Location
- 2021 Proposed Floodplain Sample Location
- 2021 Proposed Riverbank Sample Location
- 2021 Proposed Sediment Sample Location
- Floodplain Extent

Figure 4
Floodplain 1.25-1 through Floodplain 1.25-7
Additional Investigation Work Plan
Velsicol Chemical Corporation Superfund Site
St. Louis, Michigan

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