Project Klondike

Wetland and Waterbody Delineation Report

June 16, 2025

Prepared for:

Confidential Client

Prepared by:

Stantec Consulting Services Inc.
1500 Lake Shore Drive, Suite 100
Columbus, Ohio 43204

Sign-off Sheet

The conclusions in the Report titled Project Klondike Wetland and Waterbody Delineation Report are Stantec Consulting Services Inc. ("Stantec")'s professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Confidential Client (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Prepared by 

(signature)

Brad Small

Reviewed by 

(signature)

Charlie Allen

Reviewed by 

(signature)

Michelle Kearns

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

Confidential Client (“The Client”) proposes to develop approximately 483 acres of private land located in Washington Township, Miami County, Ohio (the Project area). The Project is located on land primarily used for agricultural row crops but also containing second growth deciduous forest and maintained lawn/residential land use south of the City of Piqua, Ohio (Appendix A, Figure 1).

1.1 PURPOSE

Stantec Consulting Services Inc. (Stantec) was retained by the Client to conduct a delineation of potential waters of the United States (WOTUS), including wetlands, waterbodies, and potentially isolated wetlands within the Project area. The purpose of this delineation was to identify potential jurisdictional features present within the Project area. Wetlands that are considered WOTUS are subject to regulation under Section 404 of the Clean Water Act (CWA) and the jurisdictional regulatory authority lies with the U.S. Army Corps of Engineers (USACE). Additionally, the Ohio Environmental Protection Agency (OEPA) has regulatory authority over isolated wetlands (Ohio Revised Code 6111.021).

Stantec completed the delineation of wetlands and waterbodies on October 23rd and 24th, 2024. The information contained in this report reflects the current site conditions that were observed during the field survey.

1.2 LOCATION OF PROJECT

The Project is located in Washington Township, Miami County, Ohio (Appendix A, Figure 1). The Project area is depicted on the Pleasant Hill and Troy, Ohio U.S. Geological Survey (USGS) 7.5-minute series topographic maps, and the approximate center point of the Project area in latitude and longitude coordinates is 40.111845˚N, -84.243162˚W, respectively. The Project area is located across the Garbry Creek-Great Miami River watershed (HUC 12: 050800010705) and the Upper Great Miami HUC-8 watershed (05080001), which ultimately drains to the Miami River.

2.0 METHODS

2.1 WETLAND DELINEATION

Prior to completing the survey, a desktop review of the Project area was conducted using the Troy, Ohio USGS 7.5 Minute series topographic maps (Appendix A, Figure 1), U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey of Miami County, Ohio (USDA 1978; Appendix A, Figure 2), the National Wetlands Inventory map (USFWS 2023a) (Appendix A, Figure 3), and aerial imagery mapping were reviewed to assess the likelihood of occurrence and probable location of wetlands and waterbodies within the Project area.

Following this desktop review, Stantec conducted field surveys within the Project area, October 23rd and 24th, 2024. Wetland boundaries were assessed using the "Routine On-site Determination Method" as described in the USACE Wetland Delineation Manual (USACE Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0) (USACE 2010). As of August 17, 1991, the USACE was directed to utilize the USACE Wetland Delineation Manual (USACE Environmental Laboratory 1987) to identify and delineate wetlands potentially subject to regulation under Section 404 of the Clean Water Act (CWA). Wetlands were classified according to "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al. 1979). Vegetative communities were inventoried to assess the dominant plant species in each of four vegetative layers: trees, saplings/shrubs, herbs, and woody vines. The wetland indicator status for each of the dominant species was obtained using the 2020 National Wetland Plant List (USACE 2020). The wetland soil indicators were obtained using the Munsell soil-color chart (Munsell Color 2009) and the hydric soil field indicators (USDA, NRCS 2018). The uppermost wetland boundary and sampling points were identified and surveyed using a handheld Global Positioning System (GPS) unit and mapped with Geographical Information System (GIS) software. Stantec collected data and completed relevant assessment forms, which included: USACE Wetland Determination Forms (WDF) and Ohio Rapid Assessment Method v 5.0 forms (ORAM; Mack 2001). Data forms are provided in Appendix B.

2.2 STREAM DELINEATION

Streams that demonstrated a continuously defined channel (bed and bank), ordinary high water mark (OHWM), and the disturbance of terrestrial vegetation were delineated within the Project area, per the protocols outlined in the USACE's Guidance on Ordinary High Water Mark Identification (Regulatory Guidance Letter, No. 05-05; USACE 2005). Delineated streams were classified as ephemeral, intermittent, or perennial per definitions in the Federal Register/Vol. 67, No 10 (USACE 2002) and determined as potential WOTUS in reference to the current guidance of the 2023 Rule "Revised Definition of 'Waters of the United States'" that took effect on March 20, 2023 (USEPA 2023). Functional assessment of streams within the Project area was based on completion of the OEPA Headwater Habitat Evaluation Index (HHEI; OEPA 2020) and/or Qualitative Habitat Evaluation Index (QHEI; OEPA 2006). The centerline and/or the OHWM locations of each waterway were identified and surveyed using a handheld sub-meter accuracy global positioning system (GPS) unit and mapped with GIS software. Additionally, the locations of upland drainage features (which lacked a continuously defined bed and bank/OHWM) identified within the Project area were also recorded with a sub-meter accuracy GPS unit during the field surveys.

2.3 OPEN WATER DELINEATION

Open water boundaries were assessed using the definition described in the "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al. 1979) which includes wetland and deepwater habitats with most of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage; and (3) total area exceeds 20 acres (8 hectares [ha]). Similar wetland and deepwater habitats totaling less than 20 acres (8 ha) are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up most or part of the boundary, or if the water depth in the deepest part of the basin exceeds 6.6 feet (2 meters) at low water (estimated).

3.0 OVERVIEW OF PROJECT AREA

3.1 GEOLOGY AND TOPOGRAPHY

The Project is located in Miami County, Ohio and is located within the Till Plains section of the Central Lowlands province. The Project lies within the Southern Ohio Loamy Till Plain region, which is characterized by: (1) a surface of loamy till, (2) end and recessional moraines, commonly associated with boulder belts, between relatively flat-lying ground moraine which are cut by steep-valleyed large streams; (3) stream valleys filled with outwash and alternate between broad floodplains and narrows with buried balies commonly found (ODGS 1978). Elevation ranges from 870-970 feet above sea level (*Ohio topographic map, elevation, terrain* 2024).

3.2 CLIMATE

The average winter maximum temperature in Miami County is 47 degrees Fahrenheit (°F), and the average winter daily minimum temperature is 29°F. The average summer minimum temperature is 56°F, and the average summer daily maximum temperature is 77°F. The average annual total precipitation in Miami County is 39 inches. Generally, precipitation is adequate and well distributed and varies widely from year to year, but most frequently occurs from April through July (U.S. Climate Data 2024).

3.3 SOILS

The Soil Survey of Miami County, Ohio (USDA 1978) and the NRCS Web Soil Survey were consulted to assess soil types within the Project area (USDA, NRCS 2024). Soil mapping of the Project area is included in Appendix A, Figure 2. Soils within the Project area with respective acreages and percentages are included in Table 1. The Project area contains two soil units that are considered to be hydric, 11 soils are considered to contain hydric inclusions, and four are considered to be non-hydric as shown in Table 1.

Table 1. Soil Types Known to Occur within the Project Area, Miami County, Ohio

Map Unit Symbol	Map Unit Name	Hydric?	Acres in the Project Area	Percent within Project Area
Bs	Brookston silty clay loam, fine texture, 0 to 2 percent slopes	Yes	103.75	21.48%
CeB	Celina silt loam, 2 to 6 percent slopes	No*	3.52	0.73%
CrA	Crosby silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	No*	115.89	23.99%
CrB	Crosby silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes	No*	5.43	1.12%
EmB	Eldean silt loam, 2 to 6 percent slopes	No	0.85	0.18%

Map Unit Symbol	Map Unit Name	Hydric?	Acres in the Project Area	Percent within Project Area
Md	Medway silt loam	No*	1.81	0.38%
MkA	Miamian silt loam, limestone substratum, 0 to 2 percent slopes	No*	36.77	7.61%
MkB	Miamian silt loam, limestone substratum, 2 to 6 percent slopes	No*	71.78	14.86%
MkB2	Miamian silt loam, limestone substratum, 2 to 6 percent slopes, moderately eroded	No*	31.61	6.54%
MkC2	Miamian silt loam, limestone substratum, 6 to 12 percent slopes, moderately eroded	No*	0.23	0.05%
MnA	Millsdale silt loam, 0 to 2 percent slopes	Yes	28.47	5.89%
MpA	Milton silt loam, 0 to 2 percent slopes	No	20.25	4.19%
MpB	Milton silt loam, 2 to 6 percent slopes	No	38.57	7.98%
MpB2	Milton silt loam, 2 to 6 percent slopes, moderately eroded	No	7.37	1.53%
Pq	Pits, quarry	No	7.80	1.61%
RdB	Randolph silt loam, 2 to 6 percent slopes	No*	8.96	1.85%
Totals for Project Area:			**483.07 acres**	**100.0%**

***Contains hydric inclusions

4.0 RESULTS

4.1 EXISTING CONDITIONS

Upland habitat within the Project area consists of early successional forest, agricultural fields, second growth deciduous forest, new field, maintained lawn/residential and grass swale habitats.

The agricultural field habitat is dominated by soybean (*Glycine max*), corn (*Zea mays*), common morning glory (*Ipomoea purpurea*), field bindweed (*Convolvulus arvensis*), purple deadnettle (*Lamium purpureum*), common ragweed (*Ambrosia artemisiifolia*), nodding foxtail (*Setaria faberi*), and ribwort plantain (*Plantago lanceolata*) in the herbaceous layer.

The early successional forest and second growth forest habitats are dominated by clustered black snakeroot (*Sanicula odorata*), Timothy grass (*Phleum pratense*), common ragweed, nodding foxtail, Fuller's teasel (*Dipsacus fullonum*), Virginia creeper (*Parthenocissus quinquefolia*), riverbank grape (*Vitis riparia*) and eastern poison ivy (*Toxicodendron radicans*) in the herbaceous stratum. Honey locust (*Gleditsia*

triacanthos), black walnut (*Juglans nigra*), amur honeysuckle (*Lonicera maackii*), common hackberry (*Celtis occidentalis*), black raspberry (*Rubus occidentalis*), and multiflora rose (*Rosa multiflora*) in the scrub/shrub layer. Black walnut, sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), black cherry (*Prunus serotina*), common buckthorn (*Rhamnus cathartica*), white oak (*Quercus alba*), and boxelder (*Acer negundo*) in the tree stratum.

The maintained lawn/ residential habitat is dominated by common dandelion, (*Taraxacum officinale*) Kentucky bluegrass (*Poa pratensis*) and white clover (*Trifolium repens*) in the herbaceous stratum. As well as red maple (*Acer rubrum*) as ornamental trees in the tree stratum.

The new field and grassed swale habitats are dominated by common milkweed (*Asclepias syriaca*), Timothy grass, tall fescue (*Lolium arundinaceum*), smooth brome (*Bromus inernis*), nodding foxtail, yellow foxtail (*Setaria pumila*), common morning glory, field bindweed, tall ironweed (*Vernonia gigantea*) within the herbaceous layer, with white oak present within the shrub layer.

4.2 WETLAND HABITAT

Field surveys identified four wetlands within the Project area, totaling approximately 0.25 acre. (Appendix A, Figure 4). Appendix B contains the WDF and ORAM data forms for the wetlands identified within the Project area. Representative photographs of the wetlands are provided in Appendix C. The wetlands are described below and summarized in Table 2.

Wetland 1

Wetland 1 is a palustrine emergent (PEM) wetland approximately 0.03 acre in size located within a grass swale within the Project area. The functional assessment (ORAM) of Wetland 1 yielded a score of 15 and identifies this wetland as a Category 1 wetland, indicating it is a wetland of “low” quality. Wetland 1 is potentially jurisdictional as the grass swale serves as a hydrological connection to a stream located outside of the Project area. The first soil horizon on the WDF (SP03) was 5 inches of clay loam with a chroma matrix of 10YR 3/1 and redox concentrations of 10YR 5/6 meeting the Redox Dark Surface (F6) hydric soil indicator. The primary hydrological indicators included water-stained leaves. The area was dominated by hydrophytic vegetation including reed canary grass (*Phalaris arundinacea*; Facultative Wetland (FACW)) and rice cutgrass (*Leersia oryzoides,* Obligate (OBL)) in the herbaceous stratum.

Wetland 2

Wetland 2 is a palustrine emergent (PEM) wetland approximately 0.01 acre in size located within a forested woodlot between two agricultural fields within the Project area. The functional assessment (ORAM) of Wetland 2 yielded a score of 22 and identifies this wetland as a Category 1 wetland, indicating it is a wetland of “low” quality. Wetland 2 is potentially isolated due to the lack of connection to other jurisdictional waterbodies. The first soil horizon on the WDF (SP01) was 21 inches of clay loam with a chroma matrix of 10YR 3/1 and redox concentrations of 10YR 4/6 in the matrix, meeting the Redox Dark Surface (F6) hydric soil indicator. The primary hydrological indicators included saturation, algal mat or crust, and water-stained leaves. The area was dominated by hydrophytic vegetation including swamp smartweed (*Persicaria hydropiperoides*; OBL) in the herbaceous stratum, common pawpaw (*Asimina triloba*; Facultative (FAC))

within the sampling/shrub stratum and common pawpaw and red maple (*Acer rubrum*, FAC) in the tree stratum.

Wetland 3

Wetland 3 is a palustrine forested (PFO) wetland approximately 0.14 acre in size located with a forested woodlot within the Project area. The functional assessment (ORAM) of Wetland 3 yielded a score of 40 and identifies this wetland as a Category 2 wetland, indicating it is a wetland of "moderate" quality. Wetland 3 is potentially isolated due to the lack of connection to other jurisdictional waterbodies. The first soil horizon on the WDF (SP06) was 13 inches of clay loam with a chroma matrix of 10YR 2/1 and redox concentrations of 10YR 4/6 in the matrix, meeting the Redox Dark Surface (F6) hydric soil indicator. The primary hydrological indicators included saturation, algal mat or crust, and water-stained leaves. The area was dominated by hydrophytic vegetation including calico aster (*Symphyotrichum lateriflorum;* FACW), swamp smartweed and sweet woodreed (*Cinna arundinacea;* FACW) in the herbaceous stratum and common hackberry (*Celtis occidentalis*; FAC) and silver maple (*Acer saccharinum*; FACW), in the tree stratum.

Wetland 4

Wetland 4 is a palustrine emergent (PEM) wetland approximately 0.07 acre in size located within a forested woodlot within the Project area. The functional assessment (ORAM) of Wetland 4 yielded a score of 36 and identifies this wetland as a Category 2 wetland, indicating it is a wetland of "moderate" quality. Wetland 4 is potentially isolated due to the lack of connection to other jurisdictional waterbodies. The first soil horizon on the WDF (SP8) was 15 inches of mucky loam with a chroma matrix of 10YR 2/1 and redox concentrations of 10YR 4/6 in the matrix, meeting the Redox Dark Surface (F6) hydric soil indicator. A Hydrogen Sulfide scent was observed, meeting A4. The primary hydrological indicators included surface water, saturation, sparsely vegetated concave surface, water-stained leaves and hydrogen sulfide odor. The area was dominated by hydrophytic vegetation including fowl manna grass (*Glyceria striata*; OBL) and orange jewelweed (*Impatiens capensis*; FACW) in the herbaceous stratum, and American sycamore (*Platanus occidentalis*; FACW) in the tree stratum.

Table 2. Wetlands Identified within the Project Area, Miami County, Ohio

Wetland Name	Latitude	Longitude	Classification[1]	ORAM Score[2]	ORAM Regulatory Category[2]	Total Acres
Wetland 1	40.109852	-84.246358	PEM	15	Category 1	0.03
Wetland 2	40.112967	-84.247839	PEM	22	Category 1	0.01
Wetland 3	40.117122	-84.238611	PFO	40	Category 2	0.14
Wetland 4	40.11788	-84.238698	PEM	36	Category 2	0.07
					Total Delineated Acres	**0.25**

[1]PEM = Palustrine Emergent Wetland; PFO = Palustrine Forested Wetland

[2]ORAM Score and Category are based on Ohio Rapid Assessment for Wetlands v 5.0 (Mack 2001).

4.3 STREAM HABITAT

One stream was identified within the Project area during the field surveys completed on October 23rd and 24th, 2024, totaling 389 linear feet. (Appendix A, Figure 4). Appendix B contains the HHEI data form for the stream identified within the Project area. Representative photographs are provided in Appendix C. The stream is described below and summarized in Table 2.

Stream 1

Stream 1 is an intermittent stream with approximately 389 linear feet within the Project area. The functional assessment (HHEI) of Stream 1 yielded a score of 65, indicating it is a Class III PHW stream. The stream had a bankfull width of 7.2 feet and a bankfull depth of 0.5 foot and was flowing at time of site visit. Substrates observed were primarily boulder, cobble, gravel, silt, and leaf pack/woody debris. Stream 1 drains into the Great Miami River outside the Project area and is potentially jurisdictional.

Table 3. Streams Identified within the Project Area, Miami County, Ohio

Stream Name	Latitude	Longitude	OHWM Width (feet)	OHWM Depth (feet)	Flow Regime	Evaluation Method	Score	Total Linear Feet in Project Area
Stream 1	40.111309	-84.236669	7.2	0.5	Intermittent	HHEI	65	389
Total Linear Footage in Project Area								**389**

4.4 OPEN WATER

No open water features (i.e., ponds, lakes) were delineated within the Project area during the field surveys completed on October 23rd and 24th, 2024 (Appendix A).

5.0 DISCUSSION

Stantec conducted a delineation of potential WOUS within the Project area. The purpose and objective of the wetland and waterbody delineation was to identify the extent and spatial arrangement of potential jurisdictional wetlands and waterbodies within the Project area. Field surveys identified three PEM wetlands and one PFO wetland, totaling approximately 0.25 acres and one intermittent stream, totaling approximately 389 linear feet within the Project Area.

Stantec's opinion regarding the presence/absence of jurisdictional WOUS and isolated wetlands is preliminary. Only the USACE can provide an official determination of the presence and extent of jurisdictional WOUS. Wetlands that are considered WOUS are subject to regulation under Section 404 of the CWA and the jurisdictional regulatory authority lies with the USACE. Additionally, the OEPA has regulatory authority over isolated wetlands under Ohio Revised Code 6111.021. Stantec recommends that Confidential Client contact the USACE for an approved jurisdictional determination review and concurrence with Stantec's opinion regarding the presence/absence of WOUS within the Project area prior to beginning construction activities associated with this Project.

6.0 REFERENCES

Cowardin, L. M., Carter, V., Golet, F. C., & LaRoe, E. T. (1979). *Classification of Wetlands and Deepwater Habitats of the United States*. Library of Congress Cataloging in Publication Data.

Mack, J.J. 2001. Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit. Columbus, Ohio. 72 pp.

Munsell Color. 2009. Munsell Soil Color Charts. Kollmorgen Instruments Corporation, Newburgh, New York.

Ohio Division of Geological Survey (ODGS). 1998. Physiographic Regions of Ohio: Ohio Department of Natural Resources, Division of Geological Survey, page-size map with text. 2 pp.

Ohio Environmental Protection Agency (OEPA). 2006. Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI).

OEPA. 2020. Field Methods for Evaluating Primary Headwater Streams in Ohio. Version 4.1. Ohio EPA Division of Surface Water, Columbus, Ohio. 130 pp.

Ohio topographic map, elevation, terrain. Topographic maps. (2024). https://en-us.topographic-map.com/map-k757/Ohio/

United States Army Corps of Engineers (USACE) Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

USACE. 2002. Issuance of Nationwide Permits; Notice, 67 Fed. Reg. 10. January 15, 2002. Federal Register: The Daily Journal of the United States. Available at https://www.gpo.gov/fdsys/pkg/FR-2002-01-15/pdf/02-539.pdf.

USACE. 2005. Guidance on Ordinary High Water Mark Identification (Regulatory Guidance Letter, No.05-05). Available online at https://www.nap.usace.army.mil/Portals/39/docs/regulatory/rgls/rgl05-05.pdf. Accessed May 2024.

USACE. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0), ed. J. F. Berkowitz, J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USACE. 2020. National Wetland Plant List, Version 3.5. USACE Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH. Retrieved from: http://wetland-plants.usace.army.mil/.

United States Department of Agriculture (USDA). 1978. Soil Survey of Miami County, Ohio. United States Department of Agriculture, Natural Resource Conservation Service, in cooperation with the Ohio Department of Natural Resources, Division of Soil and Water Conservation.

USDA, Natural Resource Conservation Service (USDA, NRCS). 2024. Field Indicators of Hydric Soils in the United States, Version 9.0. L.M. Vasilas, A. Miller, J.F. Berkowitz (eds.), and R Griffin. USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.

USDA. Web Soil Survey. Retrieved from: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed October 2024.

United States Environmental Protection Agency (USEPA). 2023. Revised Definition of "Waters of the United States", 40 Code of Federal Regulations 328. Available at www.govinfo.gov/content/pkg/FR-2023-01-18/pdf/2022-28595.pdf. Accessed October 2024.

United States Fish and Wildlife Service. 2023a. National Wetlands Inventory, Web Mapper. Retrieved from: http://www.fws.gov/wetlands/Data/Mapper.html. Accessed October 2024.

United States Geological Survey (USGS). Ohio 7.5 Minute Series (Topographic) Maps. 1:24,000. Reston, VA: United States Department of the Interior, USGS.

U.S Climate Data. 2024. Piqua, Ohio Weather Conditions. Retrieved from: Climate Piqua - Ohio and Weather averages Picqua (usclimatedata.com). Accessed October 2024.