WDNR Grant #LPL185723
Elkhart Lake Improvement Association
Elkhart Lake Water Quality & Habitat Improvement Project – Neuses Bay Tributary
Final Report: March 6, 2024

Grant Cycle: March 15, 2023 to March 6, 2024
The scope of work defined in this grant is a joint effort coordinated by the Elkhart Lake Improvement Association (ELIA), in partnership with Wisconsin Department of Natural Resources (WDNR), and Stantec. The following represents grant activities completed as of March 6, 2024.

Goal 1a. Data Collection
ELIA contracted Stantec to acquire data and conduct a literature review in preparation for development of a concept plan. The results of the data collection effort are summarized in the attached *Elkhart Lake – Wetland Restoration Basis of Design & Hydrologic & Hydraulic Analysis Memo*.

Goal 1b. Site Assessment
Stantec conducted a site assessment in September 2023 to survey watershed conveyance patterns, collect water and soil samples, and take depth measurements within the project area. A wetland delineation was also completed in the field. The results of the site survey, sampling, and wetland delineation are summarized in the attached *Elkhart Lake – Wetland Restoration Basis of Design & Hydrologic & Hydraulic Analysis Memo*.

Goal 1c. Concept and Preliminary Design Plans
Desktop and field data were used to develop a hydrologic and hydraulic model specific to the project area watershed. This model was used to develop conceptual and preliminary design for stakeholder review. Preliminary design plans are included in the attached *Elkhart Lake – Wetland Restoration Basis of Design & Hydrologic & Hydraulic Analysis Memo*.

ELIA has secured additional funding from the WDNR Surface Water Program to finalize design plans for construction in 2024.

Goal 1d. Education and Outreach
- Throughout the grant period, ELIA updated educational materials focused on water quality studies, Aquatic Invasive Species (AIS), and ongoing management actions and distributed to members of the community via the website (www.keepelkhartblue.org) and at the local chamber, businesses, and government buildings.
- ELIA hosted an annual meeting in June 2023 and the Ecology Committee presented the project to members (see attached *Agenda* and *Minutes*).
- ELIA hosted a booth at the local Downtown Night in August 2023 to answer lake-related questions and educate the public about water quality improvement efforts.

Stantec

Memo

To:	John Schott PO Box 725 Elkhart Lake, WI 53020	From:	Christian Burnson, PE 209 Commerce Parkway Cottage Grove, WI 53527
Project/File:	193806506	Date:	January 31, 2024

Reference: Elkhart Lake - Wetland Restoration Basis of Design & Hydrologic & Hydraulic Analysis

Background Information / Project Understanding

The Elkhart Lake Improvement Association (ELIA) hired Stantec to develop a concept wetland restoration plan to decrease nutrient transportation and provide water quality benefits to Elkhart Lake, and to quantify stormwater flows to the lake from a drainage area on the southwest side of the lake. The wetland in question receives runoff from the surrounding Shoreland Road Watershed (Watershed), most of which consists of row crop farmland and pasture. The Watershed in relation to the wetland and Elkhart Lake can be seen in Appendix A, included with this memo.

Phosphorous-laden sediments are conveyed via stormwater runoff originating from agricultural areas upstream in the Watershed and collect in the wetland area. Over time, these nutrient rich sediments have accumulated in the wetland. Phosphorus from accumulated sediments likely leaches into the ponded water in the wetland. When substantial rainfall events occur, the phosphorus-rich water in the wetland overtops a saddle point in a low adjacent ridge and flows through a residential property and is conveyed to Elkhart Lake via culverts.

Data Acquisition & Literature Review

Stantec was contracted to study the wetland, determine if the wetland was a significant source of phosphorous pollution into the lake, and devise a wetland restoration concept plan.

Stantec engineers visited the project site in September of 2023 to gather data and observe how runoff is conveyed through the Watershed. Six soil samples and two water samples were obtained in the wetland area, as well as approximate measurements of the depth of sediment deposits at the soils sampling locations (See Appendix B). The water samples were collected at a location which was relatively clear of aquatic vegetation. Four soil samples were collected from areas in the wetland and adjacent to ponded water. Additionally, one soil sample was obtained from the outlet of the upstream culvert beneath Shoreline Road, and another was obtained from the inlet of the downstream storm pipe beneath E Shoreline Road to provide comparisons to phosphorus present in wetland sediments.

Within the wetland area, the approximate sediment depth measurements were obtained at the soil sampling sites in the wetland by forcing a rod into the substrate until a consolidated layer was encountered, or until the rod could no longer be advanced by hand. Sediment deposits were estimated to range between 20" depth in the northern portion and 55" depth in the southern portion of the wetland. The team also recorded approximate GPS positions of the sample locations and all culverts in the Watershed (See Appendix B). A wetland delineation was performed by Stantec staff on the same day as the soil and water samples were collected. The Wetland Delineation Report and a Photo Log taken during the site visit are included with this memorandum in Appendix D.

The soil samples were delivered to the University of Wisconsin Soil and Forage Laboratory for total phosphorous testing. The water samples were sent to the Eurofins laboratory for detection of total phosphorous. The soil results showed the samples had an average total leachable phosphorous level of 0.103% of the total dried mass of the sample, with the highest of the six concentrations measured at the south portion of the wetland, and the lowest concentration measured at the north portion of the wetland and at the upstream culvert. The two water sample test results showed total phosphorous levels of 0.44 and 0.47 mg/L. Phosphorus testing results provided from the labs are included with this memorandum in Appendix E.

The Wisconsin Department of Natural Resources' (WDNR) standard for impaired shallow waters and streams is 0.04 mg/L and 0.075mg/L respectively. Literature values show the levels of total phosphorous found in Wisconsin wetland surface waters average 0.08 mg/L as of 2008[1]. A study reviewed by Stantec showed the highest recorded level of phosphorus in wetland surface water is 1.7 mg/L in a wetland near Delavan Lake in July of 1994[2]. Another study from 2007 showed the mean total phosphorous levels in protected wetlands surrounding Lake Michigan to be 0.0446 mg/L, with the peak level reaching 0.1793 mg/L[3].

The level of total phosphorous in the surface water found in the wetland is five times higher than the Wisconsin average and ten times higher than the standard for impairment. This is likely due to sediment from surrounding farmland being carried by stormwater runoff accumulating in the soil and water of the wetland. Based on the literature reviewed and the soil and water testing performed, Stantec proposes a plan to perform a wetland scrape and restoration in the wetland area to remove accumulated phosphorus-laden sediment to improve water quality in Elkhart Lake.

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[1] Zhongwei Liu , Yingru Li & Zhaohui Li (2009) Surface water quality and land use in Wisconsin, USA – a GIS approach, Journal of Integrative Environmental Sciences, 6:1, 69-89, DOI: 10.1080/15693430802696442

[2] Dale M. Robertson , John F. Elder , Gerald L. Goddard & William F. James (1998) Dynamics in Phosphorus Retention in Wetlands Upstream of Delavan Lake, Wisconsin, Lake and Reservoir Management, 14:4, 466-477, DOI: 10.1080/07438149809354353

[3] Anett S. Trebitz, John C. Brazner, Anne M. Cotter, Michael L. Knuth, John A. Morrice, Gregory S. Peterson, Michael E. Sierszen, Jo A. Thompson, and John R. Kelly "Water Quality in Great Lakes Coastal Wetlands: Basin-wide Patterns and Responses to an Anthropogenic Disturbance Gradient," Journal of Great Lakes Research 33(sp3), 67-85, (1 December 2007). https://doi.org/10.3394/0380-1330(2007)33[67:WQIGLC]2.0.CO;2

Proposed Scrape Plans

To reduce the levels of phosphorous entering the lake during rain events, Stantec proposes to remove accumulated sediments from the wetland to the maximum allowed depth for wetland scrapes of four feet, or until non-organic soils are encountered.

Appendix F shows conceptual plans for the wetland restoration. The plans demonstrate the approximate location of the existing wetland, culverts, a topographic map of the project area, and the proposed depth and grading plan for the scrape. These contours will likely be adjusted to support aesthetic and ecosystem function in the final design.

This work will return the wetland closer to pre-settlement conditions, improve the ecological effectiveness of the wetland, allow time for particulate and dissolved phosphorous to settle, and decrease the instances of water overtopping the shallow knoll into the adjoining property and thus flowing into the lake.

The conceptual design will advance upon receipt of future grant funding. We understand that Lakeshore Natural Resource Partnership (LNRP) has applied for a WDNR Surface Water Grant on behalf of ELIA to support final design.

H&H Model

To inform the planning phase of the wetland restoration and to understand the hydrology and hydraulics of the Watershed, a rainfall/runoff model was created. Stantec engineers used ArcGIS to classify the Watershed and subwatershed boundaries and land use based on aerial imagery and topography. Soil types and hydrologic soil groups from the Natural Resources Conservation Service (NRCS) were compiled to create a HydroCAD model. HydroCAD is a software application that is used to model storm runoff and to model best management practices using data about a watershed along with rainfall depths and distributions.

HydroCAD uses the Technical Release 55 method of predicting rainfall runoff, commonly known as the Curve Number Method developed by the NRCS. The Curve Number (CN) Method presents a procedure to calculate storm runoff for a small watershed by assigning watershed parameters based on land use, soils, and topographic data as parameters in the calculation routines. This method is one of the most commonly used modeling routines. Model parameters were defined based on collected publicly available data referenced above, topography obtained from the Sheboygan County GIS database, and site visits. Rainfall depths were derived from the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14, as shown in Table 1, and the model used the Midwest and Southeast (MSE) State Rainfall Distribution Type 4 developed by the NRCS.

Reference: Elkhart Lake - Wetland Restoration & Hydrologic & Hydraulic Analysis

NOAA Atlas 14 Rainfall Depths for 24-hour Storm Duration				
Return Interval (year)	1	2	25	100
Depth (inches)	2.22”	2.56”	4.73”	6.43”

Table 1. NOAA Atlas 14 precipitation depths

The Shoreline Road Watershed encompasses roughly 163 acres and was broken down into seven distinct subwatersheds based on hydrologic features and topographic data derived from LiDAR and is shown in Appendix C. The Watershed discharges to Elkhart Lake via a 24” storm pipe running under E Shoreline Rd in what has been designated as Subwatershed 2 (SWS 2). The project wetland area is labeled as Subwatershed 1 (SWS 1). Subwatersheds are divided along ridges, hilltops, road centerlines, and high points that effectively divide flow paths. Hydrologic Soil Groups (HSG) for each of the mapped soil types were determined from NRCS Soil Survey Geographic Database for the mapped soils present in each subwatershed. HSGs are assigned a letter classification by the database, ‘A’ soils have the highest infiltration potential (lowest runoff potential), ‘B’ soils have a somewhat middling infiltration potential (middling runoff potential), ‘C’ soils have a low infiltration potential (high runoff potential), and ‘D’ soils have very low infiltration potential (very high runoff potential).

The soils in the Shoreline Road Watershed are predominately silty loams. Topography in the Watershed is mostly flat, with steeper slopes associated with drainage ditches and ravines that convey stormwater runoff to the lake. The soils largely fall under HSG categories D and B, which indicate that there is low to medium water infiltration of the soil and moderate to high rates of runoff during storm events. The main land use in the Watershed is agricultural mostly consisting of row crop and pasture. Also present are woodlands, several wetland area, paved roads, a restored prairie, and several acres of residential land use.

The HSGs and land use are used to assign a CN per unit of land and soil group. The CN parameter defines an area’s potential for runoff. Land uses with higher rates of imperviousness will have a greater potential for runoff, thus a higher CN. Table 2 shows the weighted composite CNs for each subwatershed and the total weighted composite CN for the whole watershed.

Reference: Elkhart Lake - Wetland Restoration & Hydrologic & Hydraulic Analysis

Subwatershed	CN	Area (acres)
SWS 1	70	6.49
SWS 2	72	2.89
SWS 3	64	8.05
SWS 4	82	54.69
SWS 5	88	4.41
SWS 6	60	15.30
SWS 7	88	71.33
Total	**81.18**	**163.06**

Table 2. Composite CNs and Areas for Each Subwatershed in the Model

The modeling results expressed in Table 3 are based on assumptions from bathymetry and field analysis of the wetland. It is also assumed that the wetland contains a considerable depth of post-settlement agricultural sediment and routinely overflows the saddle (919' elevation) into Elkhart Lake. This conveys nutrients such as leached/dissolved and particulate phosphorous into the lake. Restoring the wetland by scraping out up to four feet of legacy sediments would result in a healthier wetland, and a reduction of phosphorous entering the lake.

Note that this project will do little to reduce flooding; the intent of creating the existing conditions H&H model was to provide ELIA with a tool to perform modeling for future stormwater projects elsewhere in the watershed.

A detailed report of the stormwater runoff modeling is attached to this report in Appendix G.

Storm Interval (year)	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Elevation (ft)	Peak Storage (acre-ft)
1	22.11	22.02	919.30	0.870
2	25.91	25.88	919.33	0.898
25	95.55	90.99	919.69	1.247
100	207.51	182.50	920.04	1.560

Table 3. Current Modeled Wetland Flow Rates

Conclusions and Recommendations

This memo provides a basis of design to accompany the concept plan for the wetland restoration proposed in the Shoreland Road Watershed adjacent to Elkhart Lake and to provide a summary of the hydrologic and hydraulic modeling performed to date for the Watershed. The modeling will serve as starting point for planning exercises for the design and implementation of stormwater treatment features elsewhere in the Watershed.

Stantec predicts that water in the project wetland is a likely a significant phosphorus input to Elkhart Lake. Performing a wetland scrape to remove legacy, post-settlement sediment will likely decrease phosphorus that reaches the lake. The wetland restoration project will also enhance the health and aesthetic quality of the wetland, provide habitat enhancements, and improve water quality in Elkhart Lake. These concept plans were used to apply for WDNR Surface Water Grant for the project. Should funds be obtained and the project proceeds to final design and construction,

Stantec recommends the following next steps:

- Topographic survey be performed in the project area to be used for final plans production.
- Additional soils testing to better understand the soil makeup and groundwater beneath the wetland sedimentation and understand how much accumulated sediment should be removed as part of the project.
- Research and discussion of the processes and mechanisms for phosphorous cycling.
- Final Design Plan development and development of a probable cost of construction.

Reference: Elkhart Lake - Wetland Restoration & Hydrologic & Hydraulic Analysis

Regards,

STANTEC CONSULTING SERVICES INC.

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Civil Engineer
Phone: (608) 843-0163
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stantec.com

Attachment: Click or tap here to enter text.

- Appendix A – Location Map
- Appendix B – Sampling Locations Map
- Appendix C – Subwatershed Map
- Appendix D -- Wetlands Delineation Report and Photo Log
- Appendix E -- Laboratory Test Results
- Appendix F -- Wetland Restoration Concept Plans
- Appendix G -- HydroCAD Input / Output

Reference: Elkhart Lake - Wetland Restoration & Hydrologic & Hydraulic Analysis

Appendix A

Location Map

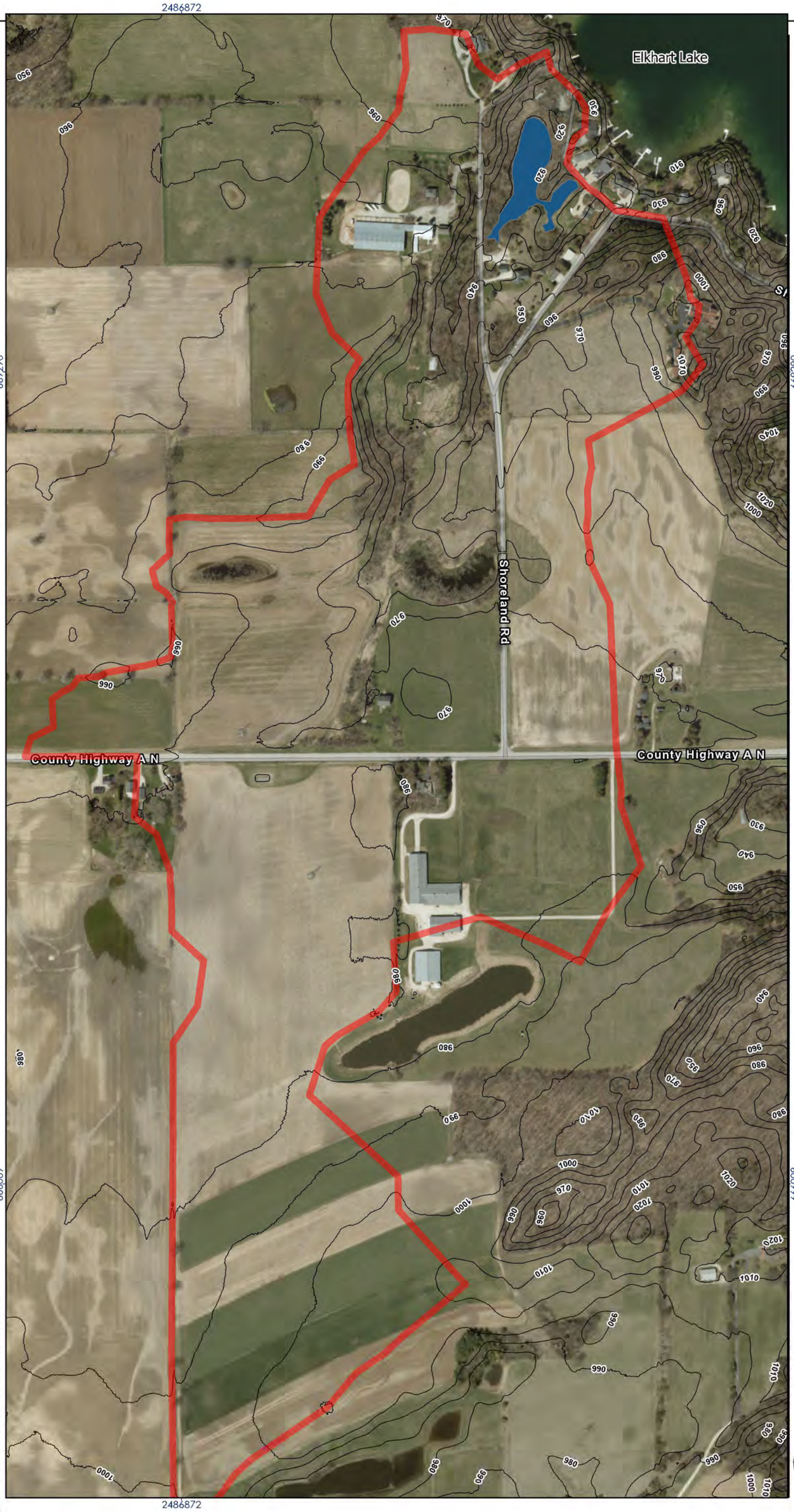


Figure No.

1

Title

Elkhart Lake Wetland Restoration Project Location

Client/Project Site map REVA

Client: Elkhart Lake Improvement Association
Project: Elkhart Lake Wetland Restoration and H&H Report

Project Location

Elkhart Lake, WI

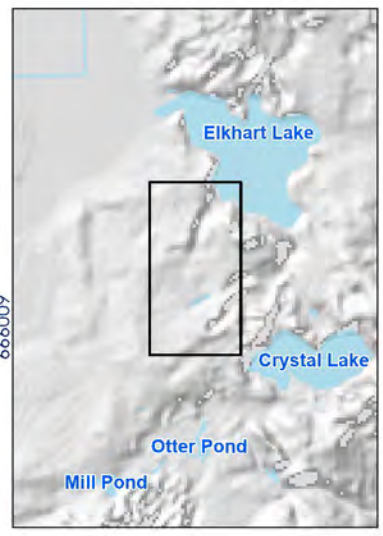
Prepared by WBD on 2023-10-24

N

0 300 600 Feet

(At original document size of 11x17) 1:4,800

Legend
- Contour Line
- Shoreland Road Watershed
- Elkhart Lake Wetland



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources:
3. Background: Hybrid Reference Layer: Esri Community Maps Contributors, Sheboygan County WI, © OpenStreetMap, Microsoft, Esri,

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Appendix B

Sampling Locations Map

Figure No.
2

Title
Elkhart Lake Wetland Restoration Sample Points

Client/Project Sample Points REVA

Client: Elkhart Lake Improvement Association
Project: Elkhart Lake Wetland Restoration and H&H Report

Project Location

Elkhart Lake, WI

Prepared by WBD on 2023-10-24

N

0 60 120 Feet

Legend
- SamplePoint
- WaterSample
- Contour Line
- Culvert

Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources:
3. Background: Hybrid Reference Layer: Esri Community Maps Contributors, Sheboygan County WI, © OpenStreetMap, Microsoft, Esri,

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Appendix C

Subwatershed Map

Figure No.

3

Title

Shoreland Road Watershed Delineation

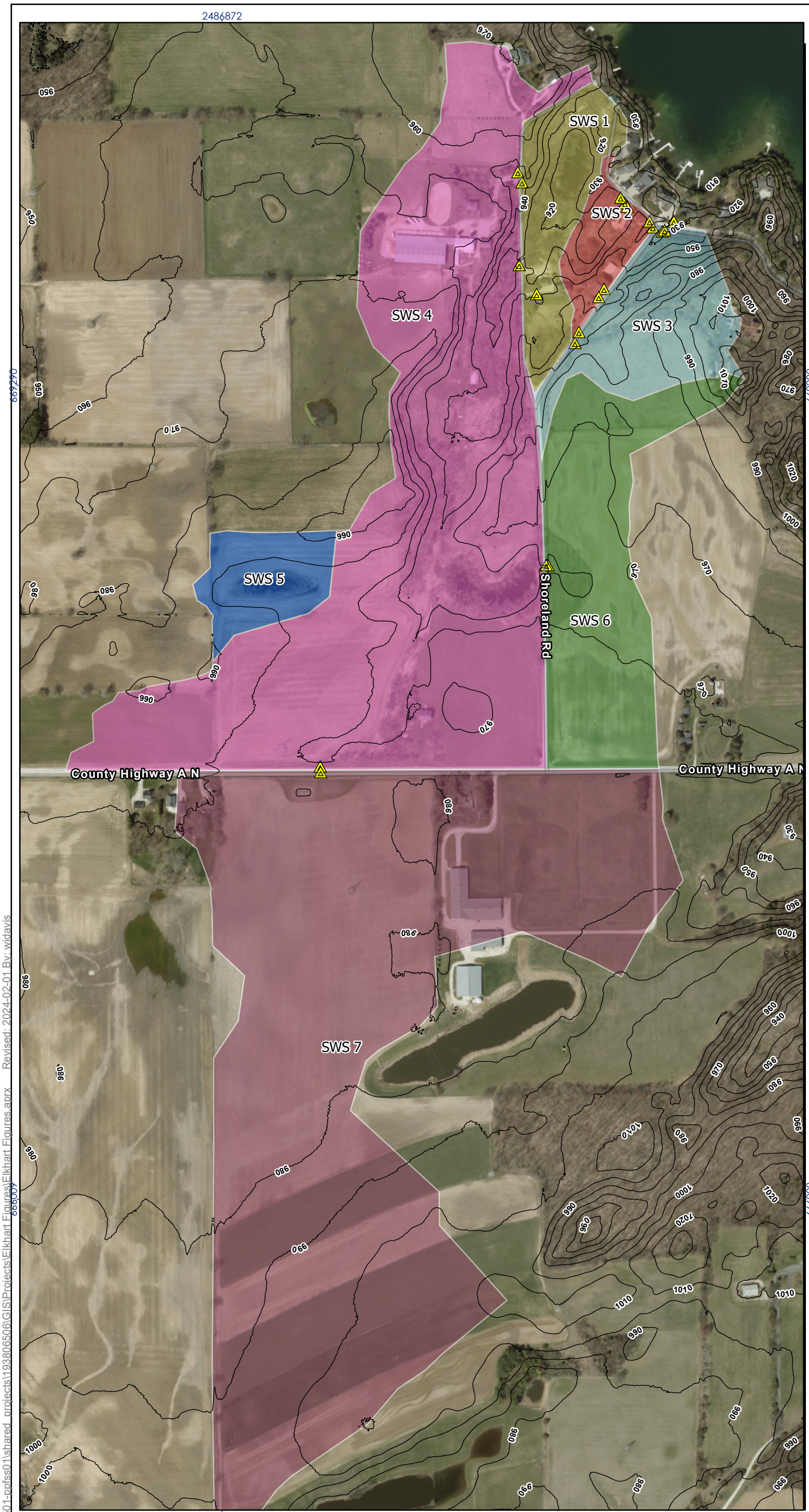
Client/Project Hydrology REVA

Client: Elkhart Lake Improvement Association
Project: Elkhart Lake Wetland Restoration and H&H Report

Project Location

Elkhart Lake, WI

Prepared by WBD on 2023-10-24



N

0 300 600 Feet

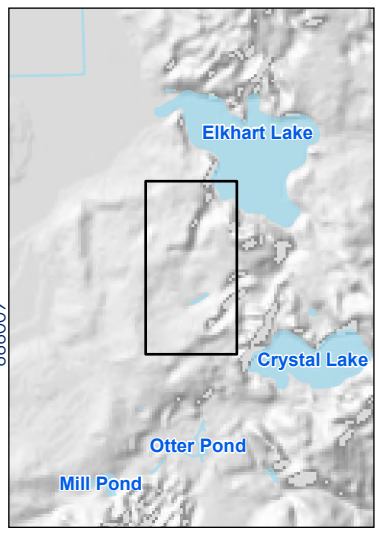
(At original document size of 11x17) 1:4,800

Legend

- Culvert
- Contour Line

Subwatershed

- SWS 1
- SWS 2
- SWS 3
- SWS 4
- SWS 5
- SWS 6
- SWS 7



Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources:
3. Background: Hybrid Reference Layer: Esri Community Maps Contributors, Sheboygan County WI, © OpenStreetMap, Microsoft, Esri,

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Appendix D

Wetlands Delineation Report and Photo Log

Assured Wetland Delineation Report

Elkhart Lake Wetland Restoration

Town of Rhine, Sheboygan County, Wisconsin

Stantec Project #:193806506

Lead Delineator: Sarah Majerus PWS

October 3, 2023

Prepared for:

Mr. John Schott
Elkhart Lake Improvement Project
PO Box 725
Elkhart Lake, WI 53020

Prepared by:

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Phone: (262) 241-4466

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LIST OF APPENDICES

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) completed a wetland delineation on portions of two adjoining parcels (Tax Key IDs 59018258750 and 5901825854) located along the southwest shoreline of Elkhart Lake in the Town of Rhine, Sheboygan County, Wisconsin (the "Study Area") on behalf of the Elkhart Lake Improvement Association (ELIA). The wetland delineation was completed by Sarah Majerus on September 14th, 2023. Ms. Majerus of Stantec is an assured delineator qualified via the Wisconsin Department of Natural Resources (WDNR) Wetland Delineation Assurance Program (see Appendix A for Delineator Qualifications).

The Study Area is approximately 4.73 acres and located in Section 30, T16N, R21E in Sheboygan County, Wisconsin. Specifically, the Study Area is located between Shoreland Road and East Shoreland Road along the southwest shoreline of Elkhart Lake (Appendix B, Figure 1). The purpose and objective of the wetland determination and delineation was to identify the extent and spatial arrangement of wetlands, as well as to identify potentially jurisdictional waterways, within the Study Area.

Wetland and waterways may be subject to federal regulation under the jurisdiction of the U.S. Army Corps of Engineers (USACE), state regulation under the jurisdiction of the Wisconsin Department of Natural Resources (WDNR), and local regulation under jurisdiction of the local county, town, city, or village. Stantec recommends this report be submitted to local authorities, the WDNR, and USACE for final jurisdictional review and concurrence. Delineations completed by a WDNR Assured Delineator do not need to obtain WDNR concurrence.

2.0 METHODS

2.1 WETLANDS

Wetland delineations were based on the criteria and methods outlined in the *Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1 (1987) and subsequent guidance documents, and applicable Regional Supplements to the *Corps of Engineers Wetland Delineation Manual*.

The wetland delineation involved the use of available resources to assist in the assessment such as U.S. Geological Survey (USGS) topographic maps, U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey, WDNR Wisconsin Wetland Inventory (WWI) mapping, and aerial photography.

The on-site wetland delineation was completed using the three criteria (vegetation, soil, and hydrology) and technical approach defined in the USACE 1987 Manual and applicable Regional Supplement. According to procedures described in the 1987 Manual and applicable Regional Supplement, areas that under normal circumstances reflect a predominance of hydrophytic vegetation, hydric soils, and wetland hydrology (e.g., inundated or saturated soils) are considered wetlands.

As recent weather patterns influence the visibility and presence of some wetland hydrology indicators, the antecedent precipitation in the three months leading up to the field investigation was reviewed. The current year's precipitation data were compared to the most recent long-term (30-year) precipitation averages and standard deviation to determine if precipitation was normal, wet, or dry for the area using the antecedent precipitation tool as developed by the USACE.

The wetland boundary and sampling points were identified and surveyed with a Global Positioning System (GPS) capable of sub-meter accuracy and mapped using Geographical Information System (GIS) software.

2.2 WATERWAYS

Review of waterway characteristics and determination of navigability and jurisdiction was beyond the scope of the investigation. However, if observed, waterways, waterbodies, culverts, and/or other connections to off-site wetland or aquatic features that may be under federal or state authority were surveyed using a GPS and mapped using GIS software.

3.0 RESULTS

3.1 SITE DESCRIPTION AND TOPOGRAPHY

The Study Area is comprised of wetland habitat that spans two adjoining residential properties. The wetland complex is located at the downstream end of a large gully tributary that discharges to Elkhart Lake, where hydrologic inputs are primarily surface water runoff and local groundwater discharge. The wetland drains east to Elkhart Lake via culverts under East Shoreland Road. Residential homes and adjoining structures are located outside of the Study Area

The Study Area contains steep slopes adjacent to wetland. Topography ranges from topographic highs of approximately 940 feet mean sea level (msl) along the west edge of the site to topographic lows of approximately 914 feet msl in wetland along the east boundary of the site, near East Shoreland Road. The Study Area is bordered by rural residential development to the south and west, and shoreline residential development to the north and east along Elkhart Lake.

3.2 SOILS

Soils present within the Study Area and their hydric status and hydric ratings are summarized in Table 1. Wetlands identified during the field investigation are located in areas mapped as non-hydric soils without WDNR wetland indicators (Appendix B, Figures 2 and 3).

Table 1. Summary of Soils Identified within the Study Area

Soil symbol: Soil Unit Name	Soil Unit Component	Soil Unit Component Percentage	Landform	Hydric Status
CrD2: Casco-Rodman complex, 12 to 20 percent slopes, eroded	Casco-Eroded	45-70	Moraines	No
	Rodman-Eroded	30-40	Moraines	No
	Fox	0-15	Moraines	No
CrE: Casco-Rodman complex, 20 to 30 percent slopes	Casco	45-70	Moraines	No
	Rodman	30-40	Moraines	No
	Fox	0-7	Moraines	No
	Casco-Eroded	0-8	Moraines	No

3.3 MAPPED WWI

There are no WWI wetlands identified within or directly adjacent to the Study Area (Appendix B, Figure 3).

3.4 CLIMATIC CONDITIONS

Average precipitation for the investigation area was obtained using the Antecedent Precipitation Tool (Gutenson and Deters, USACE). A total of 11.5 inches of precipitation occurred in the three-month period prior to the field investigation. When compared to the long-term precipitation data for the three months prior to the field investigation, precipitation conditions are considered normal (Appendix C). The Web-based

Water-budget Interactive Modeling Program (WebWIMP) determined that September is within the wet season for the Study Area.

3.5 WETLANDS

One wetland was identified and delineated within the Study Area. Wetland determination data forms were completed for six sample points along transects through the wetlands and adjacent uplands and are included in Appendix D. Photographs of the wetlands and adjacent lands are included in Appendix E. The wetland boundary and sample point locations are shown on Figure 4 (Appendix B). The wetland is summarized in Table 2 below and described in detail in the following section.

Table 2. Summary of Wetlands Identified within the Study Area

Wetland ID	Observed Wetland Type*	Mapped WWI Wetland Type**	Adjacent Surface Waters	Square Feet	Acres
W1	Shallow, Open Water / Hardwood Swamp / Wet Meadow	NA	Drains via culvert to Elkhart Lake	56,898	1.31
			TOTAL	**56,898**	**1.31**

*Wetland type based on Eggers & Reed, 2014
**Mapped WWI wetland may or may not correspond to field observed wetland type

3.5.1 Wetland W1

Wetland W1 is a shallow, open water hardwood swamp and wet meadow wetland community located in the central portion of the Study Area. Hydrologic sources for this wetland include surface water runoff from surrounding agricultural and residential areas, in addition to groundwater influence. The wetland generally follows an elevation of 916 feet msl and extends west and east of the Study Area via culverts under adjacent roadways.

Vegetation

Dominant plant species identified at sample points completed within the hardwood swamp community consist of basswood (*Tilia americana*, FACU), American elm (*Ulmus americana*, FACU) and common buckthorn (*Rhamnus cathartica*, FAC) in the canopy and clearweed (*Pilea pumila*, FACW) in the understory. Wet meadow is dominated by rice cut grass (*Leersia oryzoides*, OBL), reed canary grass (*Phalaris arundinacea*, FACW), and jewelweed (*Impatiens capensis*, FACW). Other common species identified in the wetland are listed on the data forms included in Appendix D. The dominant species within the wetland are comprised mostly of hydrophytic vegetation (OBL, FACW, and/or FAC) and meet the hydrophytic vegetation criterion.

Hydrology

The wetland has a permanently inundated hydroperiod in the northeast, with seasonal inundation/saturation in perimeter areas. Fluctuations in water levels are associated with runoff from large rain events that discharge from an approximately 160-acre watershed area. Primary indicators of wetland hydrology observed in W1 include High Water Table (A2), Saturation (A3), Drift Deposits (B3), Inundation Visible on Aerial Imagery (B7), Water-Stained Leaves (B9), Aquatic Fauna (B13), and Oxidized Rhizospheres on Living Roots (C3). Secondary indicators of wetland hydrology observed included Geomorphic Position (D2) and a positive FAC-Neutral Test (D5). Therefore, the wetland hydrology criterion was met.

Soils

Soils within the wetland are mapped by the NRCS as Casco-Rodman complex (CrD2) (Figure 2, Appendix B). The soils observed at the upland sample points were generally consistent with the Casco-Rodman complex series characteristics, which contain coarse sand and gravel and are excessively drained. Soils at wetland sample points, however, contained dark organic soil horizons over native soils. Organic soils likely formed after years of sediment deposition from storm events. NRCS Field Indicators of Hydric Soil identified at sample points within W1 included Depleted Below Dark Surface (A11), Loamy Mucky Mineral (F1), Depleted Matrix (F3), and Redox Dark Surface (F6). Therefore, the hydric soil criterion was satisfied.

3.5.2 Wetland Boundary

The wetland boundary was determined based on distinct differences in vegetation, hydrology, soils, and topography consisting of the following: 1) Transition from an open water, hardwood swamp, and wet meadow community dominated by basswood, American elm, clearweed, rice cutgrass, jewelweed, and reed canary grass to mesic forest and upland meadow habitat; 2) Transition from an area exhibiting wetland hydrology indicators within the wetland to a lack of wetland hydrology indicators within the adjacent upland; and 3) Transition from soils exhibiting hydric soil indicators to soils lacking indicators of hydric soil conditions. The transition from wetland to upland characteristics generally correlated with a well-defined topographic break.

3.6 UPLANDS

Upland within the Study Area consists of mesic forest situated on steep slopes surrounding W1, in addition to upland meadow located along shallow slopes at the south end of the wetland boundary. Mesic forest habitat is dominated by sugar maple (*Acer saccharum*, FACU), shagbark hickory (*Carya ovata*, FACU), red oak (*Quercus rubra*, FACU), basswood, black walnut (*Juglans nigra*, FACU), American elm, quaking aspen (*Populus tremuloides*, FAC), and common buckthorn in the canopy and Pennsylvania sedge (*Carex pensylvanica*, UPL), Virginia creeper (*Parthenocissus quinquefolia*, FACU), and yellow avens (*Geum aleppicum*, FAC) in the understory. Upland meadow habitat is dominated by smooth brome (*Bromus inermis*, UPL), Canada goldenrod (*Solidago canadensis*, FACU), and bergamot (*Monarda fistulosa*, FACU).

In general, upland areas were determined to be non-wetland based on the lack of wetland hydrology, hydric soils, hydrophytic vegetation, and a location in areas higher in the landscape that lacked suitable geomorphic position for wetland conditions to exist.

3.7 WATERWAYS

No waterways were identified within the Study Area; however, channelized flow does occur during rain events due to hydrologic inputs from a culvert under Shoreland Road and associated topography.

3.8 OTHER ENVIRONMENTAL CONSIDERATIONS

This report is limited to the identification of state and/or federally regulated wetlands and waterways within the Study Area. However, there may be other regulated features within the Study Area, including, but not limited to, historical or archeological features, endangered or threatened species, navigable waters, shoreland zones, and/or floodplains, etc. Federal, state, and local units of government and regional planning organizations may have regulatory authority to control or restrict land uses within or in close proximity to these features.

Specifically, in the state of Wisconsin, Wis. Adm. Code NR 151.12 requires that a “protective area” or buffer be determined from the top of the channel of lakes, streams and rivers, or at the delineated boundary of wetlands. In accordance with NR 151.12, the width of the “protective area” for less susceptible wetlands is determined by using 10% of the average wetland width, no less than 10 feet or more than 30 feet. Moderately susceptible wetlands, lakes, and perennial and intermittent streams identified on USGS topographic maps or NRCS county soil survey maps (whichever is more current) require a protective buffer of 50 feet, and outstanding or exceptional resource waters, highly susceptible wetlands, and wetlands in areas of special natural resource interest require protective buffers of 75 feet. The jurisdictional authority on wetland buffers rests with the WDNR. Local zoning authorities and/or a regional planning organization may have more restrictive buffers from wetlands than that imposed under NR 151.

4.0 CONCLUSION

Stantec completed a wetland delineation of on portions of two adjoining parcels (Tax Key IDs 59018258750 and 5901825854) located along the southwest shoreline of Elkhart Lake in the Town of Rhine, Sheboygan County, Wisconsin on behalf of ELIA. The approximate 4.73-acre Study Area is located in Section 30, T16N, R21E, Town of Rhine, Sheboygan County, Wisconsin. The purpose and objective of the wetland delineation was to identify wetlands and potentially jurisdictional waterways within the Study Area.

One wetland (W1) was identified and delineated within the Study Area in accordance with state and federal guidelines and was subsequently surveyed with GPS and mapped using GIS software. A total of 1.31 acres of wetland was delineated within proximity to the Study Area. Wetlands were comprised of open water, hardwood swamp, and wet meadow habitat. Adjacent uplands were composed of mesic forest and upland meadow.

The wetlands identified for this report may be subject to federal regulation under the jurisdiction of USACE, state regulation under the jurisdiction of the WDNR, and local regulation under jurisdiction of the local county, town, city, or village. Stantec recommends this report be submitted to local authorities, the WDNR, and USACE for final jurisdictional review and concurrence.

Prior to beginning work at this site or disturbing or altering wetlands, waterways, or adjacent lands in any way, Stantec recommends that the owner obtain the necessary permits or other agency regulatory review and concurrence with regard to the proposed work to comply with applicable regulations.

The information provided by Stantec regarding wetland boundaries is a scientific-based analysis of the wetland and upland conditions present within the Study Area at the time of the fieldwork. The delineation was performed by experienced and qualified professionals using standard practices and sound professional judgment. The ultimate decision on wetland boundaries rests with the USACE and, in some cases, the WDNR or a local unit of government. As a result, there may be adjustments to boundaries based upon review by a regulatory agency. An agency determination can vary from time to time depending on various factors including, but not limited to recent precipitation patterns and the season of the year. In addition, the physical characteristics of the Study Area can change over time, depending on the weather, vegetation patterns, drainage activities on adjacent parcels, or other events. Any of these factors can change the nature and extent of wetlands within the Study Area.

The conclusions in the Report are 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 document was published 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 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 to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

5.0 REFERENCES

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Appendix A DELINEATOR QUALIFICATIONS

Sarah Majerus PWS

Environmental Scientist

Sarah is an experienced wetland ecologist with more than 10 years of experience working with local non-profits, businesses, and municipalities to provide integrated solutions that protect and conserve our resources. Sarah specializes in wetland identification and delineation, wetland and waterway permitting, botanical assessment and characterization, and habitat restoration planning and design. She is certified as a Professional Wetland Scientist (PWS) with the Society of Wetland Scientists and a State Assured Wetland Delineator with the Wisconsin Department of Natural Resources (WDNR).

EDUCATION

Bachelor of Science, Zoology and Biological Aspects of Conservation, University of Wisconsin - Madison, Madison, Wisconsin, 2004

CERTIFICATIONS & TRAINING

Grasses, Sedges & Rushes, University of Wisconsin - La Crosse, La Crosse, Wisconsin, 2018

Wetland Flora, Institute of Botanical Training, LLC, Mukwonago, Wisconsin, 2017

Advanced Hydric Soils, Wetland Training Institute, Portage, Wisconsin, 2014

Advanced Wetland Delineation, University of Wisconsin - La Crosse, Sturgeon Bay, Wisconsin, 2016

Basic Wetland Delineation, University of Wisconsin - La Crosse, Waupaca, Wisconsin, 2008

REGISTRATIONS

Professional Wetland Scientist #2586, Society of Wetland Scientists, 2015-Present

MEMBERSHIPS

Member, Wisconsin Wetlands Association

Member, Society of Wetland Scientists

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
1027 W St Paul Ave
Milwaukee WI, WI, 53233

Tony Evers, Governor
Adam N. Payne, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

WISCONSIN
DEPT. OF NATURAL RESOURCES

April 3, 2023

Sarah Majerus, PWS
Stantec
12075 Corporate Parkway Suite 200
Mequon, WI 53092

Subject: 2023 Assured Wetland Delineator Confirmation

Dear Ms. Majerus:

This letter provides Wisconsin Department of Natural Resources (WDNR) confirmation for the wetland delineations you conduct during the 2023 growing season. You and your clients will not need to wait for the WDNR to review your wetland delineations before moving forward with project planning. This will help expedite the review process for WDNR's wetland regulatory program. Your name and contact information will continue to be listed on our website at: http://dnr.wi.gov/topic/wetlands/assurance.html.

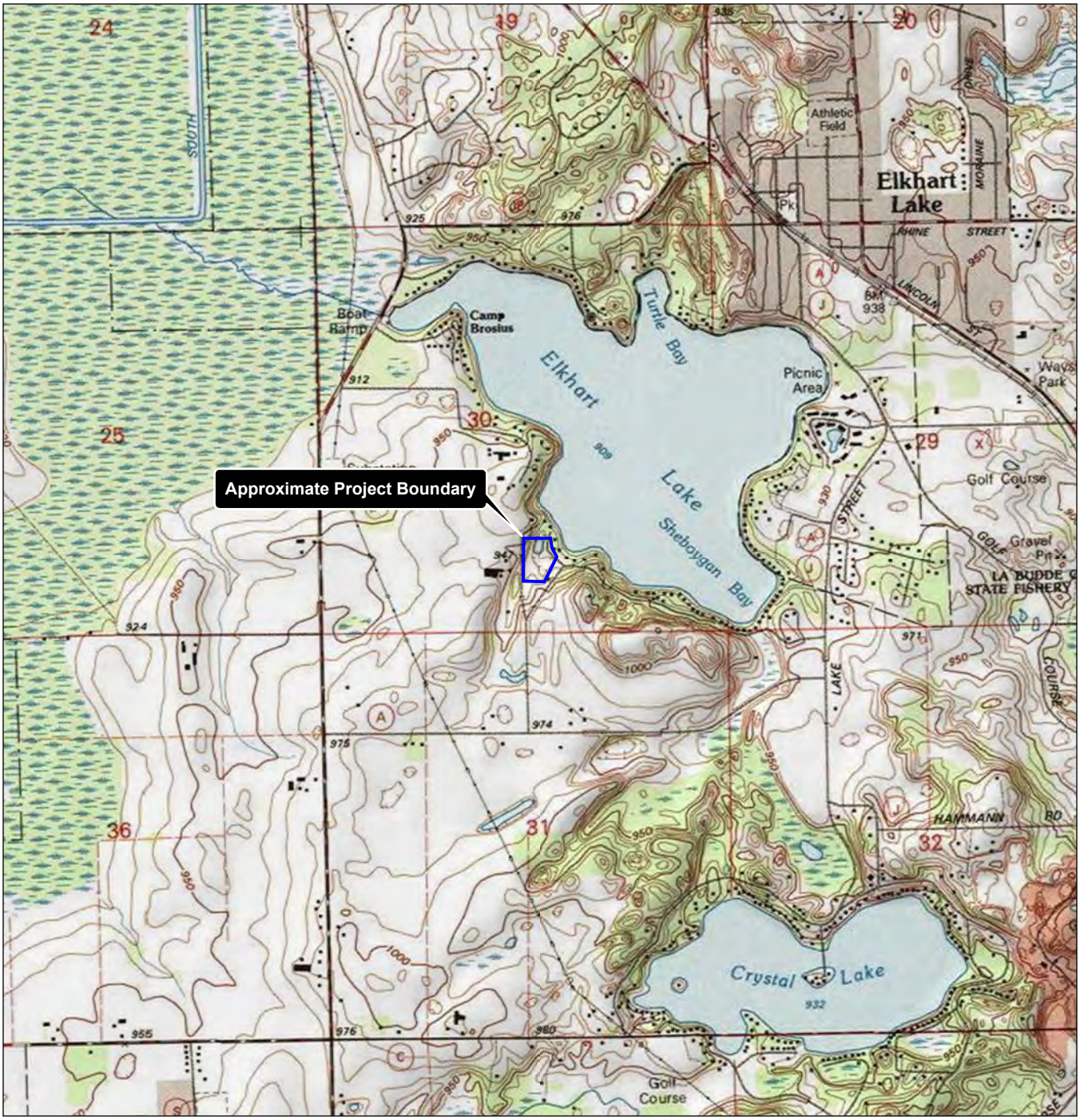
In the instance where a municipality may require a letter of confirmation for your work prior to moving forward in the local regulatory process, this letter shall serve as that confirmation. Although your wetland delineations do not require WDNR field review, inclusion of a Wetland Delineation Report is required for projects needing State authorized wetland, waterway and/or storm water permit approvals.

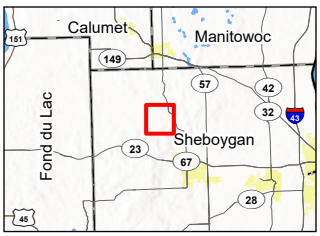
To comply with Chapter 23.321, State Statutes, please supply the department with a polygon shapefile of the wetland boundaries delineated within the project area. Please do not include data such as parcel boundaries, project limits, wetland graphic representation symbols, etc. If internal upland polygons are found within a wetland polygon, then please label as UPLAND. The shapefile should utilize a State Plane Projection and be overlain onto recent aerial photography. If a different projection system is used, please indicate in which system the data are projected. In the correspondence sent with the shapefile, please supply a brief description of each wetland's plant community (eg: wet meadow, floodplain forest, etc.). Please send these data to Calvin Lawrence (608-266-0756 or email at calvin.lawrence@wisconsin.gov).

If you or any client has a question regarding your status in the Wetland Delineation Professional Assurance Program, contact me by email at kara.brooks@wisconsin.gov or phone at 414-308-6780. Thank you for all your hard work and best wishes for the upcoming field season.

Sincerely,

Appendix B FIGURES





Legend

Approximate Project Boundary

0 1,000 2,000 Feet

(At original document size of 8.5x11)
1:24,000

N

Stantec

Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources: Stantec, Elkhart Lake Improvement Association, TIGER, WDNR
3. Background: USGS 7.5' Topographic Quadrangles

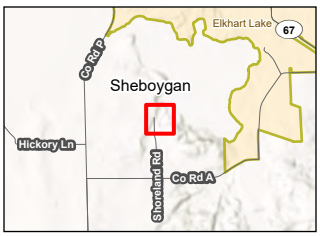
Project Location
T16N, R21E, S30
T. of Rhine, Sheboygan Co., WI

Prepared by RA on 2023-09-08
TR by DP on 2023-09-08
IR by SM on 2023-10-09

Client/Project 193806506
Elkhart Lake Improvement Association
Elkhart Lake
Wetland Delineation

Figure No.
1

Title
Project Location and Topography



Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources: Stantec, Elkhart Lake Improvement Association, WDNR, TIGER, NRCS
3. Background: NAIP 2022

Legend
- Approximate Project Boundary

NRCS Soil Survey Data
Hydric Soil Rating
- Hydric (H)*
- Predominantly Hydric (PrH)
- Partially Hydric (PaH)*
- Predominantly Non-Hydric (PNH)*
- Non-Hydric

DNR 24k Hydrography
- Perennial Stream*
- Intermittent Stream*
- Waterbody

*No Features Within Data Frame

0 75 150 Feet
(At original document size of 8.5x11)
1:1,800

N

Stantec

Project Location
T16N, R21E, S30
T. of Rhine, Sheboygan Co., WI

Prepared by RA on 2023-09-08
TR by DP on 2023-09-08
IR by SM on 2023-10-09

Client/Project 193806506
Elkhart Lake Improvement Association
Elkhart Lake
Wetland Delineation

Figure No.
2

Title
NRCS Soil Survey Data
Hydric Ratings

Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources: Stantec, Elkhart Lake Improvement Assocation, WDNR, TIGER
3. Background: NAIP 2022

Legend
- Approximate Project Boundary

WWI Wetland Class Points
- Wetland Too Small to Delineate

WWI Wetland Class Areas
- Wetland*
- Wetland Indicators

DNR 24k Hydrography
- Perennial Stream*
- Intermittent Stream*
- Waterbody

*No Features Within Data Frame

0 75 150 Feet
(At original document size of 8.5x11)
1:1,800

N

Stantec

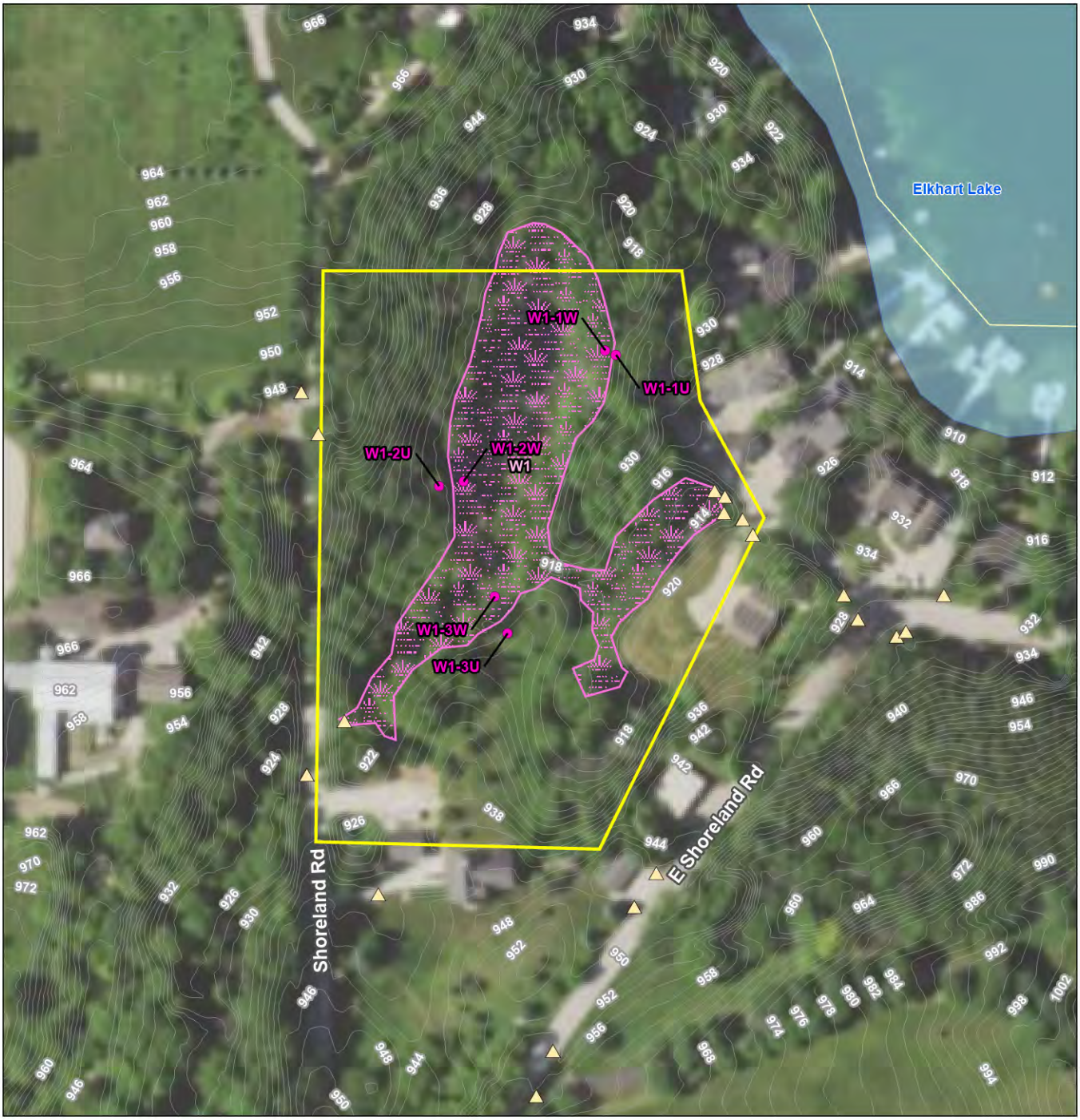
Project Location
T16N, R21E, S30
T. of Rhine, Sheboygan Co., WI

Prepared by RA on 2023-09-08
TR by DP on 2023-09-08
IR by SM on 2023-10-09

Client/Project 193806506
Elkhart Lake Improvement Association
Elkhart Lake
Wetland Delineation

Figure No.
3

Title
Wisconsin Wetland Inventory



Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources: Stantec, Elkhart Lake Improvement Assocation, WDNR, TIGER, Sheboygan County
3. Background: NAIP 2022

Legend
- Approximate Project Boundary
- Sample Point
- Culvert
- Field Delineated Wetland
- 2ft Elevation Contour

DNR 24k Hydrography
- Perennial Stream*
- Intermittent Stream*
- Waterbody

*No Features Within Data Frame

0 75 150 Feet
(At original document size of 8.5x11)
1:1,800

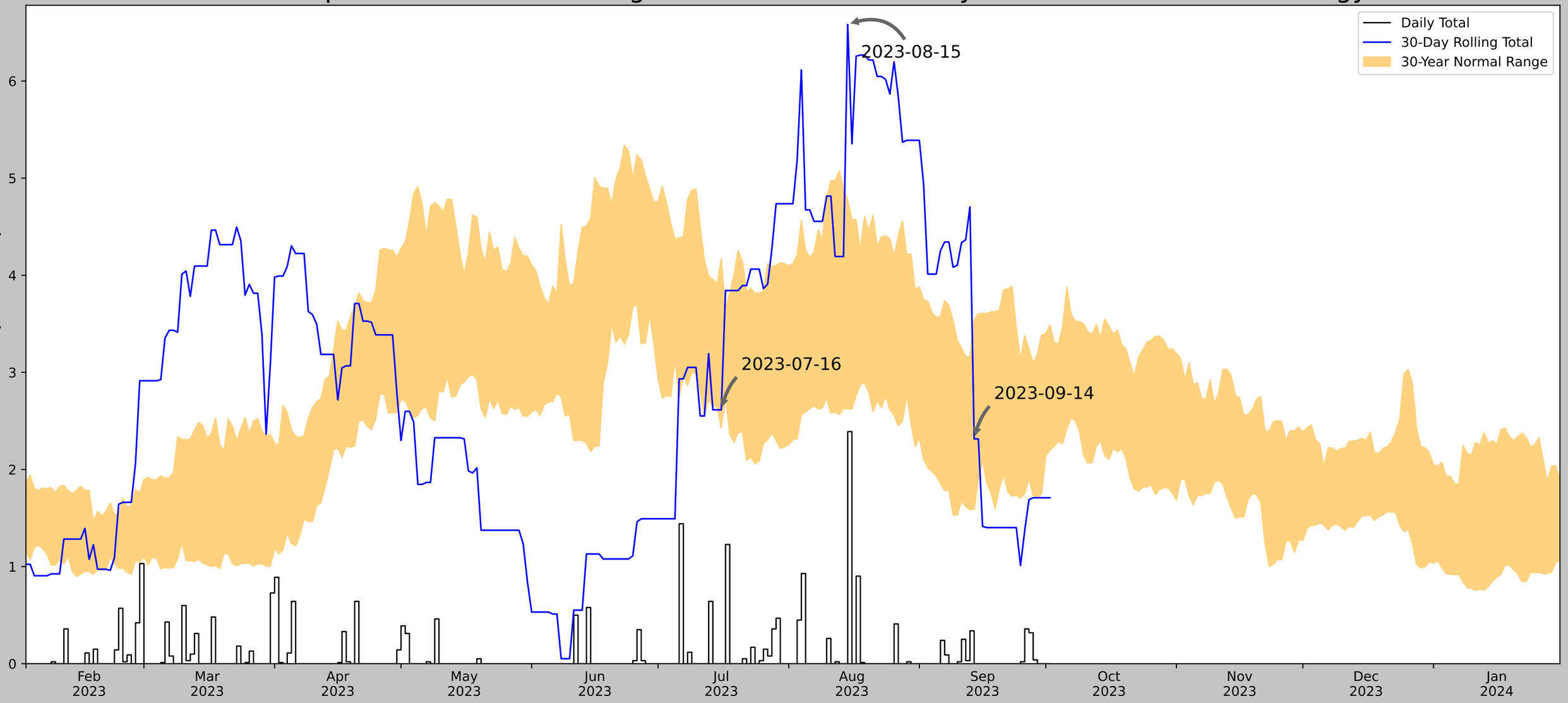
N

Stantec

Project Location	Prepared by CA on 2023-10-04
T16N, R21E, S30	TR by RA on 2023-10-05
T. of Rhine, Sheboygan Co., WI	IR by SM on 2023-10-09
Client/Project	193806506
Elkhart Lake Improvement Association	
Elkhart Lake	
Wetland Delineation	
Figure No.	
4	
Title	
Field Collected Data	

Appendix C APT ANALYSIS

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	43.821, -88.030
Observation Date	2023-09-14
Elevation (ft)	915.846
Drought Index (PDSI)	Incipient wetness (2023-08)
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-09-14	1.589764	3.540158	2.314961	Normal	2	3	6
2023-08-15	2.626378	4.772047	6.582677	Wet	3	2	6
2023-07-16	2.428347	4.166536	2.614173	Normal	2	1	2
Result							Normal Conditions - 14

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
PLYMOUTH WWTP	43.73, -87.9714	828.084	6.934	87.762	3.729	11183	83
PLYMOUTH 5.4 NE	43.8119, -87.9105	849.081	6.423	20.997	3.025	0	3
HINGHAM WWTP	43.6408, -87.9097	763.123	6.891	64.961	3.549	5	0
SHEBOYGAN CO MEM AP	43.7747, -87.8492	750.984	6.836	77.1	3.603	1	4
SHEBOYGAN	43.75, -87.7167	647.966	12.789	180.118	8.059	164	0

Appendix D WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Elkhart Lake City/County: Sheboygan County Sampling Date: 09/14/2023

Applicant/Owner: ELIA State: WI Sampling Point: W1-1W

Investigator(s): S. Majerus Section, Township, Range: S30, T016N, R021E

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0

Subregion (LRR or MLRA): LRR K, MLRA 95B Lat: 43.82195 Long: -88.030041 Datum: WGS84

Soil Map Unit Name: Casco-Rodman complex, 12 to 20 percent slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point was observed along the edge of a ponded depression, near the northeast corner of the Study Area.

Antecedent precipitation evaluation indicates normal site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- X Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present	Yes ____	No X	Depth (inches): ____
Water Table Present	Yes X	No ____	Depth (inches): 8
Saturation Present (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W1-1W

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species	Indicator Status
1. *Tilia americana*	20	Yes	FACU
2. *Ulmus americana*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	

Herb Stratum (Plot size: 5 ft)			
1. *Pilea pumila*	80	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	120 (A)		280 (B)
Prevalence Index = B/A =			2.33

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1	100					Mucky Loam	Likely depositional material from runoff events
8-12	10YR 3/2	100					Sandy Loam	
12-24	2.5Y 5/2	95	2.5Y 5/6	5	C	M	Fine Sandy Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Elkhart Lake City/County: Sheboygan County Sampling Date: 09/14/2023

Applicant/Owner: ELIA State: WI Sampling Point: W1-1U

Investigator(s): S. Majerus Section, Township, Range: S30, T016N, R021E

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): Linear Slope %: 5-8

Subregion (LRR or MLRA): LRR K, MLRA 95B Lat: 43.821937 Long: -88.030001 Datum: WGS84

Soil Map Unit Name: Casco-Rodman complex, 12 to 20 percent slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point was observed east and upslope from W1-1W. Gravel material prevented observation of soils below 10 inches.

Antecedent precipitation evaluation indicates normal site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present	Yes ____	No X	Depth (inches): ____
Water Table Present	Yes ____	No X	Depth (inches): ____
Saturation Present (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W1-1U

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species	Indicator Status
1. *Acer saccharum*	50	Yes	FACU
2. *Ulmus americana*	20	Yes	FACW
3. *Carya ovata*	10	No	FACU
4. *Quercus rubra*	10	No	FACU
5. *Tilia americana*	10	No	FACU
6. *Juglans nigra*	10	No	FACU
7.			
	110	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Rhamnus cathartica*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Carex pensylvanica*	20	Yes	UPL
2. *Geranium maculatum*	5	No	FACU
3. *Acer saccharum*	5	No	FACU
4. *Osmorhiza berteroi*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	10	x 3 =	30
FACU species	105	x 4 =	420
UPL species	20	x 5 =	100
Column Totals:	155 (A)		590 (B)
Prevalence Index = B/A =			3.81

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Sandy Loam	
6-10	10YR 2/2	100					Sandy Loam	W/ gravel/till material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

Refusal at large gravel at 10”

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Elkhart Lake City/County: Sheboygan County Sampling Date: 09/14/2023

Applicant/Owner: ELIA State: WI Sampling Point: W1-2W

Investigator(s): S.Majerus Section, Township, Range: S30, T016N, R021E

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0

Subregion (LRR or MLRA): LRR K, MLRA 95B Lat: 43.821608 Long: -88.030577 Datum: WGS84

Soil Map Unit Name: Casco-Rodman complex, 12 to 20 percent slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point was observed along the edge of a ponded depression, along the northwest boundary of W1.

Antecedent precipitation evaluation indicates normal site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present	Yes ____	No X	Depth (inches): ____
Water Table Present	Yes X	No ____	Depth (inches): 13
Saturation Present (includes capillary fringe)	Yes X	No ____	Depth (inches): 13

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W1-2W

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species	Indicator Status
1. *Tilia americana*	20	Yes	FACU
2. *Ulmus americana*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Rhamnus cathartica*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Leersia oryzoides*	60	Yes	OBL
2. *Pilea pumila*	30	Yes	FACW
3. *Impatiens capensis*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	50	x 2 =	100
FAC species	50	x 3 =	150
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	180 (A)		390 (B)
Prevalence Index = B/A =			2.17

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-2W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					Mucky Loam	Depositional material
3-8	10YR 2/2	95	7.5YR 4/6	5	C	PLM	Silty Clay Loam	Oxy rhiz
8-18	10YR 4/2	90	7.5YR 4/6	10	C	M	Clay Loam	
18-24	10YR 4/2	100					Sandy Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Elkhart Lake City/County: Sheboygan County Sampling Date: 09/14/2023

Applicant/Owner: ELIA State: WI Sampling Point: W1-2U

Investigator(s): S.Majerus Section, Township, Range: S30, T016N, R021E

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): Linear Slope %: 2-5

Subregion (LRR or MLRA): LRR K, MLRA 95B Lat: 43.821596 Long: -88.030668 Datum: WGS84

Soil Map Unit Name: Casco-Rodman complex, 12 to 20 percent slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point was observed northwest and upslope from W1-2W

Antecedent precipitation evaluation indicates normal site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present	Yes ____	No X	Depth (inches): ____
Water Table Present	Yes ____	No X	Depth (inches): ____
Saturation Present (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W1-2U

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species	Indicator Status
1. *Populus tremula*	30	Yes	FAC
2. *Tilia americana*	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Rhamnus cathartica*	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Herb Stratum (Plot size: 5 ft)			
1. *Rhamnus cathartica*	10	Yes	FAC
2. *Parthenocissus quinquefolia*	5	Yes	FACU
3. *Geum aleppicum*	5	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	95	x 3 =	285
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	120 (A)		385 (B)
Prevalence Index = B/A =			3.21

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/2	100					Sandy Loam	
14-24	10YR 4/4	100					Sandy Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Elkhart Lake City/County: Sheboygan County Sampling Date: 09/14/2023

Applicant/Owner: ELIA State: WI Sampling Point: W1-3W

Investigator(s): S.Majerus Section, Township, Range: S30, T016N, R021E

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0

Subregion (LRR or MLRA): LRR K, MLRA 95B Lat: 43.821297 Long: -88.030471 Datum: WGS84

Soil Map Unit Name: Casco-Rodman complex, 12 to 20 percent slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point was observed at the edge of a depression, along the south side of WI.

Antecedent precipitation evaluation indicates normal site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present	Yes ____	No X	Depth (inches): ____
Water Table Present	Yes ____	No X	Depth (inches): ____
Saturation Present (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W1-3W

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. *Phalaris arundinacea*	50	Yes	FACW
2. *Impatiens capensis*	40	Yes	FACW
3. *Cirsium arvense*	10	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	100 (A)		220 (B)

Prevalence Index = B/A = 2.2

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-3W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	95	7.5YR 4/6	5	C	PL	Silt Loam	Oxy rhiz
6-18	7.5YR 4/2	95	7.5YR 4/6	5	C	PLM	Silty Clay Loam	
18-24	7.5YR 3/2	95	7.5YR 4/6	5	C	PLM	Sandy Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Elkhart Lake City/County: Sheboygan County Sampling Date: 09/14/2023

Applicant/Owner: ELIA State: WI Sampling Point: W1-3U

Investigator(s): S. Majerus Section, Township, Range: S30, T016N, R021E

Landform (hillside, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope %: 2-5

Subregion (LRR or MLRA): LRR K, MLRA 95B Lat: 43.821197 Long: -88.030427 Datum: WGS84

Soil Map Unit Name: Casco-Rodman complex, 12 to 20 percent slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point was observed south and upslope from W1-3U, in upland meadow habitat. Gravel prevented observation of soils below 8 inches.

Antecedent precipitation evaluation indicates normal site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present	Yes ____	No X	Depth (inches): ____
Water Table Present	Yes ____	No X	Depth (inches): ____
Saturation Present (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: W1-3U

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. *Bromus inermis*	50	Yes	UPL
2. *Solidago canadensis*	15	No	FACU
3. *Monarda fistulosa*	15	No	FACU
4. *Daucus carota*	10	No	UPL
5. *Poa pratensis*	10	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	60	x 5 =	300
Column Totals:	100 (A)		460 (B)
Prevalence Index = B/A =			4.6

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-3U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					Sandy Loam	
5-8	7.5YR 5/4	100					Sandy Loam	W/ gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

Refusal at gravel at 8”

Appendix E SITE PHOTOGRAPHS

Stantec

Client: Elkhart Lake Improvement Association
Project: Elkhart Lake Wetland Delineation
Project Number: 193806506
Location: Sheboygan Co., WI

View of W1-1W, facing Southwest

View of W1-1W, facing South

View of W1-1W, facing Northwest

View of W1-1U, facing South

View of W1-1U, facing North

View of W1-2W, facing North

View of W1-2W, facing Southwest

View of W1-2U, facing South

View of W1-2U, facing North

View of W1-3W, facing South

View of W1-3W, facing North

View of W1-3U, facing West

View of W1-3U, facing East

Appendix E

Laboratory Test Results

Soil and Forage Analysis Lab
WISCONSIN STATE LABORATORY OF HYGIENE
UNIVERSITY OF WISCONSIN–MADISON

4702 University Avenue
Madison, WI 53705
608-262-4364
soil-lab@mailplus.wisc.edu
https://uwlab.soils.wisc.edu

Stantec / William Davis
209 Commerce Parkway
Cottage Grove, WI 53527

Date 10/11/2023
Account # 559060
Lab # 3359

COMMENTS:

Soil Total Leachable P

Sample #	Sample ID	Total Leachable P %
1	EL-E	0.11
2	EL-S	0.12
3	EL-N	0.09
4	EL-W	0.11
5	EL-US	0.09
6	EL-DS	0.10

eurofins | Environment Testing

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ANALYTICAL REPORT

PREPARED FOR

Attn: Christian Burnson
Stantec Consulting Corporation
209 Commerce Parkway
PO BOX 128
Cottage Grove, Wisconsin 53527-8955

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JOB DESCRIPTION

Elkhart Lake

JOB NUMBER

500-239709-1

Eurofins Chicago
2417 Bond Street
University Park IL 60484

See page two for job notes and contact information.

myEOL

Eurofins Chicago

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

Results relate only to the items tested and the sample(s) as received by the laboratory. The results, detection limits (LOD) and Quantitation Limits (LOQ) have been adjusted for sample dilutions and/or solids content.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Chicago Project Manager.

Authorization

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Authorized for release by
Sandie Fredrick, Project Manager II
Sandra.Fredrick@et.eurofinsus.com
(920)261-1660

Table of Contents

Case Narrative

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Job ID: 500-239709-1

Laboratory: Eurofins Chicago

Narrative

Job Narrative
500-239709-1

Receipt
The samples were received on 9/16/2023 10:20 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3º C.

General Chemistry
Method SM 4500 P E: The method blank for preparation batch 500-732778 and analytical batch 500-733187 contained Phosphorus as P above the method detection limit. This target analyte concentration was less than the reporting limit (RL) in the method blank; therefore, re-extraction and/or re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Client Sample ID: EL-1 — Lab Sample ID: 500-239709-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Phosphorus as P	0.44	B	0.25	0.12	mg/L	1		SM 4500 P E	Total/NA

Client Sample ID: EL-2 — Lab Sample ID: 500-239709-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Phosphorus as P	0.47	B	0.25	0.12	mg/L	1		SM 4500 P E	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Method	Method Description	Protocol	Laboratory
SM 4500 P E	Phosphorus	SM	EET CHI
SM 4500 P B	Phosphorous, Total and Ortho	SM	EET CHI

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Sample Summary

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-239709-1	EL-1	Water	09/14/23 12:30	09/16/23 10:20
500-239709-2	EL-2	Water	09/14/23 12:30	09/16/23 10:20

Client Sample Results

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Client Sample ID: EL-1
Date Collected: 09/14/23 12:30
Date Received: 09/16/23 10:20

Lab Sample ID: 500-239709-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus as P (SM 4500 P E)	0.44	B	0.25	0.12	mg/L		09/18/23 12:14	09/20/23 10:41	1

Client Sample Results

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Client Sample ID: EL-2

Date Collected: 09/14/23 12:30
Date Received: 09/16/23 10:20

Lab Sample ID: 500-239709-2

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus as P (SM 4500 P E)	0.47	B	0.25	0.12	mg/L		09/18/23 12:14	09/20/23 10:42	1

Definitions/Glossary

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

General Chemistry

Prep Batch: 732778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-239709-1	EL-1	Total/NA	Water	SM 4500 P B	
500-239709-2	EL-2	Total/NA	Water	SM 4500 P B	
MB 500-732778/1-A	Method Blank	Total/NA	Water	SM 4500 P B	
LCS 500-732778/2-A	Lab Control Sample	Total/NA	Water	SM 4500 P B	

Analysis Batch: 733187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-239709-1	EL-1	Total/NA	Water	SM 4500 P E	732778
500-239709-2	EL-2	Total/NA	Water	SM 4500 P E	732778
MB 500-732778/1-A	Method Blank	Total/NA	Water	SM 4500 P E	732778
LCS 500-732778/2-A	Lab Control Sample	Total/NA	Water	SM 4500 P E	732778

Method: SM 4500 P E - Phosphorus

Lab Sample ID: MB 500-732778/1-A
Matrix: Water
Analysis Batch: 733187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 732778

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus as P	0.0340	J	0.050	0.024	mg/L		09/18/23 12:14	09/20/23 09:30	1

Lab Sample ID: LCS 500-732778/2-A
Matrix: Water
Analysis Batch: 733187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 732778

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phosphorus as P	0.500	0.487		mg/L		97	88 - 123

Lab Chronicle

Client: Stantec Consulting Corporation
Project/Site: Elkhart Lake

Job ID: 500-239709-1

Client Sample ID: EL-1
Date Collected: 09/14/23 12:30
Date Received: 09/16/23 10:20

Lab Sample ID: 500-239709-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	SM 4500 P B			732778	FRG	EET CHI	09/18/23 12:14 - 09/18/23 16:14 [1]
Total/NA	Analysis	SM 4500 P E		1	733187	DM	EET CHI	09/20/23 10:41

Client Sample ID: EL-2
Date Collected: 09/14/23 12:30
Date Received: 09/16/23 10:20

Lab Sample ID: 500-239709-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	SM 4500 P B			732778	FRG	EET CHI	09/18/23 12:14 - 09/18/23 16:14 [1]
Total/NA	Analysis	SM 4500 P E		1	733187	DM	EET CHI	09/20/23 10:42

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: Stantec Consulting Corporation
Job ID: 500-239709-1
Project/Site: Elkhart Lake

Laboratory: Eurofins Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Wisconsin	State	999580010	08-31-24

Chain of Custody Record 457634

eurofins | Environment Testing TestAmerica

Address _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TAL-8210

Client Contact	Project Manager: Christian Burmeen	Site Contact:	Date:	COC No
Company Name Stantec	Tel/Email Christian.Burmeen@Stantec	Lab Contact:	Carrier:	_____ of _____ COCs
Address 709 Commerce Pkwy	Analysis Turnaround Time			Sampler
City/State/Zip Cottage Grove, WI 53527	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone 608-839-0533	TAT if different from Below _____			Walk-in Client:
Fax	☐ 2 weeks			Lab Sampling
Project Name Elkhart Lake	☐ 1 week			
Site Elkhart Lake, WI	☐ 2 days			Job / SDG No
P O #	☐ 1 day			500-239709

500-239709 COC

	Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Total Phosphorus	Sample Specific Notes
1	EL-1	09/14	12:30	G	SW	1			X	
2	EL-2	09/14	12:30	G	SW	1			X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification.
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments

3.7-3.5

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp. (°C): Obs'd _____ Corr'd _____ Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
William Davis WBD	Stantec	9/15 11:30			
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by	Company	Date/Time
			Alina Kautz	EBRA	9/16/23 1020


500-239709 Waybi
ORIGIN ID:MSNA (608) 621-0533
STANTEC CONSULTING SVCS INC.
209 COMMERCE PKWY
COTTAGE GROVE, WI 53527
UNITED STATES US
SHIP DATE: 15SEP23
ACTWGT: 8.90 LB
CAD: 6991631/SSF02441
DIMS: 10x13x9 IN
BILL THIRD PARTY
TO SAMPLE RECEIPT
EUROFINS
2417 BOND ST
UNIVERSITY PARK IL 60484
(000) 000-0000
REF:
DEPT:
INV:
PO
Fed
Expr.
SATURDAY 12:00
PRIORITY OVERNIGHT
TRK# 8172 9405 7750
0200
XO JOTA
60484
IL-US

Login Sample Receipt Checklist

Client: Stantec Consulting Corporation

Job Number: 500-239709-1

Login Number: 239709
List Number: 1
Creator: Scott, Sherri L

List Source: Eurofins Chicago

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.3
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix F

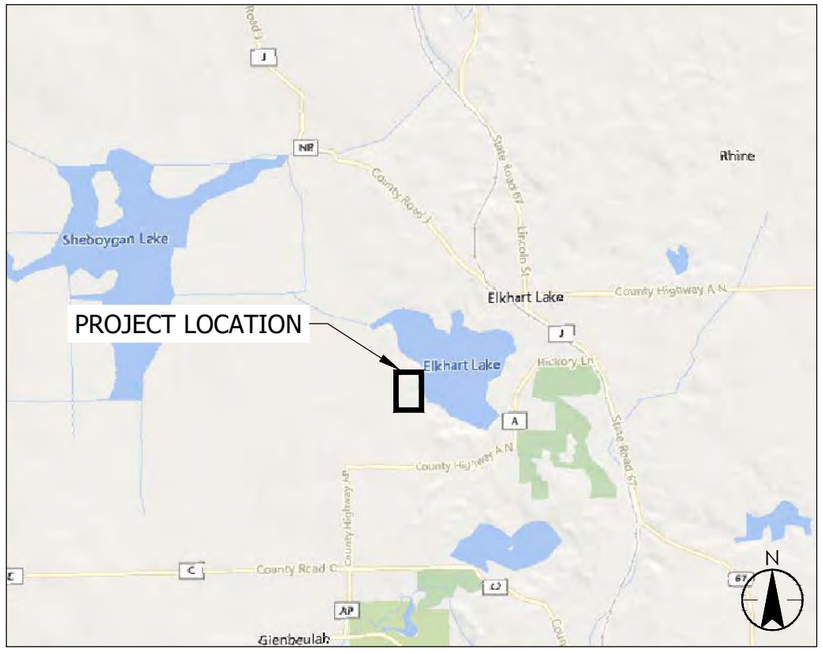
Wetland Restoration Concept Plans

ELKHART LAKE WETLAND RESTORATION CONCEPT DRAWINGS

ELKHART LAKE IMPROVEMENT ASSOCIATION

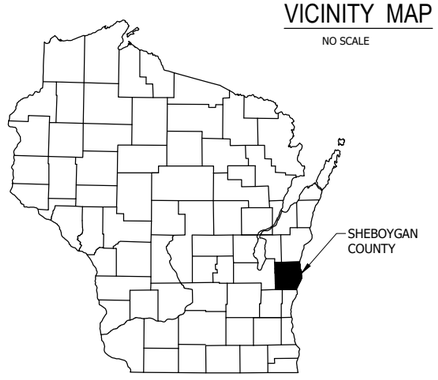
SHEBOYGAN COUNTY, WISCONSIN

SHEET INDEX



VICINITY MAP

NO SCALE



LOCATION MAP

NO SCALE

CHRISTIAN BURNSON, P.E.
NO. 45907

THE LOCATIONS OF EXISTING UTILITY INSTALLATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE. THERE MAY BE OTHER UNDERGROUND UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.

STANTEC ASSUMES NO RESPONSIBILITY FOR DAMAGES, LIABILITY OR COSTS RESULTING FROM CHANGES OR ALTERATIONS MADE TO THIS PLAN WITHOUT WRITTEN CONSENT OF STANTEC.

THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. STANTEC HAS NOT VERIFIED THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

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Cottage Grove, WI 53527
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TITLE SHEET

ELKHART LAKE WETLAND RESTORATION
ELKHART LAKE IMPROVEMENT ASSOCIATION
ELKHART LAKE, WI

DATE OF ISSUANCE
January 23, 2024

NO	REVISION	DATE

SURVEY	XXXXXXX
DRAWN	XXX
DESIGNED	XXX
CHECKED	XXX
APPROVED	XXX
PROJ. NO.	193806506

SHEET NUMBER
G0.01

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Drawing Name: C:\Users\christian.burnson\ACCDocs\Stantec\193806506\Project Files\CAD\Dwg\Sheets\193806506_G001.dwg
Xrefs: tb_34x22.MED

GENERAL

ALL WORK SHALL BE DONE IN ACCORDANCE WITH NATURAL RESOURCES CONSERVATION SERVICE (NRCS) CONSTRUCTION SPECIFICATIONS, UNLESS OTHERWISE NOTED. NRCS CONSTRUCTION SPECIFICATIONS ARE FREELY AVAILABLE ONLINE AS PART 657 OF THE NRCS NATIONAL ENGINEERING HANDBOOK.

WATERWAY AND WETLAND PERMITS HAVE BEEN NOT OBTAINED FROM THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES. THESE DRAWINGS ARE CONCEPTUAL IN NATURE AND WERE PRODUCED FOR STAKEHOLDER DECISION MAKING. SHOULD THIS PROJECT PROCEED TO CONSTRUCTION, PERMITS WILL BE APPLIED FOR AND COPIES OF THESE PERMITS WILL BE PROVIDED TO THE CONTRACTOR WHEN AVAILABLE. CONTRACTOR SHALL COMPLY WITH ALL PERMIT REQUIREMENTS AT ALL TIMES.

SITE PREPARATION AND EROSION CONTROL

VERTICAL DATUM IS NAD83.

COORDINATE SYSTEM IS WISCONSIN COUNTY SYSTEMS: SHEBOYGAN COUNTY, US FOOT

THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE THEMSELVES WITH ALL SITE CONDITIONS, PRIOR TO SUBMITTING A BID.

THE ENGINEER WILL APPLY FOR A WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR) NOTICE OF INTENT CONSTRUCTION SITE STORMWATER PERMIT PRIOR TO START OF CONSTRUCTION.

IF THE CONTRACTOR DETERMINES THAT CONTROL OF SURFACE WATER OR EXCAVATION DEWATERING IS REQUIRED, IT SHALL BE DONE IN ACCORDANCE WITH NRCS CONSTRUCTION SPECIFICATION 002, EXCAVATION.

CONTRACTOR TO BE RESPONSIBLE FOR ALL NECESSARY UTILITY LOCATING REQUIRED TO CONSTRUCT PROJECT. CONTRACTOR SHALL ARRANGE FOR UTILITY LOCATING BY WISCONSIN DIGGERS HOTLINE, SUPPLEMENTED BY PRIVATE UTILITY LOCATING IF NECESSARY.

EARTHWORK AND GRADING

EXCAVATION OF MATERIAL RELATED TO THE WETLAND RESTORATION SHALL BE DONE IN ACCORDANCE WITH NRCS CONSTRUCTION SPECIFICATIONS, INCLUDING CONSTRUCTION SPECIFICATION 002 EXCAVATION, CONSTRUCTION SPECIFICATION 003 EARTHFILL, AND CONSTRUCTION SPECIFICATION 026 TOPSOILING.

LANDSCAPING AND RESTORATION

RESTORATION SHALL BE IN ACCORDANCE WITH THE EROSION CONTROL PLAN AND NOTES, AND NRCS CONSERVATION PRACTICE STANDARD 657 - WETLAND RESTORATION.

ENGINEER WILL PROVIDE AND INSTALL FINAL SEED MIXES AND PLUG PLANTING MIXES FOR THE FOLLOWING VEGETATION ZONES SHOWN ON THE LANDSCAPE AND RESTORATION PLAN.

- EMERGENT ZONE SEED MIX
- WET MEADOW SEED MIX
- UPLAND PRAIRIE SEED MIX

EROSION CONTROL NOTES

GENERAL NOTES

1. CONTRACTOR SHALL CONFORM TO ALL RELEVANT FEDERAL, STATE, AND LOCAL REGULATIONS; THE CONDITIONS INCLUDED IN ANY PERMIT; AND TO THE CONDITIONS INCLUDED IN THE PROJECT ENGINEER'S PLANS UNLESS OTHERWISE APPROVED BY THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR) AND PROJECT ENGINEER.
2. EROSION CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE WDNR TECHNICAL STANDARDS AND WI DOT PRODUCT ACCEPTABILITY LIST (PAL).
3. A COPY OF THE EROSION CONTROL PLAN AND PERMITS SHALL BE KEPT ONSITE AND AVAILABLE FOR INSPECTION THROUGHOUT THE DURATION OF THE PROJECT. SUBMIT PLAN REVISIONS OR AMENDMENTS TO THE WDNR AT LEAST 5 DAYS PRIOR TO FIELD IMPLEMENTATION.
4. AT NO TIME MAY CONSTRUCTION EQUIPMENT OR FILL BE PLACED IN A WATERWAY OR WETLAND, EXCEPT AS APPROVED BY WDNR PERMIT. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIALS IN ANY WETLAND, FLOODPLAIN, OR FLOODWAY.
5. PUBLIC AND PRIVATE ACCESS ROADS SHALL BE KEPT FREE OF TRACKED SEDIMENT AND AT A MINIMUM CLEANED AT THE END OF EACH WORKDAY (NOT BY FLUSHING). AS WELL, THE CONTRACTOR SHALL TAKE MINIMIZATION MEASURES FOR DUST CONTROL TO THE MAXIMUM EXTENT PRACTICABLE.
6. BARE SOIL AREAS, INCLUDING SOIL STOCKPILES, LEFT UNDISTURBED FOR 7 DAYS, SHALL BE STABILIZED WITH: TEMPORARY OR PERMANENT SEED AND MULCH (PROPERLY ANCHORED BY CRIMPING, NETTING, OR TACKIFIER); HYDROMULCH; TARP; OR OTHER APPROVED METHOD.
7. THE USE, STORAGE AND DISPOSAL OF CHEMICALS, OIL & GREASE, CEMENT AND OTHER COMPOUNDS AND MATERIALS USED ON THE CONSTRUCTION SITE SHALL BE MANAGED DURING THE CONSTRUCTION PERIOD TO PREVENT THEIR TRANSPORT BY RUNOFF INTO WATERS OF THE STATE; IN THE EVENT OF ANY SPILL NOTIFICATION SHALL BE IMMEDIATELY REPORTED TO THE WDNR AND LOCAL AUTHORITIES. ALL CONSTRUCTION DEBRIS AND LITTER SHALL BE CLEANED DAILY.
8. IF THE CONTRACTOR DETERMINES THAT DEWATERING WILL BE NECESSARY, A DEWATERING PLAN FOLLOWING WDNR TECHNICAL STANDARD 1061 SHALL BE SUBMITTED BY THE CONTRACTOR TO THE WDNR FOR APPROVAL. NOTIFY THE WDNR IF DEWATERING IS SCHEDULED TO OCCUR IN AREAS OF SOIL AND/OR GROUNDWATER CONTAMINATION, OR IF DEWATERING WILL OCCUR FROM A HIGH CAPACITY WELL (70 GPM OR GREATER). PROVIDE ANTI-SCOUR PROTECTION AND MAINTAIN NON-EROSIVE FLOW DURING DEWATERING.
9. BETWEEN SEPTEMBER 15 AND OCTOBER 15 STABILIZE WITH MULCH, TACKIFIER AND A PERENNIAL SEED MIX WITH WINTER WHEAT, ANNUAL RYE, OATS OR ANNUAL RYE. DURING THE NON-GROWING SEASON (OCT. 15 - APRIL 15), WINTER STABILIZATION SHALL INCLUDE SEEDING WITH DORMANT SEED MIX AND WINTER WHEAT AND THE USE OF MULCH AND POLYMER/TACKIFIER (AS AN ANCHORING METHOD) OR A CLASS 1-TYPE B EROSION MAT ON ALL BARE SOIL AREAS OF THE SITE.
   - MULCH SHALL CONSIST OF HAY OR STRAW FREE OF DISEASED PLANT RESIDUE, NOXIOUS WEEDS, HARMFUL CHEMICAL RESIDUES, HEAVY METALS, HYDROCARBONS, AND OTHER KNOWN ENVIRONMENTAL TOXICANTS.
   - MULCH SHALL COVER A MINIMUM OF 80% OF THE SOIL SURFACE AND SHALL BE ½ TO 1 ½ INCHES THICK.
   - IF THE CONDITIONS ARE TOO COLD TO APPLY A POLYMER/TACKIFIER, A MULCH CRIMPER OR BIODEGRADABLE NETTING SHALL BE USED AS A TEMPORARY ALTERNATE ANCHORING METHOD.
10. IF SNOW COVER PREVENTS THE INSTALLATION OF THESE ITEMS; THE CONDITION OF THE SITE, INCLUDING THE AMOUNT OF SNOW COVER, WILL BE NOTED ON EVERY EROSION AND SEDIMENT CONTROL INSPECTION REPORT. ONCE THE SNOW IS 2 INCHES OR LESS ON A MAJORITY OF THE SITE, THE ABOVE-MENTIONED WINTER STABILIZATION METHODS SHALL BE IMMEDIATELY EMPLOYED.
11. ALL FINISH GRADED DITCHES AND SWALES SHALL BE PLANTED, SODDED OR SEEDED AND MULCHED OR MATTED IMMEDIATELY AFTER COMPLETION.
12. IF ANY ITEM IN THE EROSION CONTROL PLAN REQUIRES MODIFICATION, THE CONTRACTOR SHALL SUBMIT AN EROSION CONTROL PLAN REVISION TO THE PROJECT ENGINEER AND WDNR STORMWATER SPECIALIST TO RECEIVE APPROVAL BEFORE PROCEEDING.
13. ALL LAND DISTURBING ACTIVITIES SHALL BE CONDUCTED IN A LOGICAL SEQUENCE AS TO MINIMIZE THE AMOUNT OF BARE SOIL EXPOSED AT ANY ONE TIME. MAINTAIN EXISTING VEGETATION AS LONG AS POSSIBLE.
14. ANY OFF-SITE SEDIMENT DEPOSITS SHALL BE CLEANED UP AND RESTORED OR STABILIZED WITH 24 HOURS, WEATHER PERMITTING, OF ANY OFF-SITE SEDIMENT DEPOSITION. ALL SEDIMENT SHALL BE PROPERLY DISPOSED OF AND STABILIZED IN AN UPLAND LOCATION ON OR OFF-SITE.
15. MAKE APPROPRIATE PROVISIONS FOR WATERING, AS NEEDED, DURING THE FIRST 8 WEEKS FOLLOWING SEEDING OR PLANTING AREAS WHENEVER MORE THAN SEVEN (7) CONSECUTIVE DAYS OF DRY WEATHER OCCUR (NO RAIN).

EROSION CONTROL INSTALLATION AND SEQUENCING

1. TRACKING PAD AND SEDIMENT LOGS SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING CONSTRUCTION ACTIVITIES.
2. ONCE THE TEMPORARY EROSION CONTROL DEVICES HAVE BEEN INSTALLED, GRADING AND RESTORATION ACTIVITIES CAN BE COMPLETED.
3. FLOWS SHALL BE DIRECTED DURING CONSTRUCTION TO THE SEDIMENT LOGS.
4. UPON COMPLETION OF GRADING ANY DISTURBED GROUND SHALL BE TEMPORALITY SEEDED AND MULCH PLACED WITHIN 7 DAYS.
5. PERMANENT STABILIZATION SHALL OCCUR AFTER FINAL GRADING, OF ANY AREAS THAT WERE TEMPORARILY SEEDED.

REMOVAL OF EROSION CONTROL MEASURES

1. SEDIMENT LOGS SHALL BE REMOVED WHEN ALL LAND DISTURBING CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED AND THE AREA HAS REACHED FINAL STABILIZATION. ANY SOIL DISTURBANCE THAT HAS OCCURRED BECAUSE OF ITS REMOVAL SHALL BE IMMEDIATELY STABILIZED.
2. TRACKING PAD SHALL BE REMOVED WHEN ALL LAND DISTURBING CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED ALONG ITS ASSOCIATED ACCESS ROAD. ANY SOIL DISTURBANCE THAT HAS OCCURRED AS A RESULT ITS REMOVAL SHALL BE IMMEDIATELY STABILIZED.

EROSION CONTROL INSPECTION AND MAINTENANCE

1. INSPECT ALL EROSION CONTROL MEASURES PRIOR TO COMMENCING GRADING ACTIVITIES. EROSION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF EVERY ½ INCH OR GREATER RAIN EVENT. MAINTENANCE SHALL BE IN ACCORDANCE WITH THE WDNR TECHNICAL STANDARDS AND THE ENGINEER'S PLANS AND SPECIFICATIONS AND AS DEEMED NECESSARY BY REGULATORY AGENCIES. KEEP INSPECTION REPORTS ON-SITE AND AVAILABLE UPON REQUEST. ALL MAINTENANCE AND/OR REPAIRS SHALL BE COMPLETED WITHIN 24 HOURS OF NOTIFICATION BY THE EROSION CONTROL INSPECTOR. THE CONTRACTOR SHALL MAINTAIN AN EROSION CONTROL LOG BOOK ON SITE NOTING INSPECTION DATE AND TIMES, REPAIRS NECESSARY, AND REPAIRS MADE.
2. THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE EROSION CONTROL MEASURES IN ACCORDANCE WITH WDNR TECHNICAL STANDARDS AND AS FOLLOWS:
   A. TRACKING PAD (1057) - MAINTENANCE SHALL TAKE PLACE BY SCRAPING OR TOP-DRESSING WITH ADDITIONAL AGGREGATE. A MINIMUM 50-FOOT-LONG AND 12-INCH THICK PAD CONSISTING OF A MINIMUM OF 3-INCH CLEAR WASHED STONE SHALL BE MAINTAINED. THE WIDTH OF THE TRACKING PAD SHALL EXTEND THE FULL DISTANCE OF THE EGRESS POINT.
   B. SEDIMENT LOGS (1056) - SEDIMENT /DEBRIS/DEPOSITS SHALL BE REMOVED WHEN THEY REACH 50% OF THE HEIGHT OF THE SEDIMENT LOGS. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE NON-WETLAND OR FLOODPLAIN AREA AND STABILIZED. SEDIMENT LOGS THAT ARE DAMAGED OR NOT PERFORMING AS DESIGNED SHALL BE REPAIRED OR REPLACED IMMEDIATELY.

Stantec
209 Commerce Parkway
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NOTES

ELKHART LAKE WETLAND RESTORATION
ELKHART LAKE IMPROVEMENT ASSOCIATION
ELKHART LAKE, WI

DATE OF ISSUANCE
January 23, 2024

NO	REVISION	DATE

SURVEY	XXXXXXX
DRAWN	XXX
DESIGNED	XXX
CHECKED	XXX
APPROVED	XXX
PROJ. NO.	193806506

SHEET NUMBER
G0.02

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Xrefs: 193422.MEQ

LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DELINEATED WETLAND
- EXISTING FLOW ARROW
- EXISTING OUTFALL
- EXISTING STORM PIPE

NOTES:

ELEVATION AND PARCEL DATA RETRIEVED FROM SHEBOYGAN COUNTY GEOSPATIAL HUB.

THE WETLAND WAS DELINEATED 09/14/2023.

THE CULVERTS WERE NOT SURVEYED AND THEREFORE ARE APPROXIMATE.

N

0 60' 120'

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EXISTING SITE PLAN

ELKHART LAKE WETLAND RESTORATION
ELKHART LAKE IMPROVEMENT ASSOCIATION
ELKHART LAKE, WI

DATE OF ISSUANCE
January 23, 2024

NO	REVISION	DATE

SURVEY	XXXXXXX
DRAWN	XXX
DESIGNED	XXX
CHECKED	XXX
APPROVED	XXX
PROJ. NO.	193806506

SHEET NUMBER
C0.01

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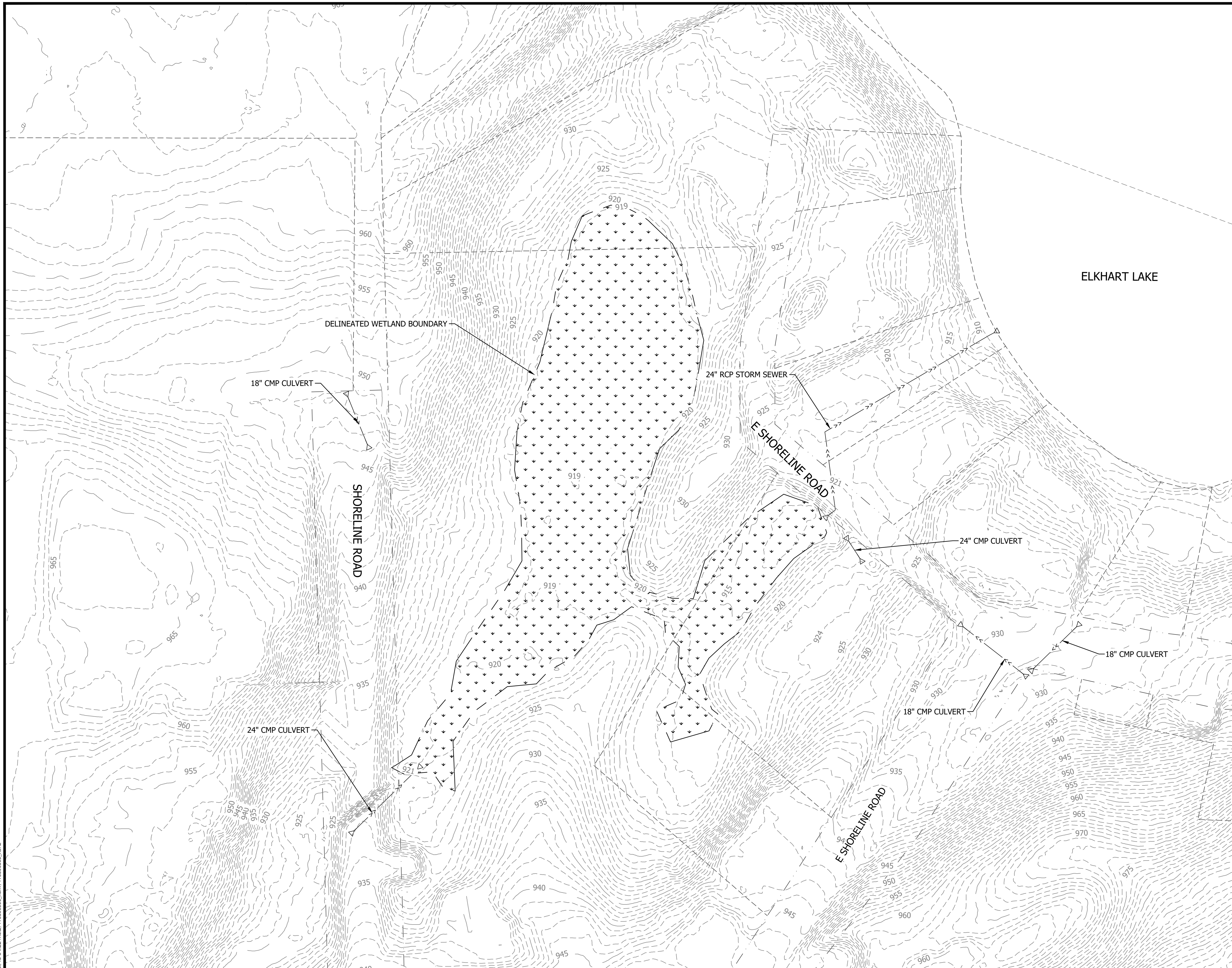

LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DELINEATED WETLAND
- EXISTING FLOW ARROW
- EXISTING OUTFALL
- EXISTING STORM PIPE

NOTES:

ELEVATION AND PARCEL DATA RETRIEVED FROM SHEBOYGAN COUNTY GEOSPATIAL HUB.

THE WETLAND WAS DELINEATED 09/14/2023.

THE CULVERTS WERE NOT SURVEYED AND THEREFORE ARE APPROXIMATE.

N

0 40' 80'

Stantec
209 Commerce Parkway
Cottage Grove, WI 53527
www.stantec.com

NOT FOR CONSTRUCTION

EXISTING CONDITIONS PLAN

ELKHART LAKE WETLAND RESTORATION
ELKHART LAKE IMPROVEMENT ASSOCIATION
ELKHART LAKE, WI

DATE OF ISSUANCE	
January 23, 2024	

NO	REVISION	DATE

SURVEY	XXXXXXXX
DRAWN	XXX
DESIGNED	XXX
CHECKED	XXX
APPROVED	XXX
PROJ. NO.	193806506

SHEET NUMBER
C0.02

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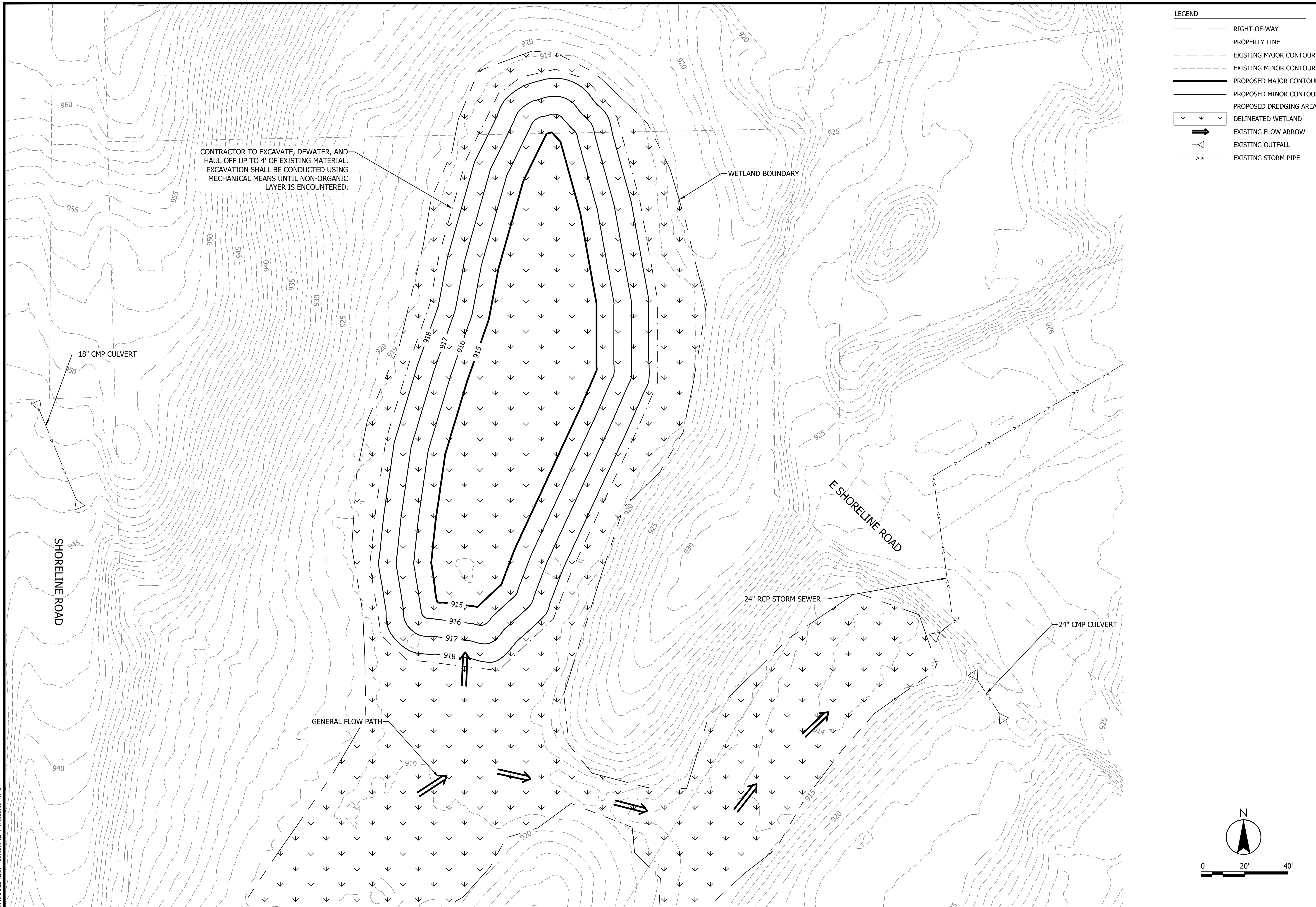

Stantec

209 Commerce Parkway
Cottage Grove, WI 53527
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NOT FOR CONSTRUCTION

PROPOSED SITE & GRADING PLAN

ELKHART LAKE WETLAND RESTORATION
ELKHART LAKE IMPROVEMENT ASSOCIATION
ELKHART LAKE, WI

DATE OF ISSUANCE		
January 23, 2024		
NO	REVISION	DATE

SURVEY	XXXXXXXX
DRAWN	XXX
DESIGNED	XXX
CHECKED	XXX
APPROVED	XXX
PROJ. NO.	193806506

SHEET NUMBER
C2.01

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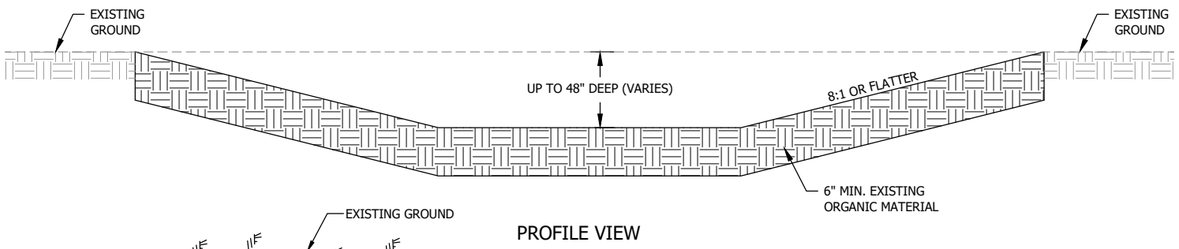
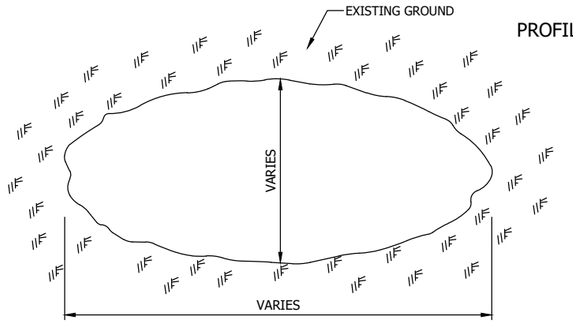


PROFILE VIEW



PLAN VIEW

NOTE:
MINIMUM DISTANCES, SHAPE AND DEPTH INTENDED TO BE IRREGULAR.

WETLAND SCRAPE DETAIL

1

NOT TO SCALE

Stantec
209 Commerce Parkway
Cottage Grove, WI 53527
www.stantec.com

NOT FOR CONSTRUCTION

DETAILS

ELKHART LAKE WETLAND RESTORATION
ELKHART LAKE IMPROVEMENT ASSOCIATION
ELKHART LAKE, WI

DATE OF ISSUANCE
January 23, 2024

NO	REVISION	DATE

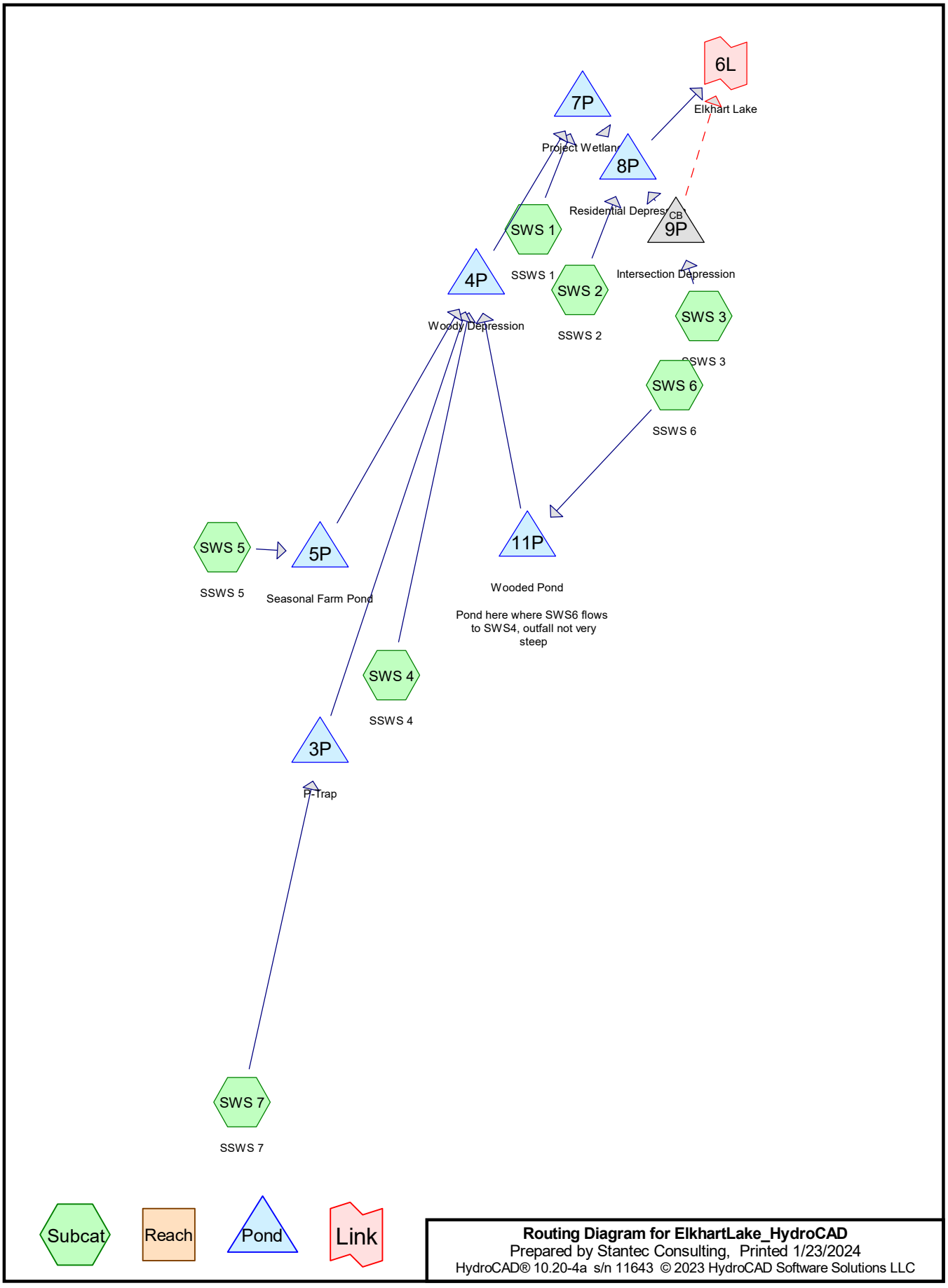
SURVEY	XXXXXXX
DRAWN	XXX
DESIGNED	XXX
CHECKED	XXX
APPROVED	XXX
PROJ. NO.	193806506

SHEET NUMBER
C8.01

Plot Date: 01/23/2024 - 1:05pm
Drawing name: N:\USSO\1-PMSO\1 Shared_projects\1 193806506\CAD\Dwg\Sheets\193806506_C800.dwg
Xrefs: TB_3422-MEQ

Appendix G

HydroCAD Input / Output



Routing Diagram for ElkhartLake_HydroCAD
Prepared by Stantec Consulting, Printed 1/23/2024

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 9199 WI Sheboygan

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	MSE 24-hr	4	Default	24.00	1	2.23	2
2	2-Year	MSE 24-hr	4	Default	24.00	1	2.57	2
3	25-Year	MSE 24-hr	4	Default	24.00	1	4.75	2
4	100-Year	MSE 24-hr	4	Default	24.00	1	6.48	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.520	74	Farmstead, HSG B (SWS 4)
5.597	86	Farmstead, HSG D (SWS 4, SWS 7)
0.242	85	Gravel Road, HSG B (SWS 7)
0.096	91	Gravel Road, HSG D (SWS 7)
17.605	58	Meadow, HSG B (SWS 3, SWS 6)
3.850	69	Pasture, HSG B (SWS 4)
12.264	84	Pasture, HSG D (SWS 4)
4.507	98	Paved Road, HSG B (SWS 1, SWS 2, SWS 3, SWS 4, SWS 6, SWS 7)
0.695	98	Paved Road, HSG D (SWS 4, SWS 7)
5.366	68	Residential 1 acre, HSG B (SWS 1, SWS 2, SWS 4)
3.561	84	Residential 1 acre, HSG D (SWS 4, SWS 7)
0.295	75	Residential 1/4 acre, HSG B (SWS 1, SWS 2, SWS 3)
2.189	65	Residential 2 acre, HSG B (SWS 3, SWS 6)
6.429	78	Row Crop, HSG B (SWS 7)
79.830	89	Row Crop, HSG D (SWS 4, SWS 5, SWS 7)
0.557	98	Water, HSG B (SWS 1, SWS 4)
1.064	98	Water, HSG D (SWS 4)
2.089	60	Woods Fair, HSG B (SWS 3, SWS 6)
4.740	55	Woods Good, HSG B (SWS 1, SWS 2, SWS 4)
0.487	77	Woods Good, HSG D (SWS 4)
5.143	66	Woods Poor, HSG B (SWS 4)
4.930	83	Woods Poor, HSG D (SWS 4, SWS 5)
163.056	**81**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
54.532	HSG B	SWS 1, SWS 2, SWS 3, SWS 4, SWS 6, SWS 7
0.000	HSG C	
108.524	HSG D	SWS 4, SWS 5, SWS 7
0.000	Other	
163.056		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.520	0.000	5.597	0.000	7.117	Farmstead	SWS 4, SWS 7
0.000	0.242	0.000	0.096	0.000	0.338	Gravel Road	SWS 7
0.000	17.605	0.000	0.000	0.000	17.605	Meadow	SWS 3, SWS 6
0.000	3.850	0.000	12.264	0.000	16.114	Pasture	SWS 4
0.000	4.507	0.000	0.695	0.000	5.202	Paved Road	SWS 1, SWS 2, SWS 3, SWS 4, SWS 6, SWS 7
0.000	5.366	0.000	3.561	0.000	8.927	Residential 1 acre	SWS 1, SWS 2, SWS 4, SWS 7
0.000	0.295	0.000	0.000	0.000	0.295	Residential 1/4 acre	SWS 1, SWS 2, SWS 3
0.000	2.189	0.000	0.000	0.000	2.189	Residential 2 acre	SWS 3, SWS 6
0.000	6.429	0.000	79.830	0.000	86.259	Row Crop	SWS 4, SWS 5, SWS 7
0.000	0.557	0.000	1.064	0.000	1.621	Water	SWS 1, SWS 4
0.000	2.089	0.000	0.000	0.000	2.089	Woods Fair	SWS 3, SWS 6
0.000	4.740	0.000	0.487	0.000	5.227	Woods Good	SWS 1, SWS 2, SWS 4
0.000	5.143	0.000	4.930	0.000	10.073	Woods Poor	SWS 4, SWS 5
0.000	**54.532**	**0.000**	**108.524**	**0.000**	**163.056**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	3P	972.00	971.00	55.0	0.0182	0.025	0.0	24.0	0.0	
2	4P	923.00	922.00	64.0	0.0156	0.025	0.0	24.0	0.0	
3	8P	914.00	909.00	240.0	0.0208	0.013	0.0	24.0	0.0	
4	9P	930.00	929.00	40.0	0.0250	0.025	0.0	18.0	0.0	Intersection
5	9P	930.00	929.00	52.0	0.0192	0.025	0.0	18.0	0.0	Intersection

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SWS 1: SSWS 1 Runoff Area=6.488 ac 22.13% Impervious Runoff Depth>0.30"
Flow Length=781' Tc=17.0 min CN=70 Runoff=1.66 cfs 0.162 af

Subcatchment SWS 2: SSWS 2 Runoff Area=2.892 ac 17.12% Impervious Runoff Depth>0.36"
Flow Length=680' Tc=9.5 min CN=72 Runoff=1.30 cfs 0.087 af

Subcatchment SWS 3: SSWS 3 Runoff Area=8.048 ac 7.77% Impervious Runoff Depth>0.16"
Flow Length=1,413' Tc=17.1 min CN=64 Runoff=0.68 cfs 0.106 af

Subcatchment SWS 4: SSWS 4 Runoff Area=54.687 ac 6.14% Impervious Runoff Depth>0.74"
Flow Length=3,302' Tc=37.4 min CN=82 Runoff=30.01 cfs 3.387 af

Subcatchment SWS 5: SSWS 5 Runoff Area=4.412 ac 0.00% Impervious Runoff Depth>1.09"
Flow Length=300' Tc=11.0 min CN=88 Runoff=6.74 cfs 0.401 af

Subcatchment SWS 6: SSWS 6 Runoff Area=15.297 ac 4.31% Impervious Runoff Depth>0.09"
Flow Length=1,367' Tc=32.3 min CN=60 Runoff=0.39 cfs 0.112 af

Subcatchment SWS 7: SSWS 7 Runoff Area=71.232 ac 0.35% Impervious Runoff Depth>1.07"
Flow Length=3,349' Tc=65.4 min CN=88 Runoff=40.88 cfs 6.342 af

Pond 3P: P-Trap Peak Elev=973.77' Storage=3.271 af Inflow=40.88 cfs 6.342 af
Outflow=11.32 cfs 5.153 af

Pond 4P: Woody Depression Peak Elev=927.43' Storage=0.667 af Inflow=33.16 cfs 8.644 af
Outflow=21.64 cfs 8.617 af

Pond 5P: Seasonal Farm Pond Peak Elev=972.63' Storage=0.401 af Inflow=6.74 cfs 0.401 af
Outflow=0.00 cfs 0.000 af

Pond 7P: Project Wetland Peak Elev=919.30' Storage=0.870 af Inflow=22.11 cfs 8.779 af
Outflow=22.02 cfs 8.052 af

Pond 8P: Residential Depression Peak Elev=916.77' Storage=0.535 af Inflow=22.40 cfs 8.194 af
Outflow=20.15 cfs 8.104 af

Pond 9P: Intersection Depression Peak Elev=930.28' Inflow=0.68 cfs 0.106 af
Primary=0.36 cfs 0.056 af Secondary=0.32 cfs 0.050 af Outflow=0.68 cfs 0.106 af

Pond 11P: Wooded Pond Peak Elev=954.01' Storage=0.018 af Inflow=0.39 cfs 0.112 af
Outflow=0.31 cfs 0.104 af

Link 6L: Elkhart Lake Inflow=20.23 cfs 8.154 af
Primary=20.23 cfs 8.154 af

Total Runoff Area = 163.056 ac Runoff Volume = 10.596 af Average Runoff Depth = 0.78"
95.82% Pervious = 156.233 ac 4.18% Impervious = 6.823 ac

Summary for Subcatchment SWS 1: SSWS 1

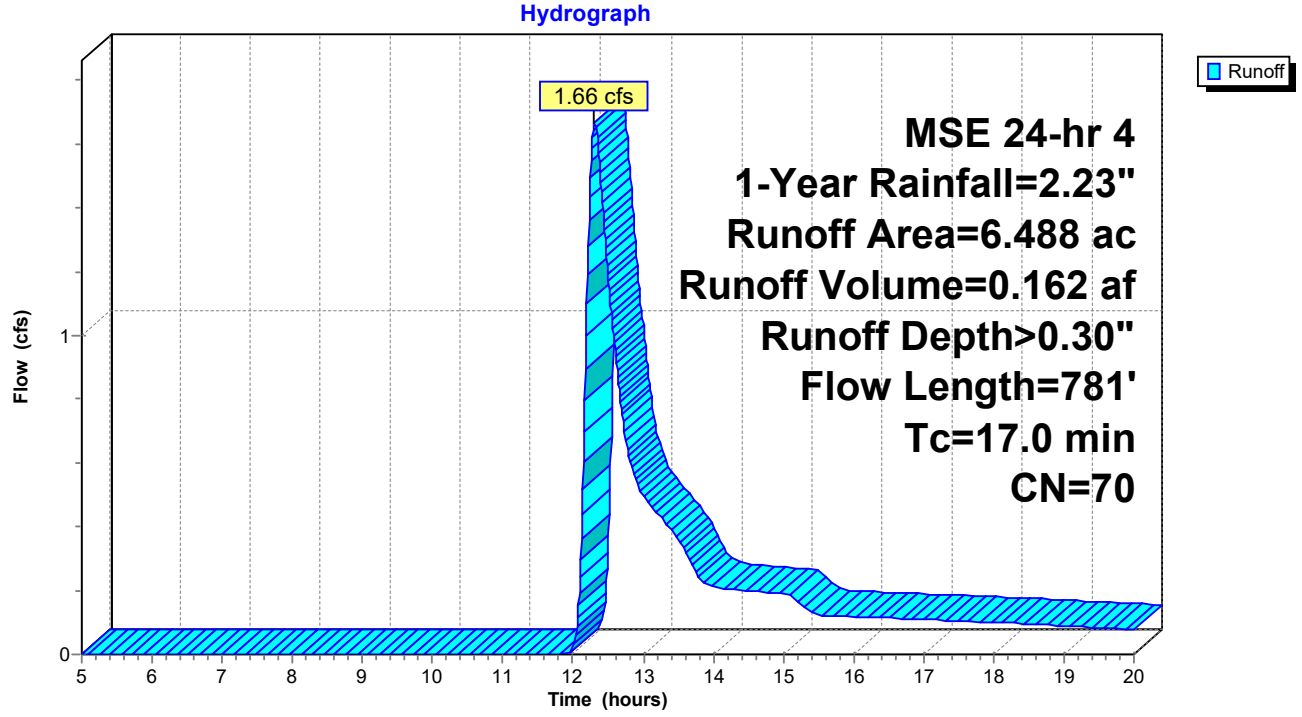
Runoff = 1.66 cfs @ 12.31 hrs, Volume= 0.162 af, Depth> 0.30"
Routed to Pond 7P : Project Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	0.891	98	Paved Road, HSG B
*	2.638	68	Residential 1 acre, HSG B
*	0.096	75	Residential 1/4 acre, HSG B
*	0.545	98	Water, HSG B
*	2.318	55	Woods Good, HSG B
	6.488	70	Weighted Average
	5.052		77.87% Pervious Area
	1.436		22.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	699	0.0558	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	81	0.0984	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.57"
17.0	781	Total			

Subcatchment SWS 1: SSWS 1



Summary for Subcatchment SWS 2: SSWS 2

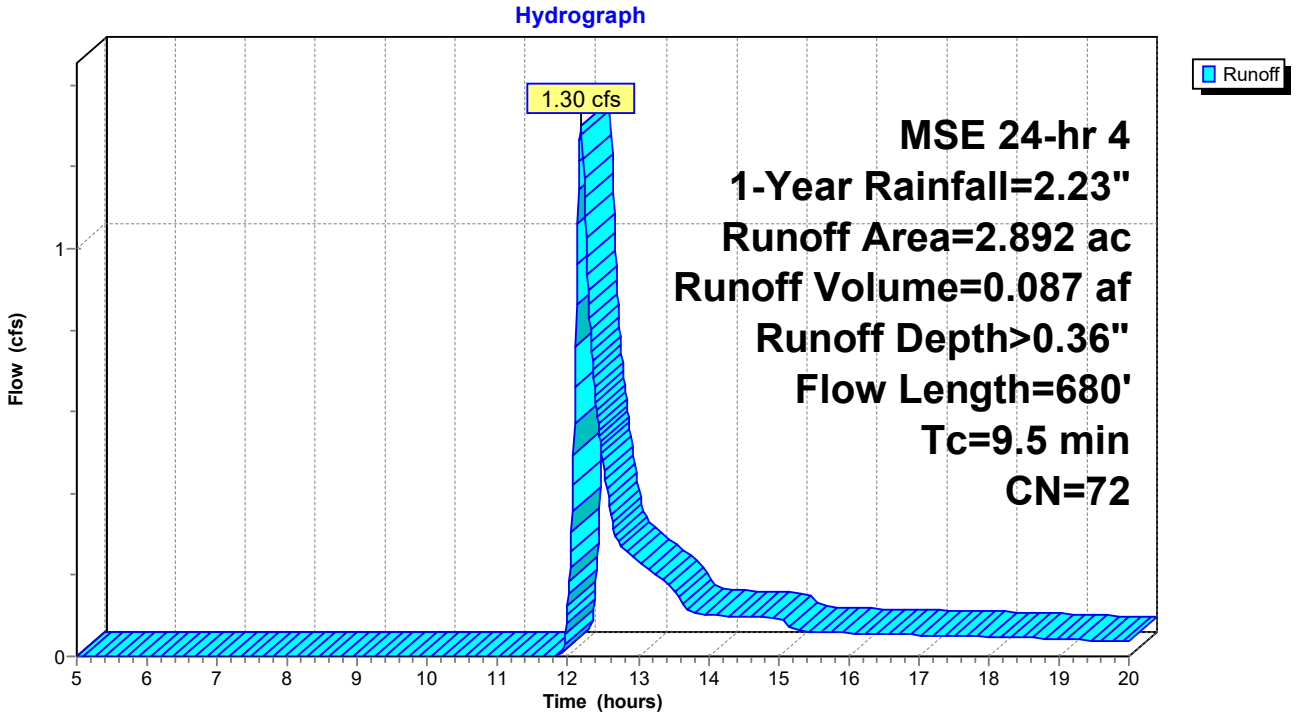
Runoff = 1.30 cfs @ 12.19 hrs, Volume= 0.087 af, Depth> 0.36"
Routed to Pond 8P : Residential Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	0.495	98	Paved Road, HSG B
*	2.073	68	Residential 1 acre, HSG B
*	0.021	75	Residential 1/4 acre, HSG B
*	0.303	55	Woods Good, HSG B
	2.892	72	Weighted Average
	2.397		82.88% Pervious Area
	0.495		17.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	580	0.0638	3.79		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.0	100	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
9.5	680	Total			

Subcatchment SWS 2: SSWS 2



Summary for Subcatchment SWS 3: SSWS 3

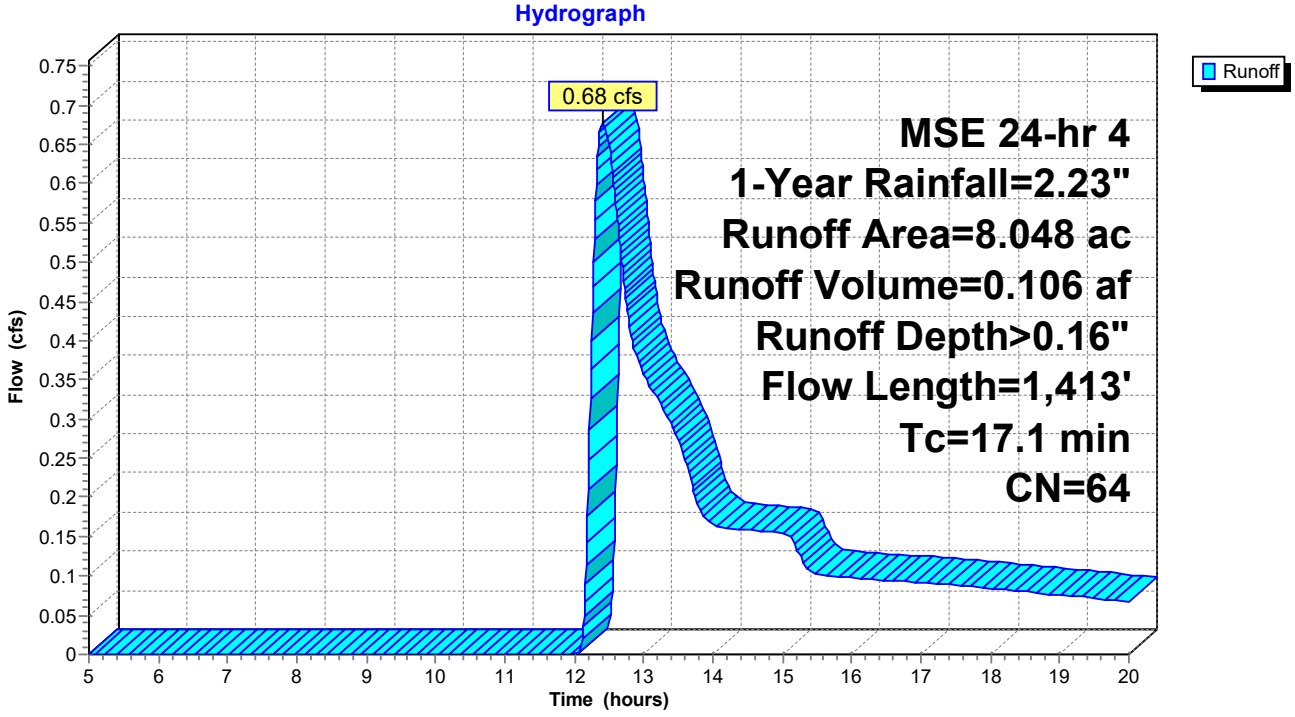
Runoff = 0.68 cfs @ 12.41 hrs, Volume= 0.106 af, Depth> 0.16"
Routed to Pond 9P : Intersection Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	3.177	58	Meadow, HSG B
*	0.625	98	Paved Road, HSG B
*	0.178	75	Residential 1/4 acre, HSG B
*	2.016	65	Residential 2 acre, HSG B
*	2.052	60	Woods Fair, HSG B
	8.048	64	Weighted Average
	7.423		92.23% Pervious Area
	0.625		7.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	1,313	0.0640	1.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	100	0.2089	0.35		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
17.1	1,413	Total			

Subcatchment SWS 3: SSWS 3



Summary for Subcatchment SWS 4: SSWS 4

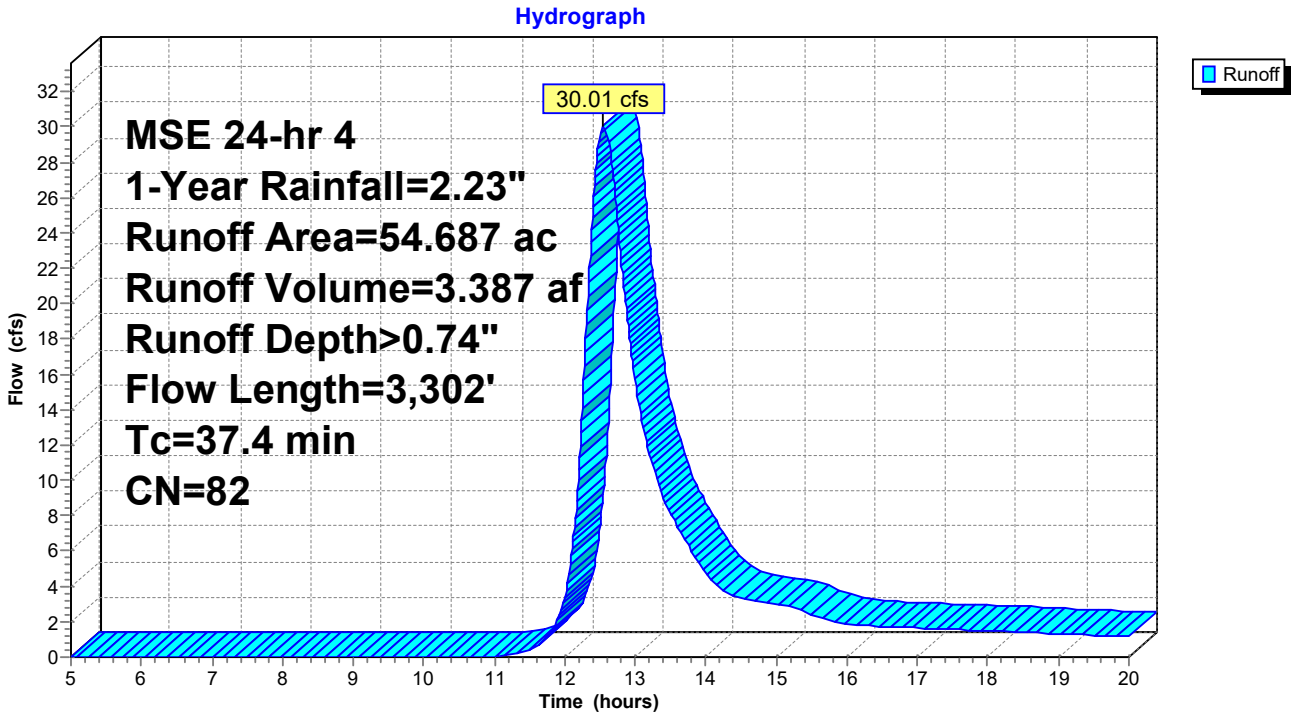
Runoff = 30.01 cfs @ 12.55 hrs, Volume= 3.387 af, Depth> 0.74"
Routed to Pond 4P : Woody Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	1.520	74	Farmstead, HSG B
*	2.673	86	Farmstead, HSG D
*	3.850	69	Pasture, HSG B
*	1.028	84	Pasture, HSG D
*	0.150	84	Pasture, HSG D
*	11.086	84	Pasture, HSG D
*	1.697	98	Paved Road, HSG B
*	0.205	98	Paved Road, HSG D
*	0.009	98	Paved Road, HSG D
*	0.371	98	Paved Road, HSG D
*	0.655	68	Residential 1 acre, HSG B
*	1.292	84	Residential 1 acre, HSG D
*	1.537	89	Row Crop, HSG D
*	0.312	89	Row Crop, HSG D
*	15.167	89	Row Crop, HSG D
*	0.012	98	Water, HSG B
*	1.060	98	Water, HSG D
*	0.004	98	Water, HSG D
*	2.119	55	Woods Good, HSG B
*	0.487	77	Woods Good, HSG D
*	5.143	66	Woods Poor, HSG B
*	0.306	83	Woods Poor, HSG D
*	0.938	83	Woods Poor, HSG D
*	3.066	83	Woods Poor, HSG D
	54.687	82	Weighted Average
	51.329		93.86% Pervious Area
	3.358		6.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	2,000	0.0215	4.64	34.76	**Channel Flow,** Area= 7.5 sf Perim= 14.7' r= 0.51' n= 0.030
18.2	1,202	0.0150	1.10		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
12.0	99	0.0201	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
37.4	3,302	Total			

Subcatchment SWS 4: SSWS 4



Summary for Subcatchment SWS 5: SSWS 5

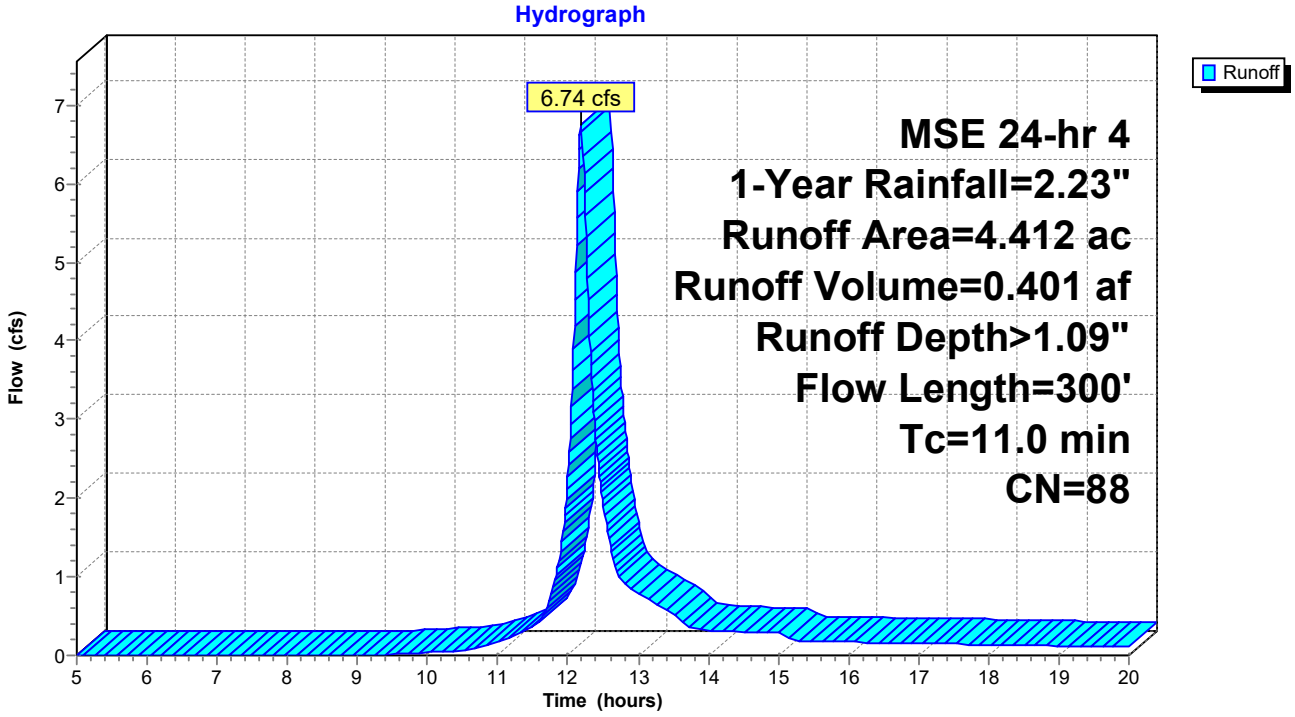
Runoff = 6.74 cfs @ 12.19 hrs, Volume= 0.401 af, Depth> 1.09"
Routed to Pond 5P : Seasonal Farm Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	3.792	89	Row Crop, HSG D
*	0.620	83	Woods Poor, HSG D
	4.412	88	Weighted Average
	4.412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	205	0.0779	2.51		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
9.6	95	0.0317	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
11.0	300	Total			

Subcatchment SWS 5: SSWS 5



Summary for Subcatchment SWS 6: SSWS 6

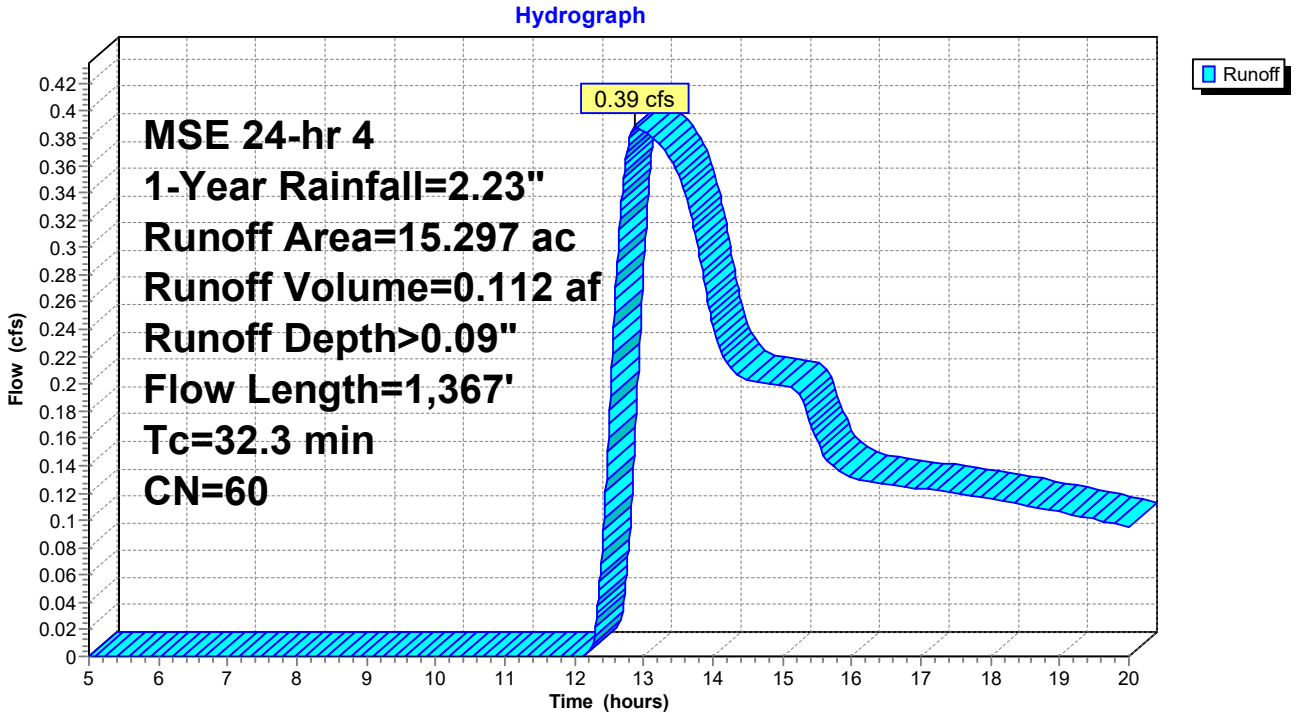
Runoff = 0.39 cfs @ 12.89 hrs, Volume= 0.112 af, Depth> 0.09"
Routed to Pond 11P : Wooded Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	14.428	58	Meadow, HSG B
*	0.659	98	Paved Road, HSG B
*	0.173	65	Residential 2 acre, HSG B
*	0.037	60	Woods Fair, HSG B
	15.297	60	Weighted Average
	14.638		95.69% Pervious Area
	0.659		4.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	1,267	0.0158	0.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.3	100	0.2808	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
32.3	1,367	Total			

Subcatchment SWS 6: SSWS 6



Summary for Subcatchment SWS 7: SSWS 7

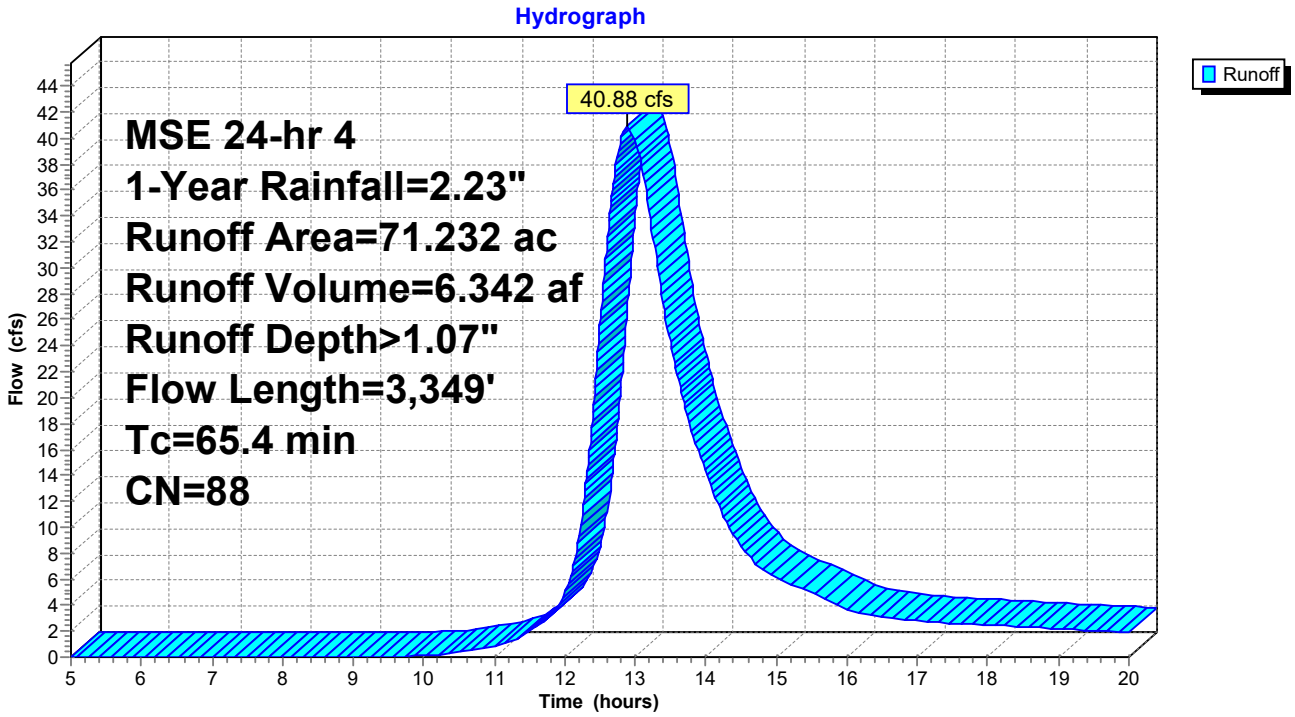
Runoff = 40.88 cfs @ 12.87 hrs, Volume= 6.342 af, Depth> 1.07"
Routed to Pond 3P : P-Trap

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-Year Rainfall=2.23"

	Area (ac)	CN	Description
*	0.242	85	Gravel Road, HSG B
*	0.013	91	Gravel Road, HSG D
*	0.083	91	Gravel Road, HSG D
*	0.813	86	Farmstead, HSG D
*	2.111	86	Farmstead, HSG D
*	0.140	98	Paved Road, HSG B
*	0.071	98	Paved Road, HSG D
*	0.039	98	Paved Road, HSG D
*	0.253	84	Residential 1 acre, HSG D
*	0.102	84	Residential 1 acre, HSG D
*	1.914	84	Residential 1 acre, HSG D
*	6.429	78	Row Crop, HSG B
*	14.978	89	Row Crop, HSG D
*	8.489	89	Row Crop, HSG D
*	35.555	89	Row Crop, HSG D
	71.232	88	Weighted Average
	70.982		99.65% Pervious Area
	0.250		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	3,249	0.0105	0.92		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.6	100	0.0902	0.25		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
65.4	3,349	Total			

Subcatchment SWS 7: SSWS 7



Summary for Pond 3P: P-Trap

Inflow Area = 71.232 ac, 0.35% Impervious, Inflow Depth > 1.07" for 1-Year event
Inflow = 40.88 cfs @ 12.87 hrs, Volume= 6.342 af
Outflow = 11.32 cfs @ 14.21 hrs, Volume= 5.153 af, Atten= 72%, Lag= 80.7 min
Primary = 11.32 cfs @ 14.21 hrs, Volume= 5.153 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 973.77' @ 14.21 hrs Surf.Area= 3.547 ac Storage= 3.271 af

Plug-Flow detention time= 159.1 min calculated for 5.153 af (81% of inflow)
Center-of-Mass det. time= 114.9 min (950.9 - 836.0)

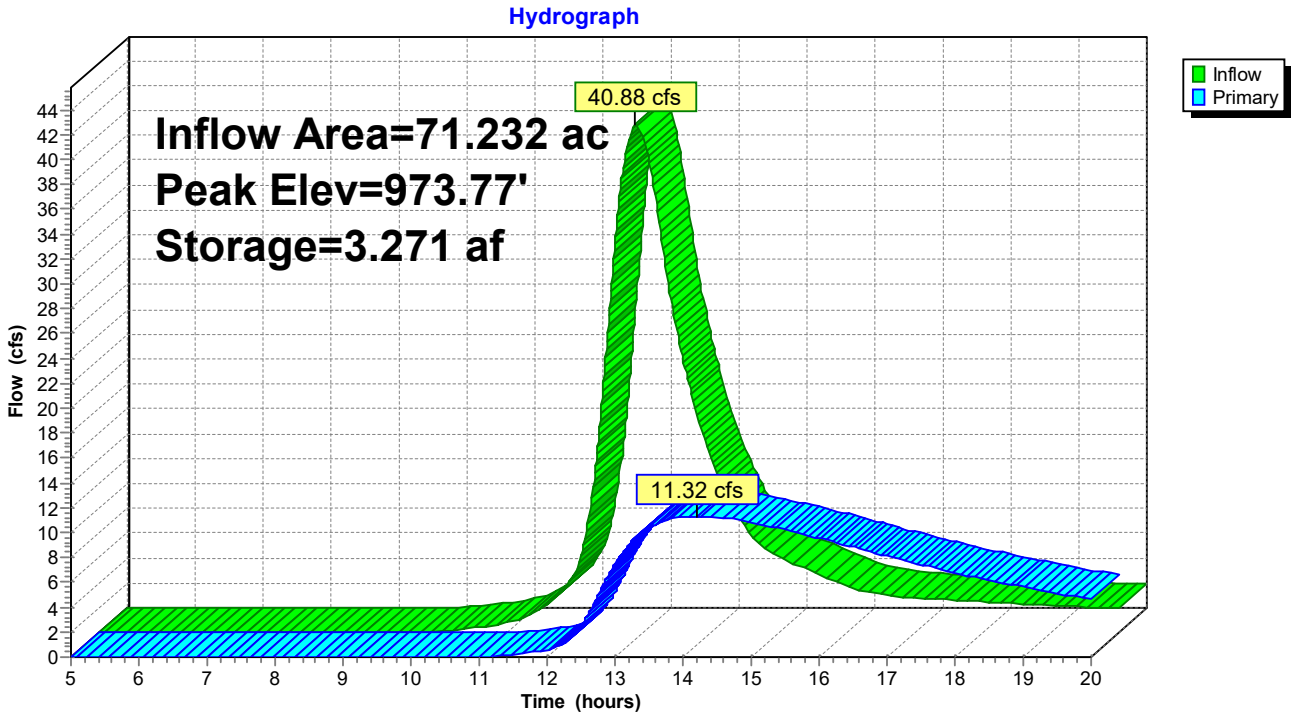
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	14.985 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.250	0.000	0.000
973.00	2.000	1.125	1.125
974.00	4.000	3.000	4.125
975.00	5.860	4.930	9.055
976.00	6.000	5.930	14.985

Device	Routing	Invert	Outlet Devices
#1	Primary	972.00'	**24.0" Round Culvert** L= 55.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 972.00' / 971.00' S= 0.0182 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	975.50'	**160.0' long + 3.0 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=11.32 cfs @ 14.21 hrs HW=973.77' (Free Discharge)
1=Culvert (Barrel Controls 11.32 cfs @ 5.10 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: P-Trap



Summary for Pond 4P: Woody Depression

Inflow Area = 145.628 ac, 2.93% Impervious, Inflow Depth > 0.71" for 1-Year event
Inflow = 33.16 cfs @ 12.59 hrs, Volume= 8.644 af
Outflow = 21.64 cfs @ 13.11 hrs, Volume= 8.617 af, Atten= 35%, Lag= 31.3 min
Primary = 21.64 cfs @ 13.11 hrs, Volume= 8.617 af
Routed to Pond 7P : Project Wetland

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 927.43' @ 13.11 hrs Surf.Area= 0.334 ac Storage= 0.667 af

Plug-Flow detention time= 11.5 min calculated for 8.617 af (100% of inflow)
Center-of-Mass det. time= 10.5 min (913.9 - 903.3)

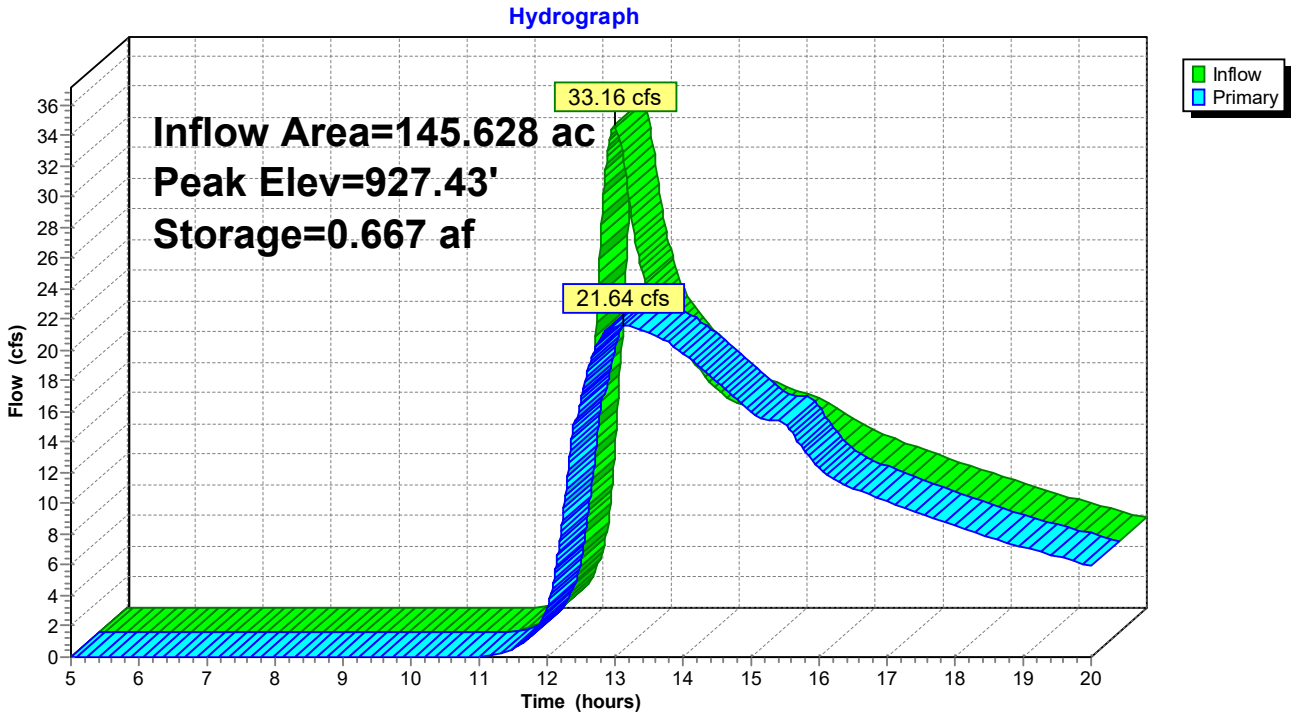
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	4.840 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.003	0.000	0.000
924.00	0.030	0.016	0.016
925.00	0.130	0.080	0.096
926.00	0.220	0.175	0.272
927.00	0.300	0.260	0.531
928.00	0.380	0.340	0.871
929.00	0.460	0.420	1.291
930.00	0.550	0.505	1.796
931.00	0.640	0.595	2.391
932.00	0.750	0.695	3.086
932.50	0.810	0.390	3.476
933.00	0.875	0.421	3.898
934.00	1.010	0.943	4.840

Device	Routing	Invert	Outlet Devices
#1	Primary	923.00'	**24.0" Round CMP_Round 24"** L= 64.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 923.00' / 922.00' S= 0.0156 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	933.00'	**66.0' long + 2.2 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=21.64 cfs @ 13.11 hrs HW=927.43' (Free Discharge)
1=CMP_Round 24" (Barrel Controls 21.64 cfs @ 6.89 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 4P: Woody Depression



Summary for Pond 5P: Seasonal Farm Pond

Inflow Area = 4.412 ac, 0.00% Impervious, Inflow Depth > 1.09" for 1-Year event
Inflow = 6.74 cfs @ 12.19 hrs, Volume= 0.401 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 972.63' @ 20.00 hrs Surf.Area= 0.702 ac Storage= 0.401 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

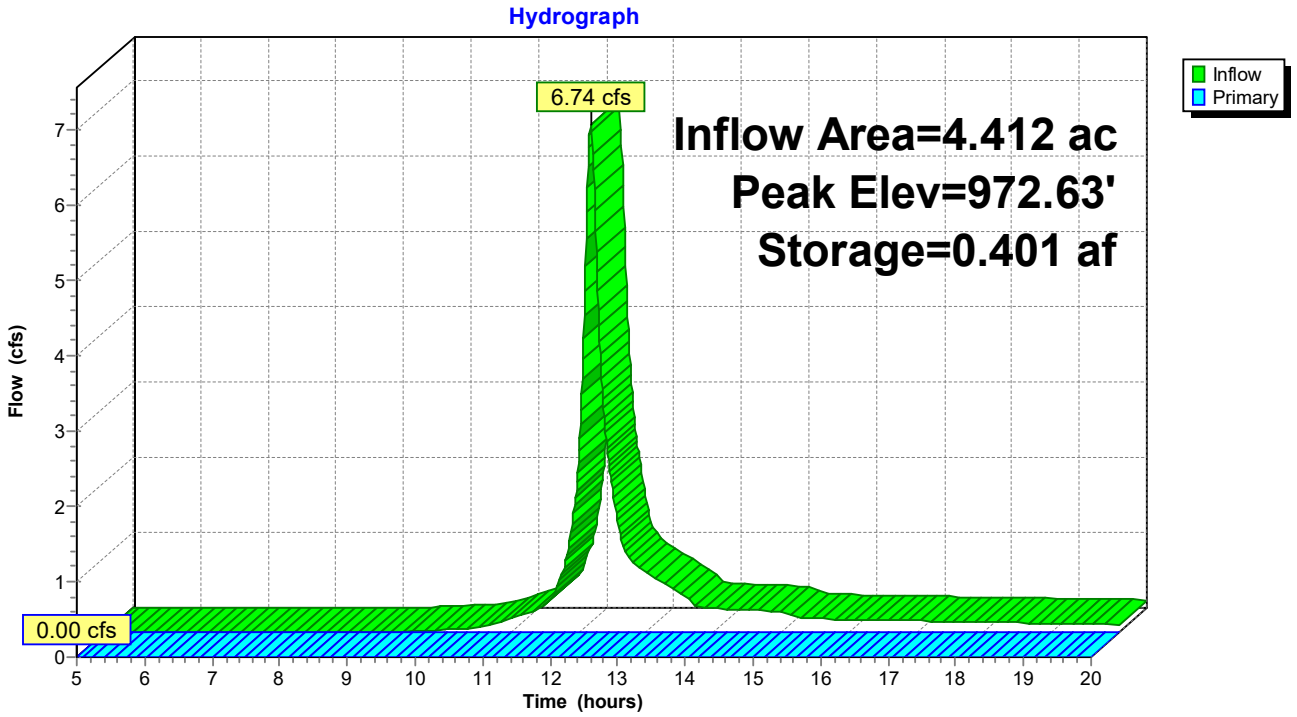
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	1.540 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.570	0.000	0.000
973.00	0.780	0.675	0.675
974.00	0.950	0.865	1.540

Device	Routing	Invert	Outlet Devices
#1	Primary	973.50'	**38.0' long + 28.0 '/' SideZ x 42.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=972.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Seasonal Farm Pond



Summary for Pond 7P: Project Wetland

Inflow Area = 152.116 ac, 3.75% Impervious, Inflow Depth > 0.69" for 1-Year event
Inflow = 22.11 cfs @ 13.08 hrs, Volume= 8.779 af
Outflow = 22.02 cfs @ 13.23 hrs, Volume= 8.052 af, Atten= 0%, Lag= 8.6 min
Primary = 22.02 cfs @ 13.23 hrs, Volume= 8.052 af
Routed to Pond 8P : Residential Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 919.30' @ 13.23 hrs Surf.Area= 0.898 ac Storage= 0.870 af

Plug-Flow detention time= 41.6 min calculated for 8.046 af (92% of inflow)
Center-of-Mass det. time= 19.3 min (932.0 - 912.7)

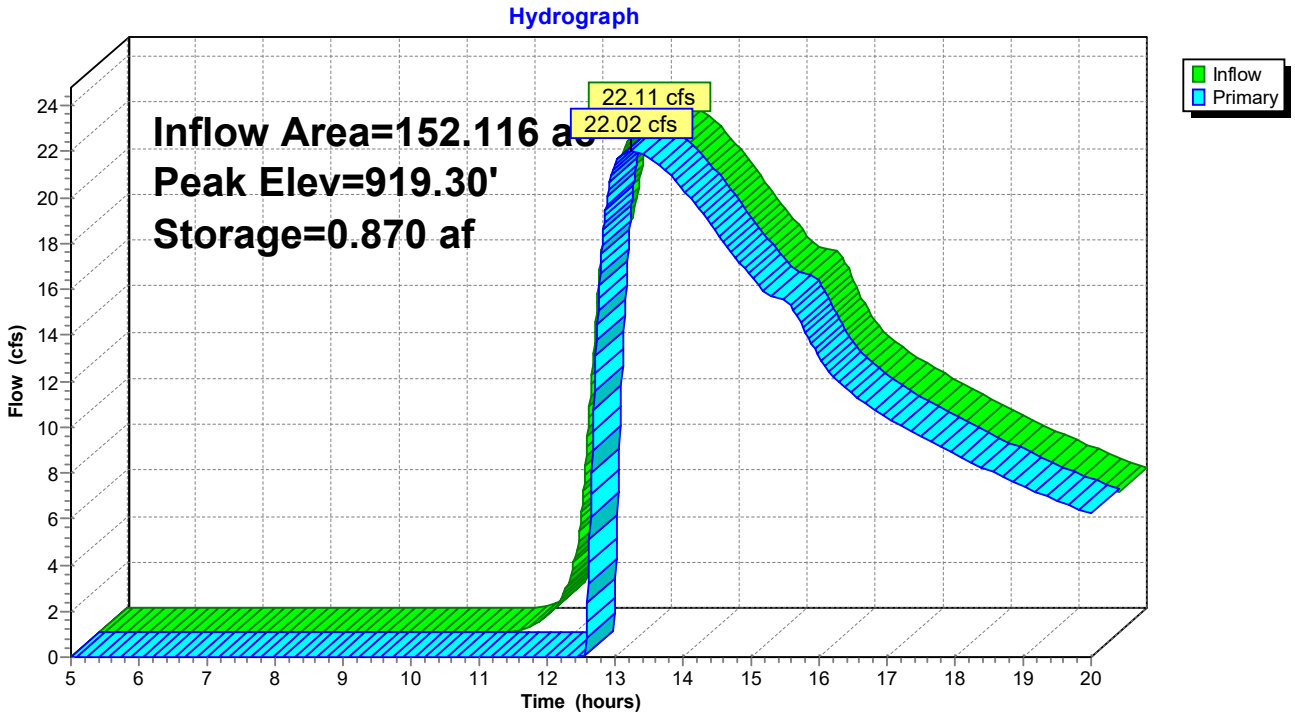
Volume	Invert	Avail.Storage	Storage Description
#1	918.00'	1.560 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.00	0.400	0.000	0.000
919.00	0.830	0.615	0.615
920.00	1.060	0.945	1.560

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**45.0' long + 25.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=22.01 cfs @ 13.23 hrs HW=919.30' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 22.01 cfs @ 1.42 fps)

Pond 7P: Project Wetland



Summary for Pond 8P: Residential Depression

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 0.60" for 1-Year event
Inflow = 22.40 cfs @ 13.21 hrs, Volume= 8.194 af
Outflow = 20.15 cfs @ 14.11 hrs, Volume= 8.104 af, Atten= 10%, Lag= 54.1 min
Primary = 20.15 cfs @ 14.11 hrs, Volume= 8.104 af
Routed to Link 6L : Elkhart Lake

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 916.77' @ 14.11 hrs Surf.Area= 0.367 ac Storage= 0.535 af

Plug-Flow detention time= 14.5 min calculated for 8.104 af (99% of inflow)
Center-of-Mass det. time= 11.6 min (942.1 - 930.6)

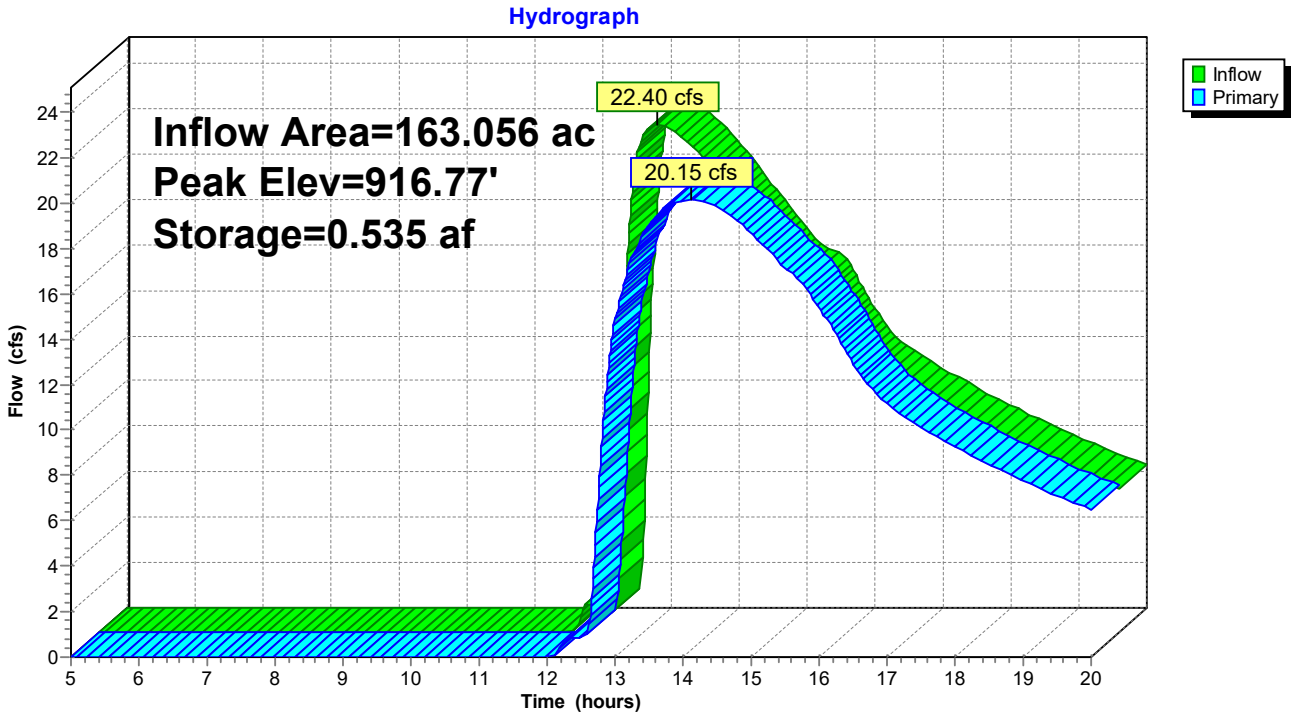
Volume	Invert	Avail.Storage	Storage Description
#1	914.00'	3.701 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.00	0.030	0.000	0.000
915.00	0.120	0.075	0.075
916.00	0.290	0.205	0.280
917.00	0.390	0.340	0.620
918.00	0.490	0.440	1.060
919.00	0.576	0.533	1.593
920.00	0.649	0.612	2.206
921.00	0.742	0.695	2.901
922.00	0.857	0.799	3.701

Device	Routing	Invert	Outlet Devices
#1	Primary	914.00'	**24.0" Round RCP_Round 24"** L= 240.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 914.00' / 909.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Primary	921.00'	**96.5' long + 4.8 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=20.15 cfs @ 14.11 hrs HW=916.77' (Free Discharge)
1=RCP_Round 24" (Inlet Controls 20.15 cfs @ 6.41 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: Residential Depression



Summary for Pond 9P: Intersection Depression

[57] Hint: Peaked at 930.28' (Flood elevation advised)

Inflow Area = 8.048 ac, 7.77% Impervious, Inflow Depth > 0.16" for 1-Year event
Inflow = 0.68 cfs @ 12.41 hrs, Volume= 0.106 af
Outflow = 0.68 cfs @ 12.41 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.41 hrs, Volume= 0.056 af
Routed to Pond 8P : Residential Depression
Secondary = 0.32 cfs @ 12.41 hrs, Volume= 0.050 af
Routed to Link 6L : Elkhart Lake

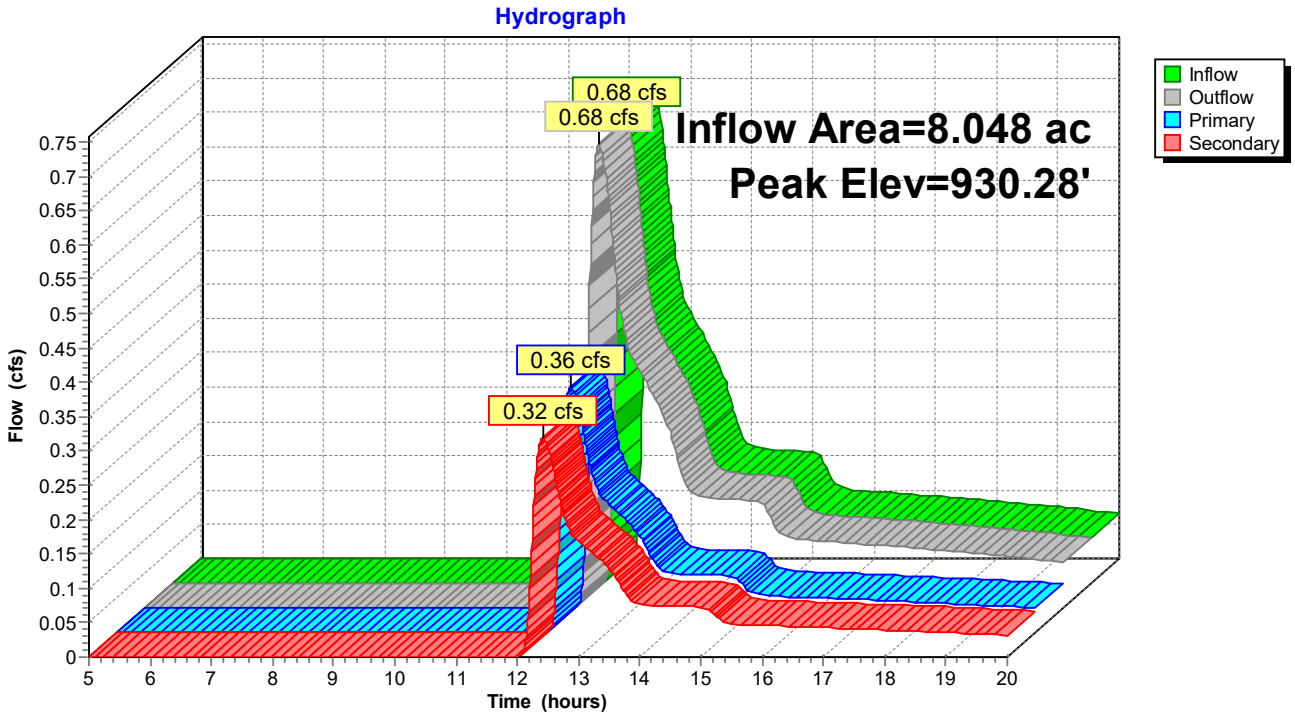
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 930.28' @ 12.41 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	930.00'	**18.0" Round CMP_Round 18"** L= 40.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0250 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf
#2	Secondary	930.00'	**18.0" Round CMP_Round 18"** L= 52.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0192 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=0.36 cfs @ 12.41 hrs HW=930.28' (Free Discharge)
↑—**1=CMP_Round 18"** (Barrel Controls 0.36 cfs @ 2.34 fps)

Secondary OutFlow Max=0.32 cfs @ 12.41 hrs HW=930.28' (Free Discharge)
↑—**2=CMP_Round 18"** (Barrel Controls 0.32 cfs @ 2.09 fps)

Pond 9P: Intersection Depression



Summary for Pond 11P: Wooded Pond

Inflow Area = 15.297 ac, 4.31% Impervious, Inflow Depth > 0.09" for 1-Year event
Inflow = 0.39 cfs @ 12.89 hrs, Volume= 0.112 af
Outflow = 0.31 cfs @ 13.75 hrs, Volume= 0.104 af, Atten= 21%, Lag= 51.7 min
Primary = 0.31 cfs @ 13.75 hrs, Volume= 0.104 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 954.01' @ 13.75 hrs Surf.Area= 1.274 ac Storage= 0.018 af

Plug-Flow detention time= 46.6 min calculated for 0.104 af (93% of inflow)
Center-of-Mass det. time= 28.3 min (944.3 - 916.0)

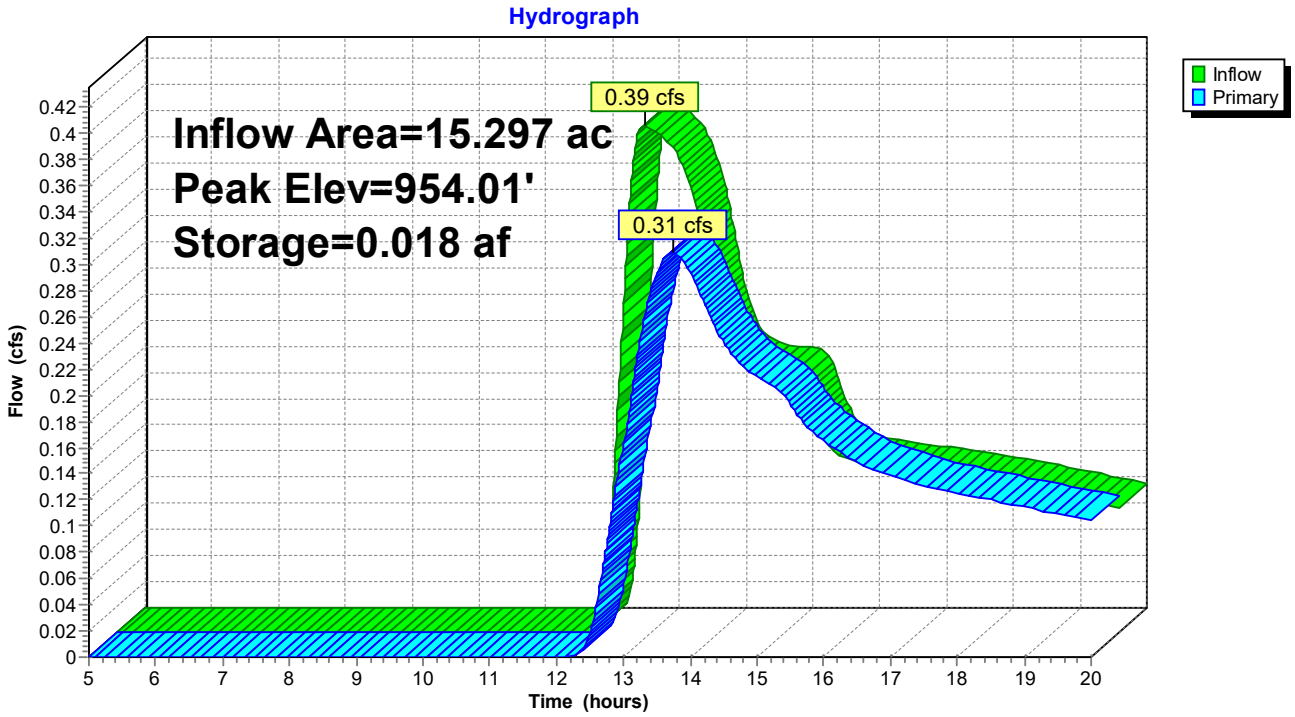
Volume	Invert	Avail.Storage	Storage Description
#1	954.00'	1.395 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
954.00	1.270	0.000	0.000
955.00	1.520	1.395	1.395

Device	Routing	Invert	Outlet Devices
#1	Primary	954.00'	**70.0' long + 9.0 '/' SideZ x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.30 cfs @ 13.75 hrs HW=954.01' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.30 cfs @ 0.30 fps)

Pond 11P: Wooded Pond

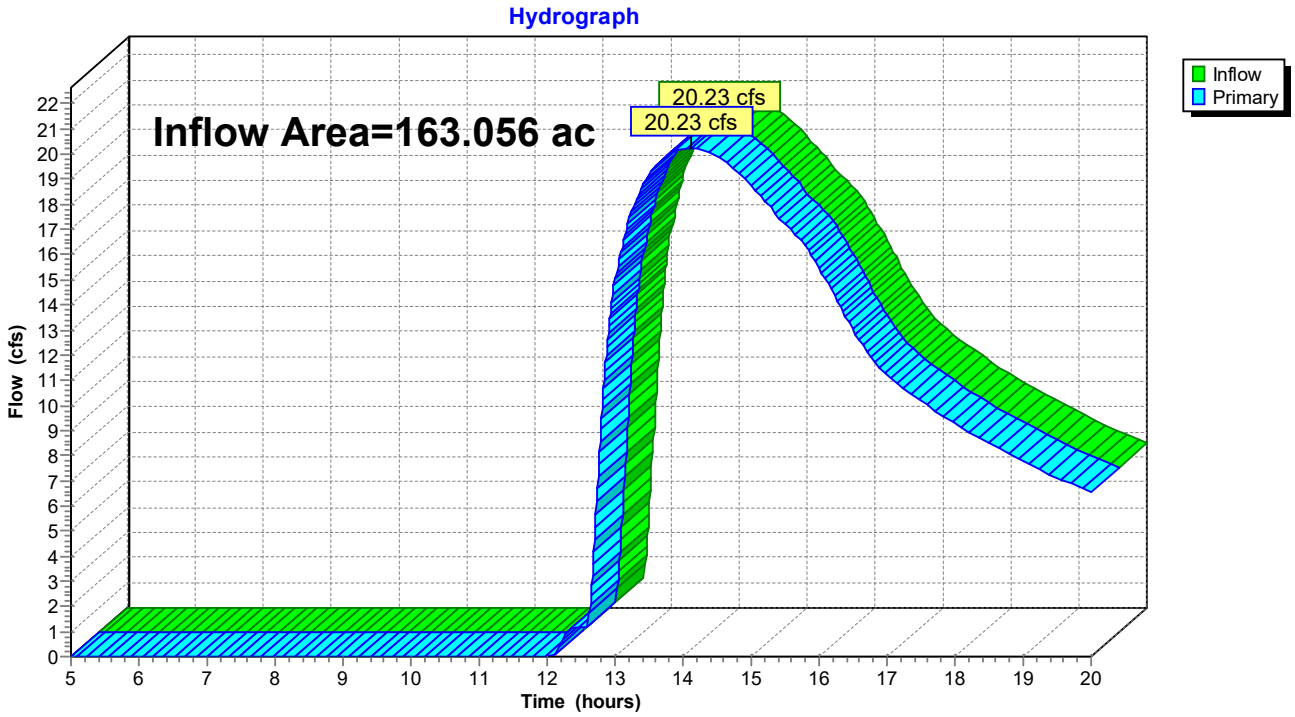


Summary for Link 6L: Elkhart Lake

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 0.60" for 1-Year event
Inflow = 20.23 cfs @ 14.11 hrs, Volume= 8.154 af
Primary = 20.23 cfs @ 14.11 hrs, Volume= 8.154 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Link 6L: Elkhart Lake



Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SWS 1: SSWS 1 Runoff Area=6.488 ac 22.13% Impervious Runoff Depth>0.44"
Flow Length=781' Tc=17.0 min CN=70 Runoff=2.78 cfs 0.241 af

Subcatchment SWS 2: SSWS 2 Runoff Area=2.892 ac 17.12% Impervious Runoff Depth>0.52"
Flow Length=680' Tc=9.5 min CN=72 Runoff=2.03 cfs 0.125 af

Subcatchment SWS 3: SSWS 3 Runoff Area=8.048 ac 7.77% Impervious Runoff Depth>0.26"
Flow Length=1,413' Tc=17.1 min CN=64 Runoff=1.51 cfs 0.176 af

Subcatchment SWS 4: SSWS 4 Runoff Area=54.687 ac 6.14% Impervious Runoff Depth>0.97"
Flow Length=3,302' Tc=37.4 min CN=82 Runoff=39.82 cfs 4.439 af

Subcatchment SWS 5: SSWS 5 Runoff Area=4.412 ac 0.00% Impervious Runoff Depth>1.37"
Flow Length=300' Tc=11.0 min CN=88 Runoff=8.41 cfs 0.502 af

Subcatchment SWS 6: SSWS 6 Runoff Area=15.297 ac 4.31% Impervious Runoff Depth>0.17"
Flow Length=1,367' Tc=32.3 min CN=60 Runoff=1.04 cfs 0.211 af

Subcatchment SWS 7: SSWS 7 Runoff Area=71.232 ac 0.35% Impervious Runoff Depth>1.34"
Flow Length=3,349' Tc=65.4 min CN=88 Runoff=51.32 cfs 7.953 af

Pond 3P: P-Trap Peak Elev=974.02' Storage=4.197 af Inflow=51.32 cfs 7.953 af
Outflow=13.48 cfs 6.401 af

Pond 4P: Woody Depression Peak Elev=928.69' Storage=1.152 af Inflow=44.15 cfs 11.039 af
Outflow=25.31 cfs 10.999 af

Pond 5P: Seasonal Farm Pond Peak Elev=972.77' Storage=0.502 af Inflow=8.41 cfs 0.502 af
Outflow=0.00 cfs 0.000 af

Pond 7P: Project Wetland Peak Elev=919.33' Storage=0.898 af Inflow=25.91 cfs 11.240 af
Outflow=25.88 cfs 10.492 af

Pond 8P: Residential Depression Peak Elev=917.46' Storage=0.811 af Inflow=26.40 cfs 10.710 af
Outflow=23.74 cfs 10.591 af

Pond 9P: Intersection Depression Peak Elev=930.42' Inflow=1.51 cfs 0.176 af
Primary=0.79 cfs 0.093 af Secondary=0.71 cfs 0.083 af Outflow=1.51 cfs 0.176 af

Pond 11P: Wooded Pond Peak Elev=954.03' Storage=0.032 af Inflow=1.04 cfs 0.211 af
Outflow=0.73 cfs 0.200 af

Link 6L: Elkhart Lake Inflow=23.85 cfs 10.674 af
Primary=23.85 cfs 10.674 af

Total Runoff Area = 163.056 ac Runoff Volume = 13.647 af Average Runoff Depth = 1.00"
95.82% Pervious = 156.233 ac 4.18% Impervious = 6.823 ac

Summary for Subcatchment SWS 1: SSWS 1

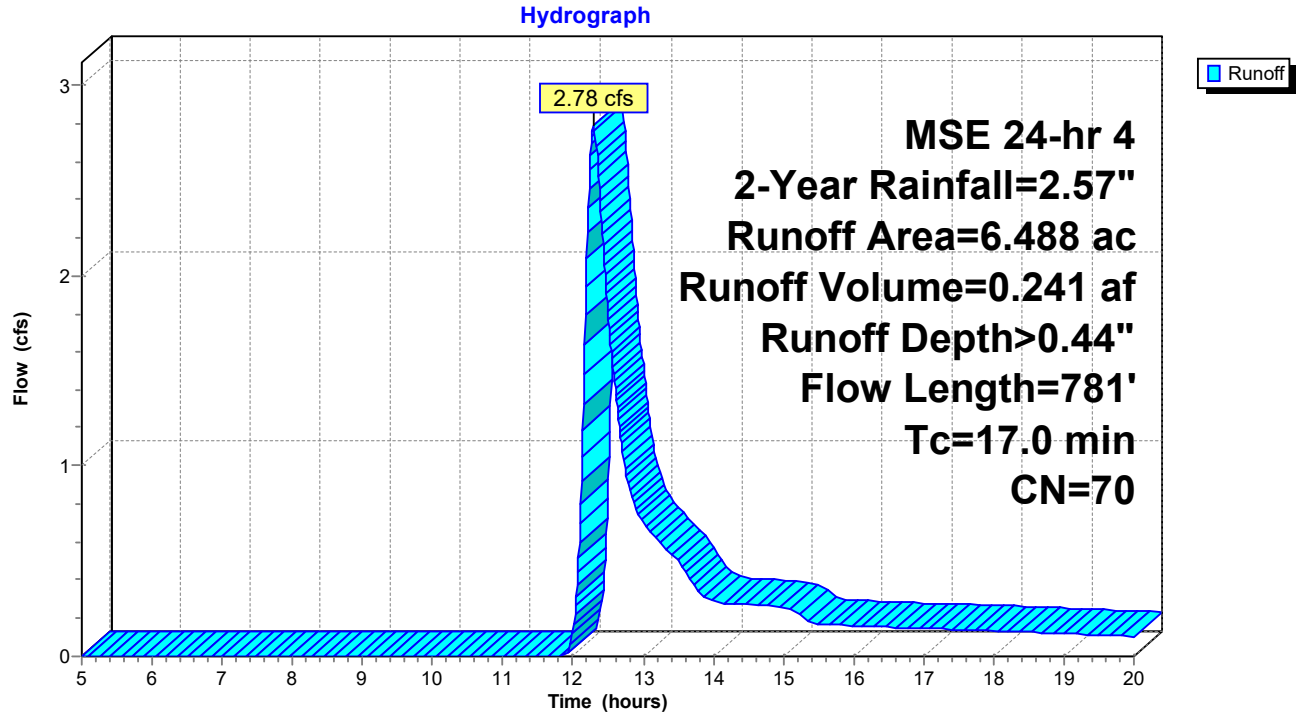
Runoff = 2.78 cfs @ 12.30 hrs, Volume= 0.241 af, Depth> 0.44"
Routed to Pond 7P : Project Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	0.891	98	Paved Road, HSG B
*	2.638	68	Residential 1 acre, HSG B
*	0.096	75	Residential 1/4 acre, HSG B
*	0.545	98	Water, HSG B
*	2.318	55	Woods Good, HSG B
	6.488	70	Weighted Average
	5.052		77.87% Pervious Area
	1.436		22.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	699	0.0558	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	81	0.0984	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.57"
17.0	781	Total			

Subcatchment SWS 1: SSWS 1



Summary for Subcatchment SWS 2: SSWS 2

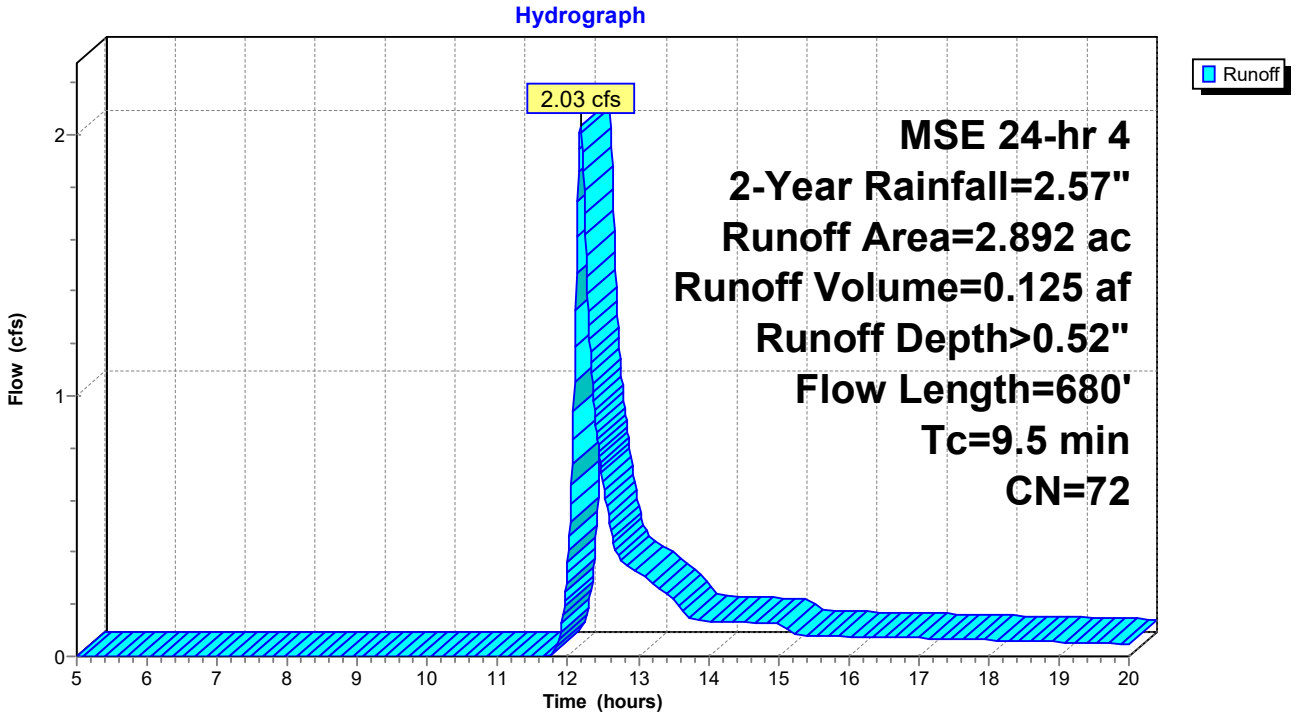
Runoff = 2.03 cfs @ 12.18 hrs, Volume= 0.125 af, Depth> 0.52"
Routed to Pond 8P : Residential Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	0.495	98	Paved Road, HSG B
*	2.073	68	Residential 1 acre, HSG B
*	0.021	75	Residential 1/4 acre, HSG B
*	0.303	55	Woods Good, HSG B
	2.892	72	Weighted Average
	2.397		82.88% Pervious Area
	0.495		17.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	580	0.0638	3.79		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.0	100	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
9.5	680	Total			

Subcatchment SWS 2: SSWS 2



Summary for Subcatchment SWS 3: SSWS 3

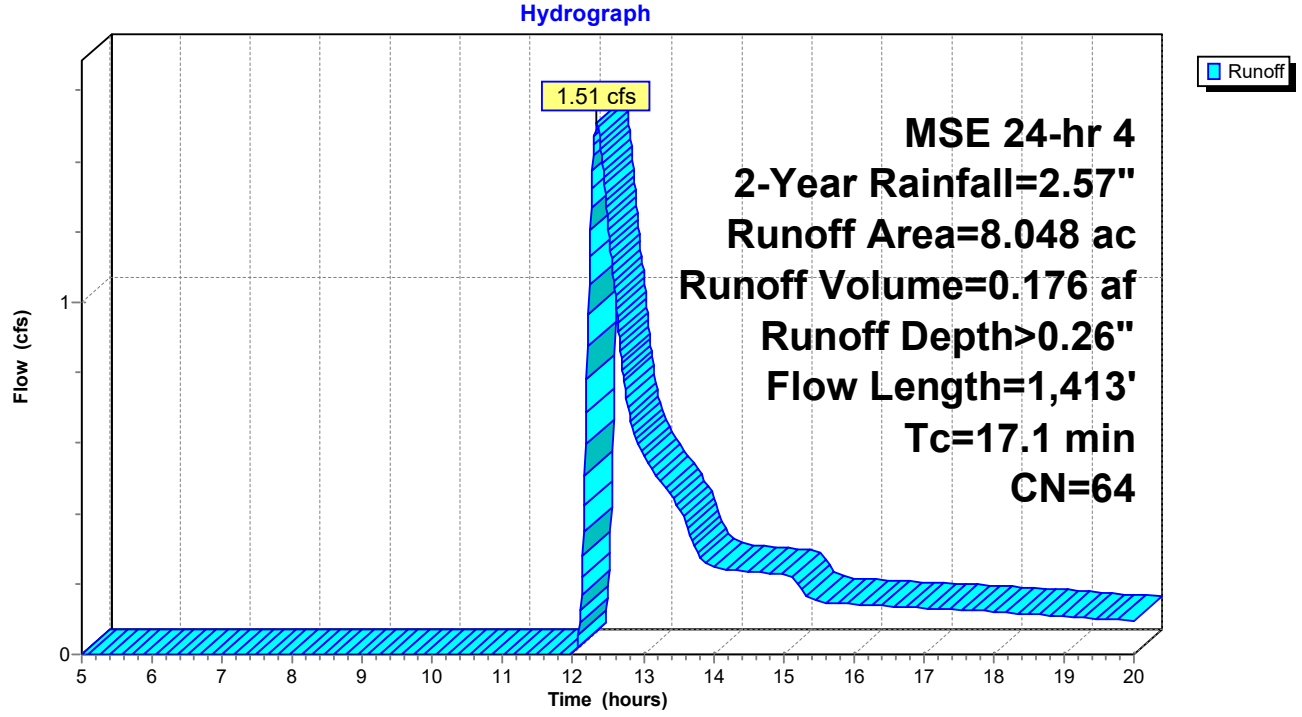
Runoff = 1.51 cfs @ 12.34 hrs, Volume= 0.176 af, Depth> 0.26"
Routed to Pond 9P : Intersection Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	3.177	58	Meadow, HSG B
*	0.625	98	Paved Road, HSG B
*	0.178	75	Residential 1/4 acre, HSG B
*	2.016	65	Residential 2 acre, HSG B
*	2.052	60	Woods Fair, HSG B
	8.048	64	Weighted Average
	7.423		92.23% Pervious Area
	0.625		7.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	1,313	0.0640	1.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	100	0.2089	0.35		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
17.1	1,413	Total			

Subcatchment SWS 3: SSWS 3



Summary for Subcatchment SWS 4: SSWS 4

[47] Hint: Peak is 115% of capacity of segment #1

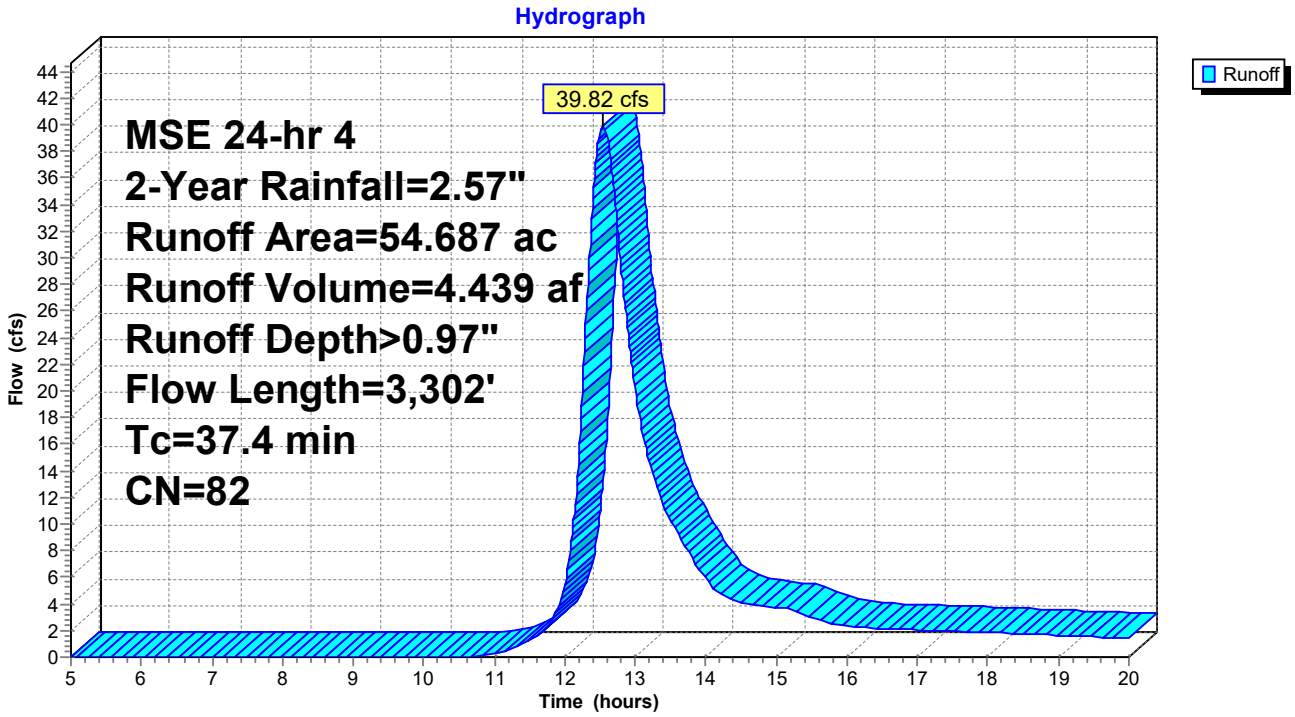
Runoff = 39.82 cfs @ 12.55 hrs, Volume= 4.439 af, Depth> 0.97"
Routed to Pond 4P : Woody Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	1.520	74	Farmstead, HSG B
*	2.673	86	Farmstead, HSG D
*	3.850	69	Pasture, HSG B
*	1.028	84	Pasture, HSG D
*	0.150	84	Pasture, HSG D
*	11.086	84	Pasture, HSG D
*	1.697	98	Paved Road, HSG B
*	0.205	98	Paved Road, HSG D
*	0.009	98	Paved Road, HSG D
*	0.371	98	Paved Road, HSG D
*	0.655	68	Residential 1 acre, HSG B
*	1.292	84	Residential 1 acre, HSG D
*	1.537	89	Row Crop, HSG D
*	0.312	89	Row Crop, HSG D
*	15.167	89	Row Crop, HSG D
*	0.012	98	Water, HSG B
*	1.060	98	Water, HSG D
*	0.004	98	Water, HSG D
*	2.119	55	Woods Good, HSG B
*	0.487	77	Woods Good, HSG D
*	5.143	66	Woods Poor, HSG B
*	0.306	83	Woods Poor, HSG D
*	0.938	83	Woods Poor, HSG D
*	3.066	83	Woods Poor, HSG D
	54.687	82	Weighted Average
	51.329		93.86% Pervious Area
	3.358		6.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	2,000	0.0215	4.64	34.76	**Channel Flow,** Area= 7.5 sf Perim= 14.7' r= 0.51' n= 0.030
18.2	1,202	0.0150	1.10		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
12.0	99	0.0201	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
37.4	3,302	Total			

Subcatchment SWS 4: SSWS 4



Summary for Subcatchment SWS 5: SSWS 5

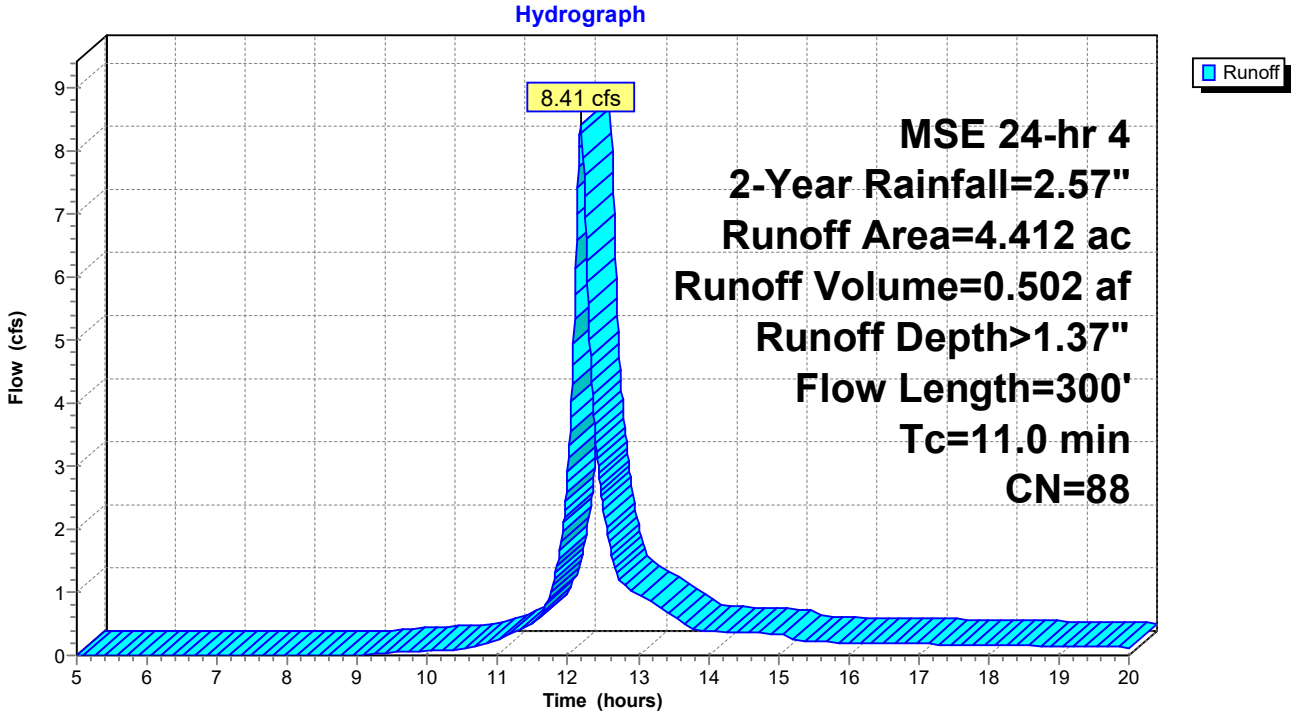
Runoff = 8.41 cfs @ 12.19 hrs, Volume= 0.502 af, Depth> 1.37"
Routed to Pond 5P : Seasonal Farm Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	3.792	89	Row Crop, HSG D
*	0.620	83	Woods Poor, HSG D
	4.412	88	Weighted Average
	4.412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	205	0.0779	2.51		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
9.6	95	0.0317	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
11.0	300	Total			

Subcatchment SWS 5: SSWS 5



Summary for Subcatchment SWS 6: SSWS 6

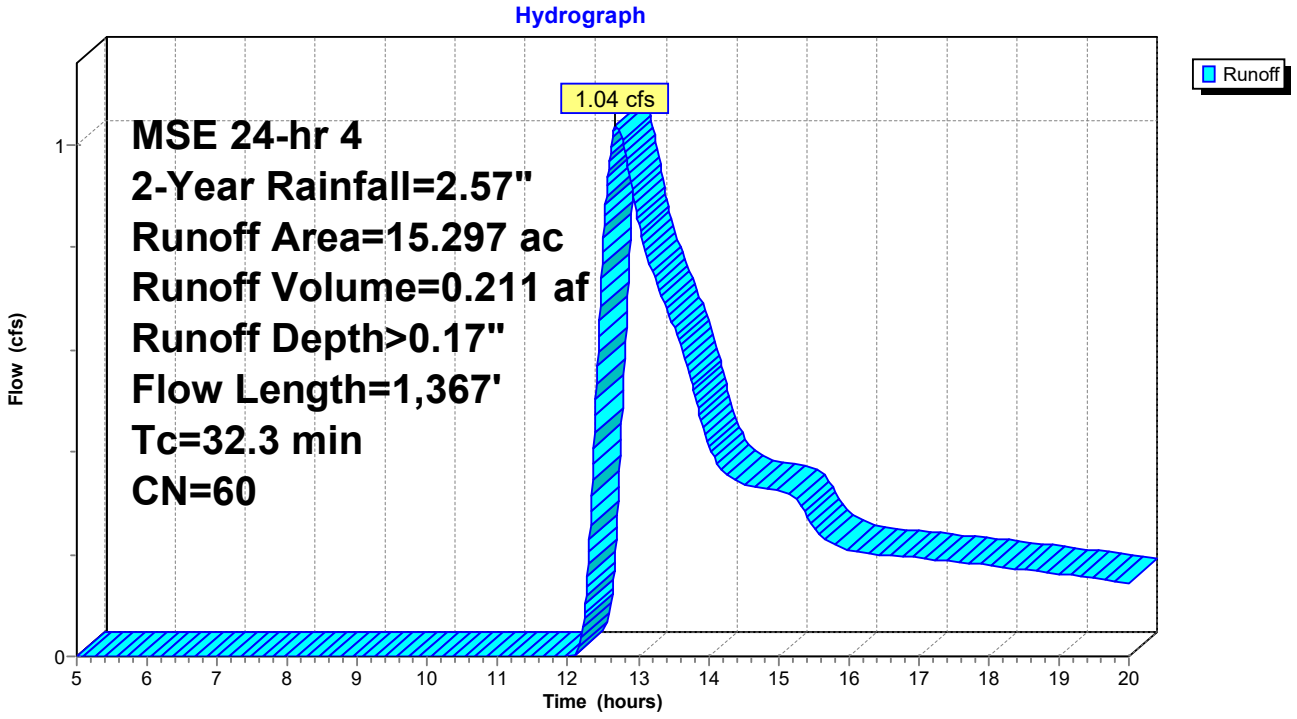
Runoff = 1.04 cfs @ 12.67 hrs, Volume= 0.211 af, Depth> 0.17"
Routed to Pond 11P : Wooded Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	14.428	58	Meadow, HSG B
*	0.659	98	Paved Road, HSG B
*	0.173	65	Residential 2 acre, HSG B
*	0.037	60	Woods Fair, HSG B
	15.297	60	Weighted Average
	14.638		95.69% Pervious Area
	0.659		4.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	1,267	0.0158	0.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.3	100	0.2808	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
32.3	1,367	Total			

Subcatchment SWS 6: SSWS 6



Summary for Subcatchment SWS 7: SSWS 7

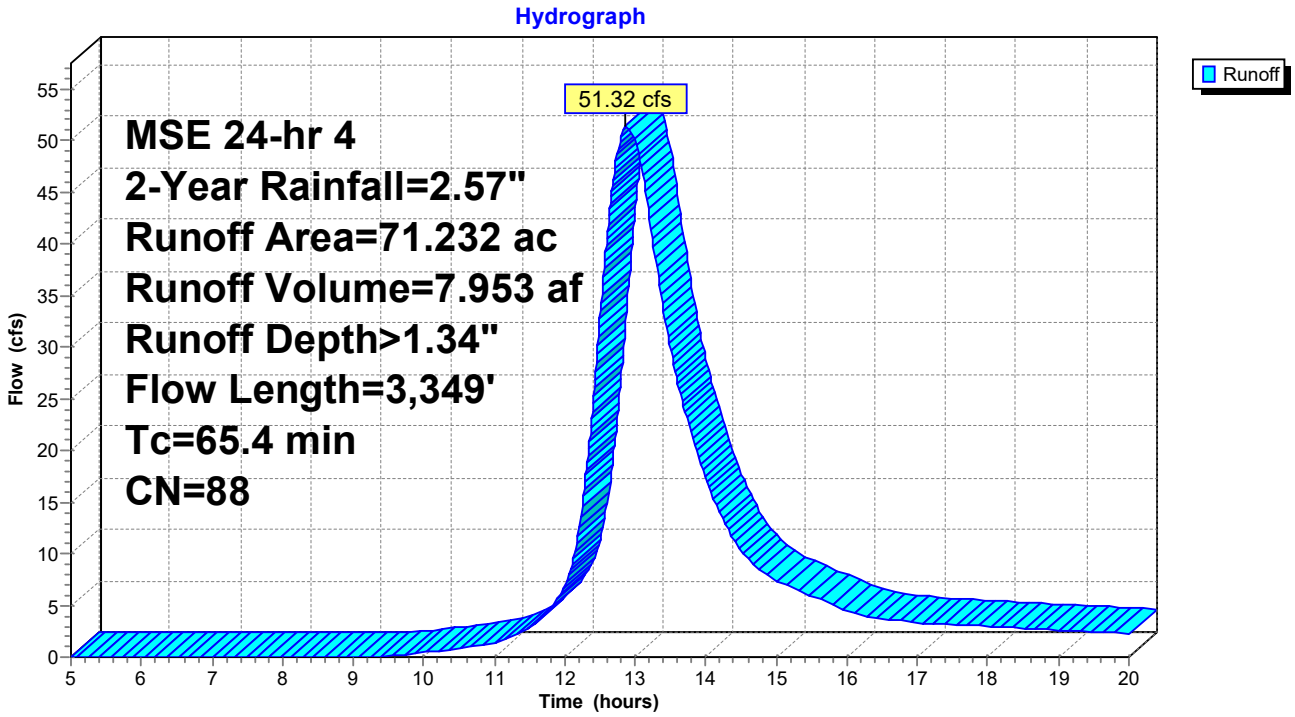
Runoff = 51.32 cfs @ 12.87 hrs, Volume= 7.953 af, Depth> 1.34"
Routed to Pond 3P : P-Trap

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Year Rainfall=2.57"

	Area (ac)	CN	Description
*	0.242	85	Gravel Road, HSG B
*	0.013	91	Gravel Road, HSG D
*	0.083	91	Gravel Road, HSG D
*	0.813	86	Farmstead, HSG D
*	2.111	86	Farmstead, HSG D
*	0.140	98	Paved Road, HSG B
*	0.071	98	Paved Road, HSG D
*	0.039	98	Paved Road, HSG D
*	0.253	84	Residential 1 acre, HSG D
*	0.102	84	Residential 1 acre, HSG D
*	1.914	84	Residential 1 acre, HSG D
*	6.429	78	Row Crop, HSG B
*	14.978	89	Row Crop, HSG D
*	8.489	89	Row Crop, HSG D
*	35.555	89	Row Crop, HSG D
	71.232	88	Weighted Average
	70.982		99.65% Pervious Area
	0.250		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	3,249	0.0105	0.92		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.6	100	0.0902	0.25		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
65.4	3,349	Total			

Subcatchment SWS 7: SSWS 7



Summary for Pond 3P: P-Trap

Inflow Area = 71.232 ac, 0.35% Impervious, Inflow Depth > 1.34" for 2-Year event
Inflow = 51.32 cfs @ 12.87 hrs, Volume= 7.953 af
Outflow = 13.48 cfs @ 14.23 hrs, Volume= 6.401 af, Atten= 74%, Lag= 82.1 min
Primary = 13.48 cfs @ 14.23 hrs, Volume= 6.401 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 974.02' @ 14.23 hrs Surf.Area= 4.033 ac Storage= 4.197 af

Plug-Flow detention time= 164.7 min calculated for 6.396 af (80% of inflow)
Center-of-Mass det. time= 119.8 min (951.8 - 832.0)

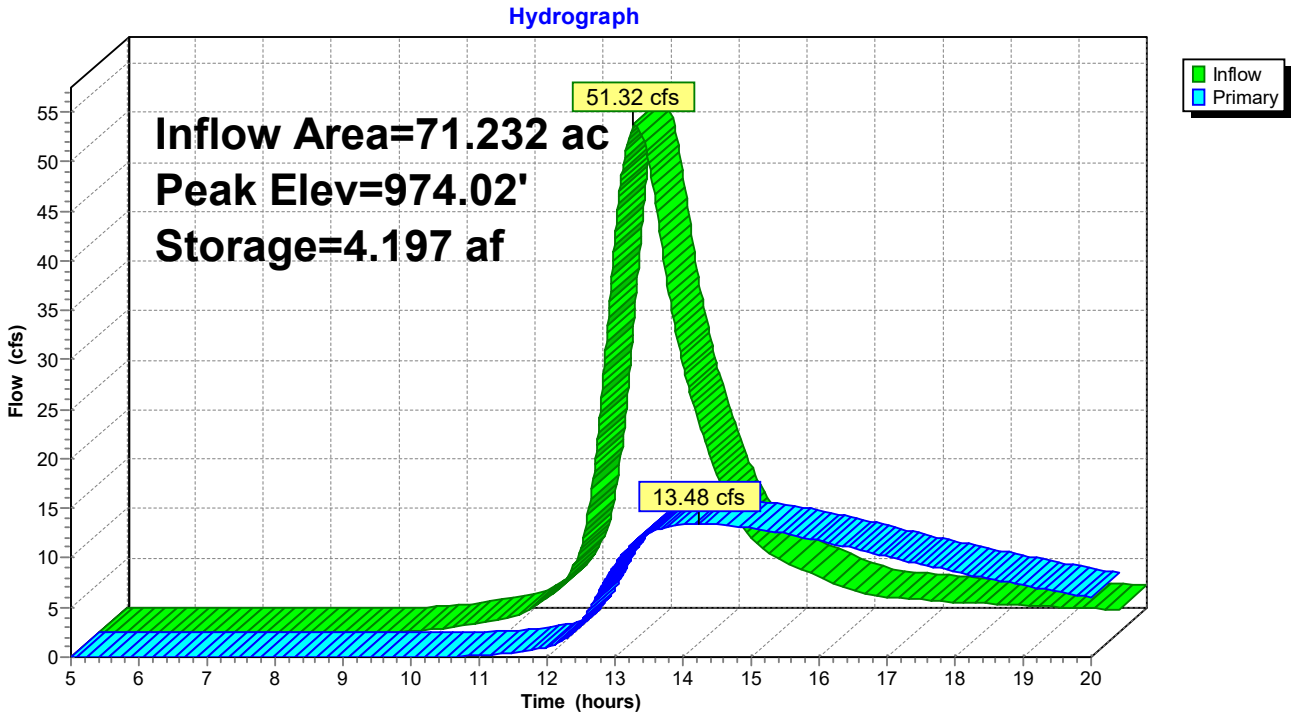
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	14.985 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.250	0.000	0.000
973.00	2.000	1.125	1.125
974.00	4.000	3.000	4.125
975.00	5.860	4.930	9.055
976.00	6.000	5.930	14.985

Device	Routing	Invert	Outlet Devices
#1	Primary	972.00'	**24.0" Round Culvert** L= 55.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 972.00' / 971.00' S= 0.0182 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	975.50'	**160.0' long + 3.0 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=13.48 cfs @ 14.23 hrs HW=974.02' (Free Discharge)
1=Culvert (Barrel Controls 13.48 cfs @ 5.29 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: P-Trap



Summary for Pond 4P: Woody Depression

Inflow Area = 145.628 ac, 2.93% Impervious, Inflow Depth > 0.91" for 2-Year event
Inflow = 44.15 cfs @ 12.59 hrs, Volume= 11.039 af
Outflow = 25.31 cfs @ 13.29 hrs, Volume= 10.999 af, Atten= 43%, Lag= 42.1 min
Primary = 25.31 cfs @ 13.29 hrs, Volume= 10.999 af
Routed to Pond 7P : Project Wetland

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 928.69' @ 13.29 hrs Surf.Area= 0.435 ac Storage= 1.152 af

Plug-Flow detention time= 18.0 min calculated for 10.999 af (100% of inflow)
Center-of-Mass det. time= 16.9 min (917.0 - 900.0)

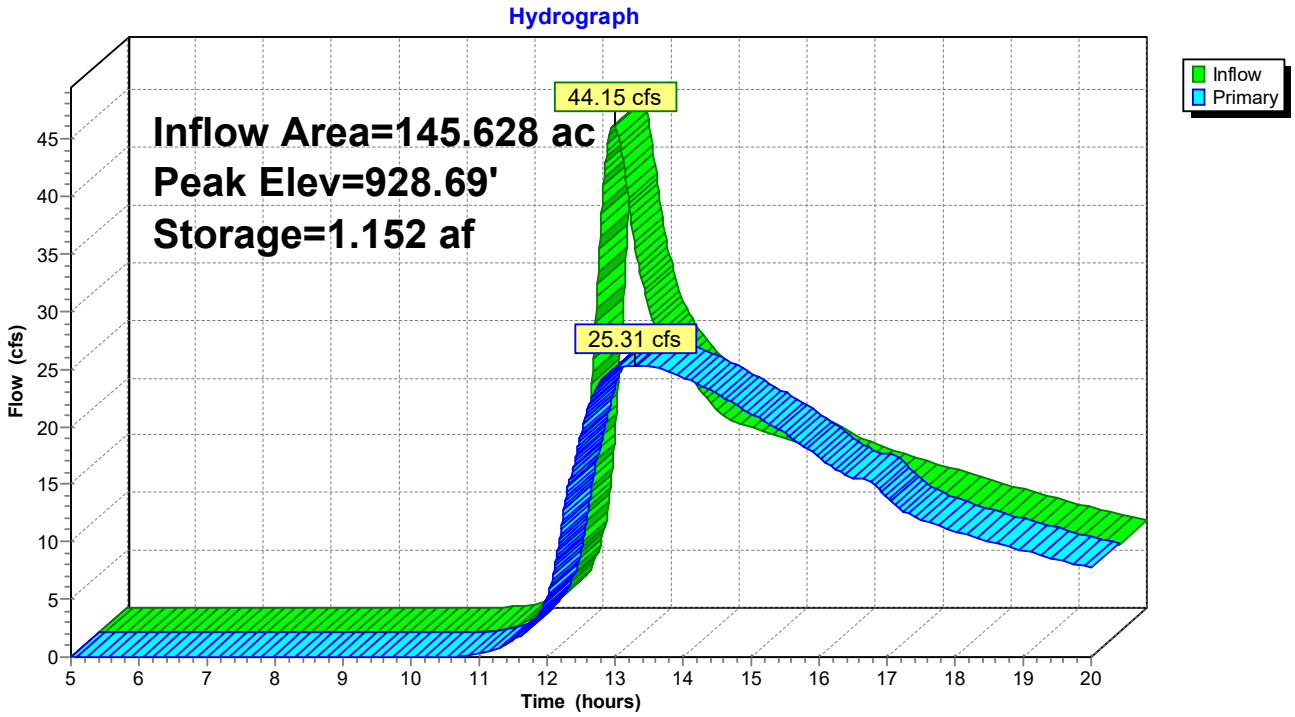
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	4.840 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.003	0.000	0.000
924.00	0.030	0.016	0.016
925.00	0.130	0.080	0.096
926.00	0.220	0.175	0.272
927.00	0.300	0.260	0.531
928.00	0.380	0.340	0.871
929.00	0.460	0.420	1.291
930.00	0.550	0.505	1.796
931.00	0.640	0.595	2.391
932.00	0.750	0.695	3.086
932.50	0.810	0.390	3.476
933.00	0.875	0.421	3.898
934.00	1.010	0.943	4.840

Device	Routing	Invert	Outlet Devices
#1	Primary	923.00'	**24.0" Round CMP_Round 24"** L= 64.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 923.00' / 922.00' S= 0.0156 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	933.00'	**66.0' long + 2.2 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=25.32 cfs @ 13.29 hrs HW=928.69' (Free Discharge)
1=CMP_Round 24" (Barrel Controls 25.32 cfs @ 8.06 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 4P: Woody Depression



Summary for Pond 5P: Seasonal Farm Pond

Inflow Area = 4.412 ac, 0.00% Impervious, Inflow Depth > 1.37" for 2-Year event
Inflow = 8.41 cfs @ 12.19 hrs, Volume= 0.502 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 972.77' @ 20.00 hrs Surf.Area= 0.732 ac Storage= 0.502 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

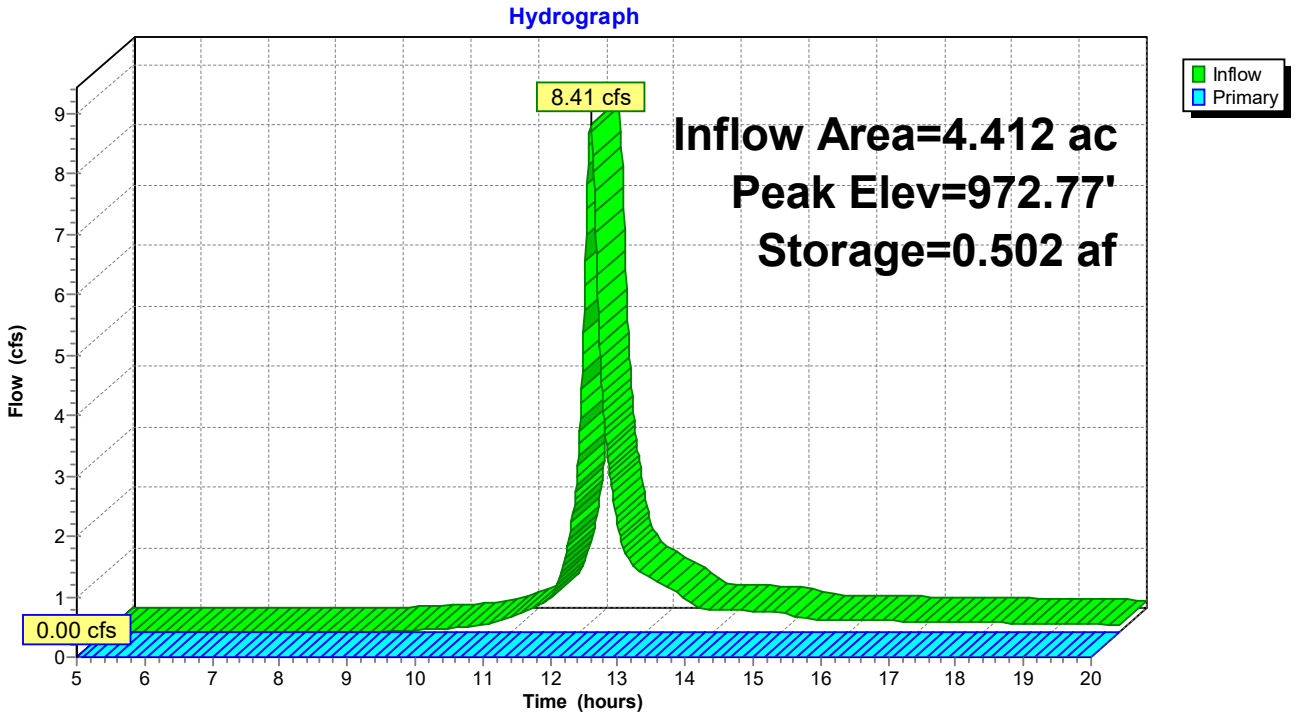
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	1.540 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.570	0.000	0.000
973.00	0.780	0.675	0.675
974.00	0.950	0.865	1.540

Device	Routing	Invert	Outlet Devices
#1	Primary	973.50'	**38.0' long + 28.0 '/' SideZ x 42.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=972.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Seasonal Farm Pond



Summary for Pond 7P: Project Wetland

Inflow Area = 152.116 ac, 3.75% Impervious, Inflow Depth > 0.89" for 2-Year event
Inflow = 25.91 cfs @ 13.23 hrs, Volume= 11.240 af
Outflow = 25.88 cfs @ 13.33 hrs, Volume= 10.492 af, Atten= 0%, Lag= 5.7 min
Primary = 25.88 cfs @ 13.33 hrs, Volume= 10.492 af
Routed to Pond 8P : Residential Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 919.33' @ 13.33 hrs Surf.Area= 0.905 ac Storage= 0.898 af

Plug-Flow detention time= 34.5 min calculated for 10.492 af (93% of inflow)
Center-of-Mass det. time= 16.6 min (931.9 - 915.3)

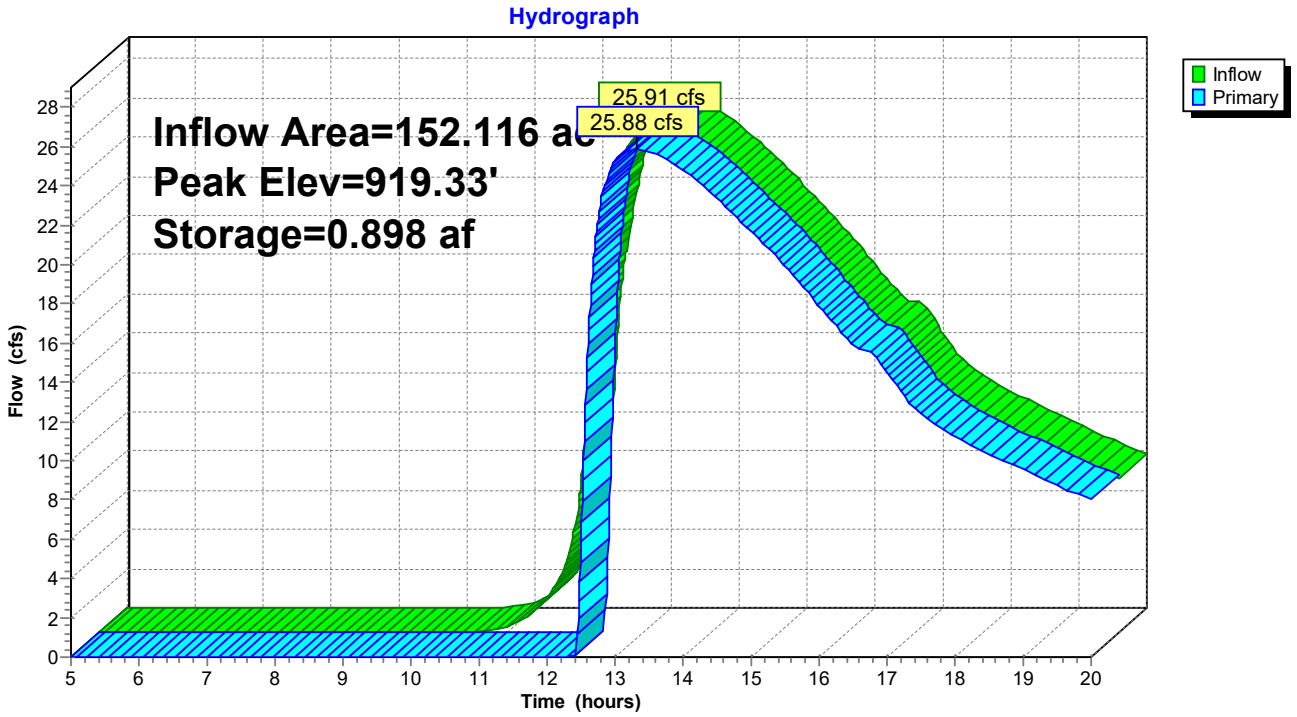
Volume	Invert	Avail.Storage	Storage Description
#1	918.00'	1.560 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.00	0.400	0.000	0.000
919.00	0.830	0.615	0.615
920.00	1.060	0.945	1.560

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**45.0' long + 25.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=25.87 cfs @ 13.33 hrs HW=919.33' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 25.87 cfs @ 1.49 fps)

Pond 7P: Project Wetland



Summary for Pond 8P: Residential Depression

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 0.79" for 2-Year event
Inflow = 26.40 cfs @ 13.28 hrs, Volume= 10.710 af
Outflow = 23.74 cfs @ 14.47 hrs, Volume= 10.591 af, Atten= 10%, Lag= 71.5 min
Primary = 23.74 cfs @ 14.47 hrs, Volume= 10.591 af
Routed to Link 6L : Elkhart Lake

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 917.46' @ 14.47 hrs Surf.Area= 0.436 ac Storage= 0.811 af

Plug-Flow detention time= 18.6 min calculated for 10.591 af (99% of inflow)
Center-of-Mass det. time= 15.6 min (945.6 - 930.0)

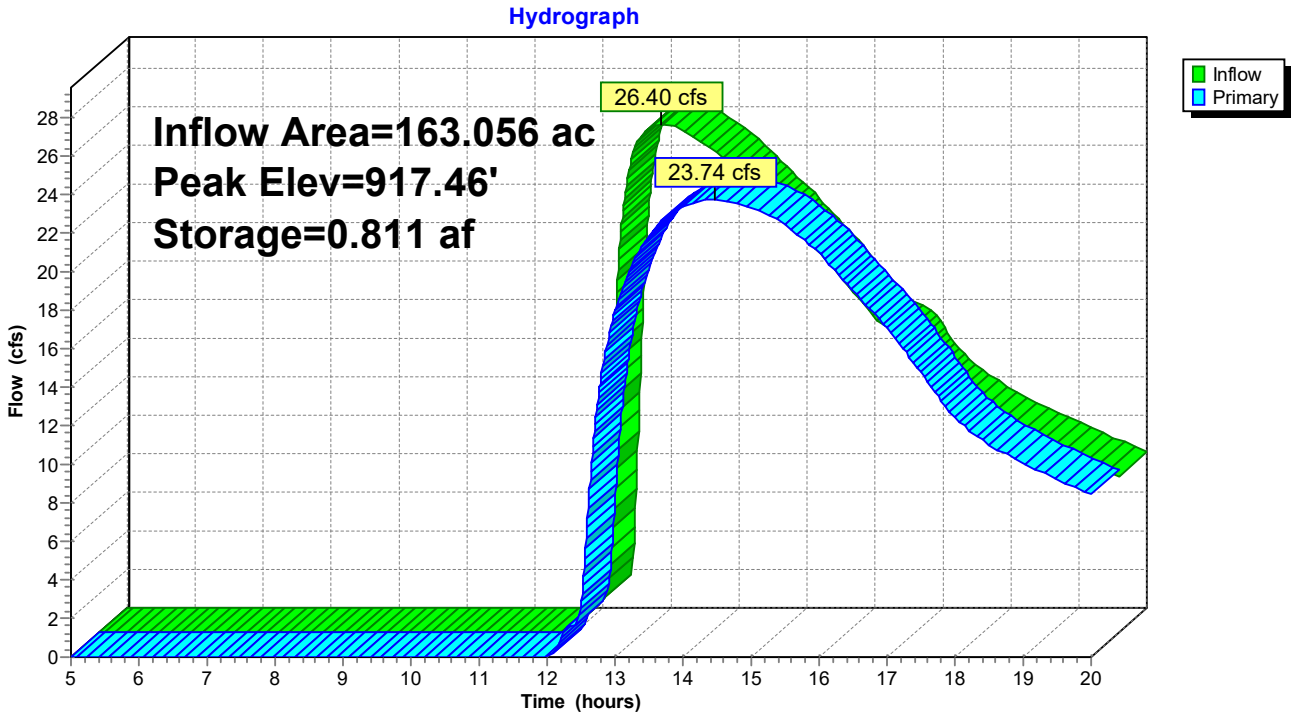
Volume	Invert	Avail.Storage	Storage Description
#1	914.00'	3.701 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.00	0.030	0.000	0.000
915.00	0.120	0.075	0.075
916.00	0.290	0.205	0.280
917.00	0.390	0.340	0.620
918.00	0.490	0.440	1.060
919.00	0.576	0.533	1.593
920.00	0.649	0.612	2.206
921.00	0.742	0.695	2.901
922.00	0.857	0.799	3.701

Device	Routing	Invert	Outlet Devices
#1	Primary	914.00'	**24.0" Round RCP_Round 24"** L= 240.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 914.00' / 909.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Primary	921.00'	**96.5' long + 4.8 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=23.74 cfs @ 14.47 hrs HW=917.46' (Free Discharge)
↑—**1=RCP_Round 24"** (Inlet Controls 23.74 cfs @ 7.56 fps)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Residential Depression



Summary for Pond 9P: Intersection Depression

[57] Hint: Peaked at 930.42' (Flood elevation advised)

Inflow Area = 8.048 ac, 7.77% Impervious, Inflow Depth > 0.26" for 2-Year event
Inflow = 1.51 cfs @ 12.34 hrs, Volume= 0.176 af
Outflow = 1.51 cfs @ 12.34 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min
Primary = 0.79 cfs @ 12.34 hrs, Volume= 0.093 af
Routed to Pond 8P : Residential Depression
Secondary = 0.71 cfs @ 12.34 hrs, Volume= 0.083 af
Routed to Link 6L : Elkhart Lake

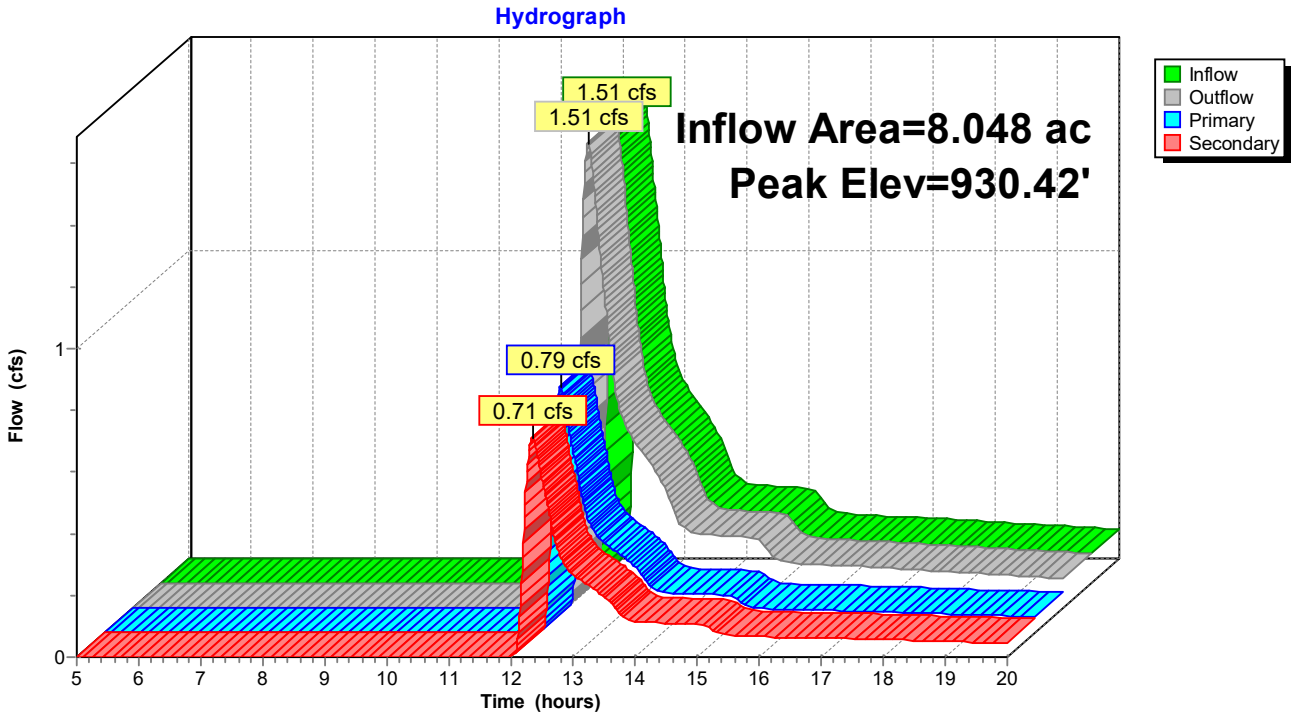
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 930.42' @ 12.34 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	930.00'	**18.0" Round CMP_Round 18"** L= 40.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0250 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf
#2	Secondary	930.00'	**18.0" Round CMP_Round 18"** L= 52.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0192 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=0.79 cfs @ 12.34 hrs HW=930.42' (Free Discharge)
↑—**1=CMP_Round 18"** (Barrel Controls 0.79 cfs @ 2.91 fps)

Secondary OutFlow Max=0.71 cfs @ 12.34 hrs HW=930.42' (Free Discharge)
↑—**2=CMP_Round 18"** (Barrel Controls 0.71 cfs @ 2.62 fps)

Pond 9P: Intersection Depression



Summary for Pond 11P: Wooded Pond

Inflow Area = 15.297 ac, 4.31% Impervious, Inflow Depth > 0.17" for 2-Year event
Inflow = 1.04 cfs @ 12.67 hrs, Volume= 0.211 af
Outflow = 0.73 cfs @ 13.27 hrs, Volume= 0.200 af, Atten= 30%, Lag= 36.1 min
Primary = 0.73 cfs @ 13.27 hrs, Volume= 0.200 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 954.03' @ 13.27 hrs Surf.Area= 1.276 ac Storage= 0.032 af

Plug-Flow detention time= 39.2 min calculated for 0.200 af (95% of inflow)
Center-of-Mass det. time= 23.3 min (914.5 - 891.2)

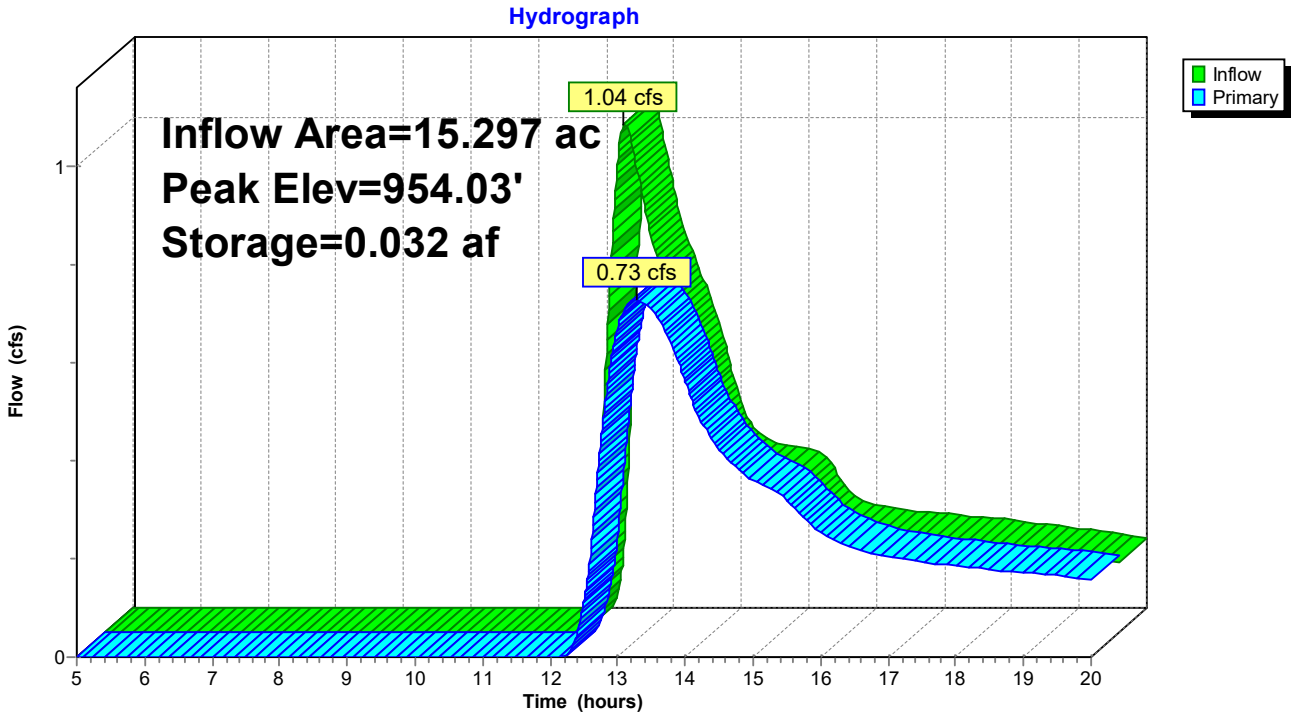
Volume	Invert	Avail.Storage	Storage Description
#1	954.00'	1.395 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
954.00	1.270	0.000	0.000
955.00	1.520	1.395	1.395

Device	Routing	Invert	Outlet Devices
#1	Primary	954.00'	**70.0' long + 9.0 '/' SideZ x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.72 cfs @ 13.27 hrs HW=954.03' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.72 cfs @ 0.40 fps)

Pond 11P: Wooded Pond

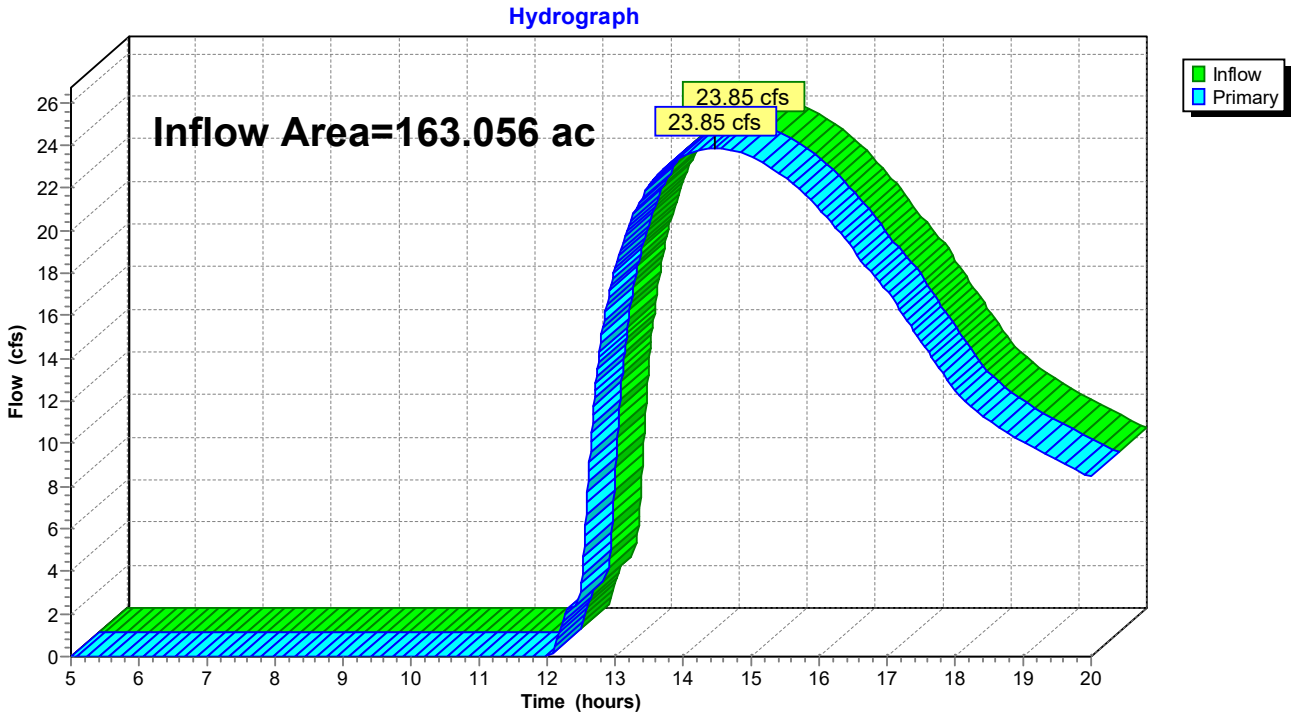


Summary for Link 6L: Elkhart Lake

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 0.79" for 2-Year event
Inflow = 23.85 cfs @ 14.47 hrs, Volume= 10.674 af
Primary = 23.85 cfs @ 14.47 hrs, Volume= 10.674 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Link 6L: Elkhart Lake



Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SWS 1: SSWS 1 Runoff Area=6.488 ac 22.13% Impervious Runoff Depth>1.73"
Flow Length=781' Tc=17.0 min CN=70 Runoff=12.75 cfs 0.936 af

Subcatchment SWS 2: SSWS 2 Runoff Area=2.892 ac 17.12% Impervious Runoff Depth>1.89"
Flow Length=680' Tc=9.5 min CN=72 Runoff=8.09 cfs 0.454 af

Subcatchment SWS 3: SSWS 3 Runoff Area=8.048 ac 7.77% Impervious Runoff Depth>1.31"
Flow Length=1,413' Tc=17.1 min CN=64 Runoff=11.56 cfs 0.882 af

Subcatchment SWS 4: SSWS 4 Runoff Area=54.687 ac 6.14% Impervious Runoff Depth>2.69"
Flow Length=3,302' Tc=37.4 min CN=82 Runoff=111.01 cfs 12.254 af

Subcatchment SWS 5: SSWS 5 Runoff Area=4.412 ac 0.00% Impervious Runoff Depth>3.28"
Flow Length=300' Tc=11.0 min CN=88 Runoff=19.45 cfs 1.205 af

Subcatchment SWS 6: SSWS 6 Runoff Area=15.297 ac 4.31% Impervious Runoff Depth>1.06"
Flow Length=1,367' Tc=32.3 min CN=60 Runoff=12.03 cfs 1.345 af

Subcatchment SWS 7: SSWS 7 Runoff Area=71.232 ac 0.35% Impervious Runoff Depth>3.22"
Flow Length=3,349' Tc=65.4 min CN=88 Runoff=121.44 cfs 19.143 af

Pond 3P: P-Trap Peak Elev=975.44' Storage=11.674 af Inflow=121.44 cfs 19.143 af
Outflow=19.62 cfs 11.949 af

Pond 4P: Woody Depression Peak Elev=933.46' Storage=4.317 af Inflow=130.08 cfs 25.623 af
Outflow=92.89 cfs 24.576 af

Pond 5P: Seasonal Farm Pond Peak Elev=973.52' Storage=1.106 af Inflow=19.45 cfs 1.205 af
Outflow=0.36 cfs 0.102 af

Pond 7P: Project Wetland Peak Elev=919.69' Storage=1.246 af Inflow=95.55 cfs 25.512 af
Outflow=90.98 cfs 24.619 af

Pond 8P: Residential Depression Peak Elev=921.23' Storage=3.074 af Inflow=93.27 cfs 25.535 af
Outflow=66.61 cfs 23.997 af

Pond 9P: Intersection Depression Peak Elev=931.37' Inflow=11.56 cfs 0.882 af
Primary=5.94 cfs 0.461 af Secondary=5.62 cfs 0.420 af Outflow=11.56 cfs 0.882 af

Pond 11P: Wooded Pond Peak Elev=954.15' Storage=0.188 af Inflow=12.03 cfs 1.345 af
Outflow=10.08 cfs 1.318 af

Link 6L: Elkhart Lake Inflow=67.50 cfs 24.418 af
Primary=67.50 cfs 24.418 af

Total Runoff Area = 163.056 ac Runoff Volume = 36.218 af Average Runoff Depth = 2.67"
95.82% Pervious = 156.233 ac 4.18% Impervious = 6.823 ac

Summary for Subcatchment SWS 1: SSWS 1

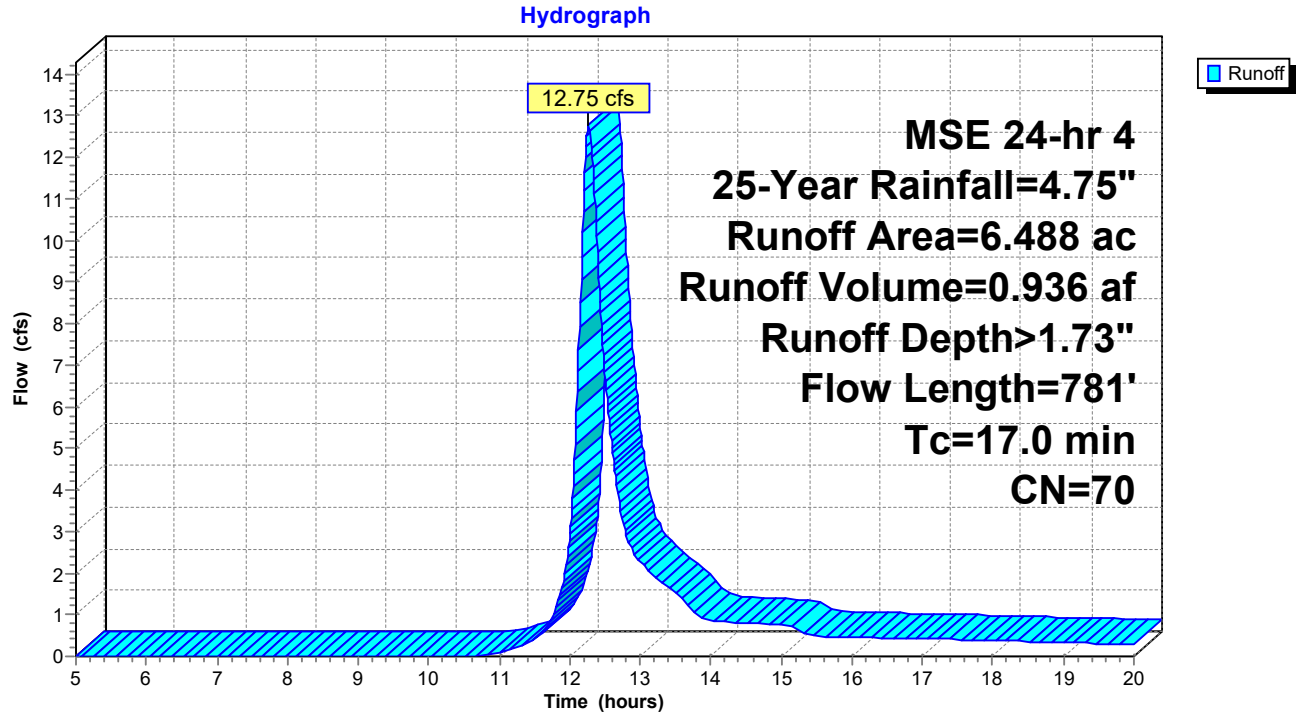
Runoff = 12.75 cfs @ 12.26 hrs, Volume= 0.936 af, Depth> 1.73"
Routed to Pond 7P : Project Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	0.891	98	Paved Road, HSG B
*	2.638	68	Residential 1 acre, HSG B
*	0.096	75	Residential 1/4 acre, HSG B
*	0.545	98	Water, HSG B
*	2.318	55	Woods Good, HSG B
	6.488	70	Weighted Average
	5.052		77.87% Pervious Area
	1.436		22.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	699	0.0558	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	81	0.0984	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.57"
17.0	781	Total			

Subcatchment SWS 1: SSWS 1



Summary for Subcatchment SWS 2: SSWS 2

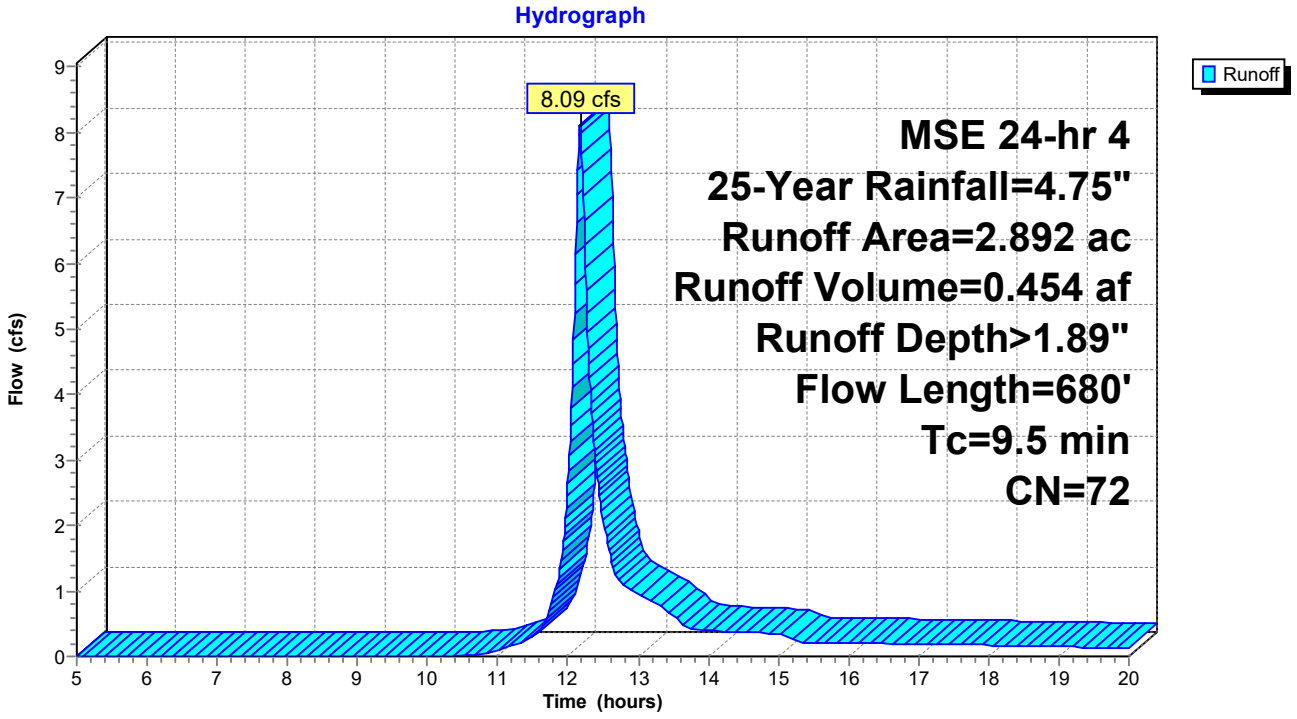
Runoff = 8.09 cfs @ 12.17 hrs, Volume= 0.454 af, Depth> 1.89"
Routed to Pond 8P : Residential Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	0.495	98	Paved Road, HSG B
*	2.073	68	Residential 1 acre, HSG B
*	0.021	75	Residential 1/4 acre, HSG B
*	0.303	55	Woods Good, HSG B
	2.892	72	Weighted Average
	2.397		82.88% Pervious Area
	0.495		17.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	580	0.0638	3.79		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.0	100	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
9.5	680	Total			

Subcatchment SWS 2: SSWS 2



Summary for Subcatchment SWS 3: SSWS 3

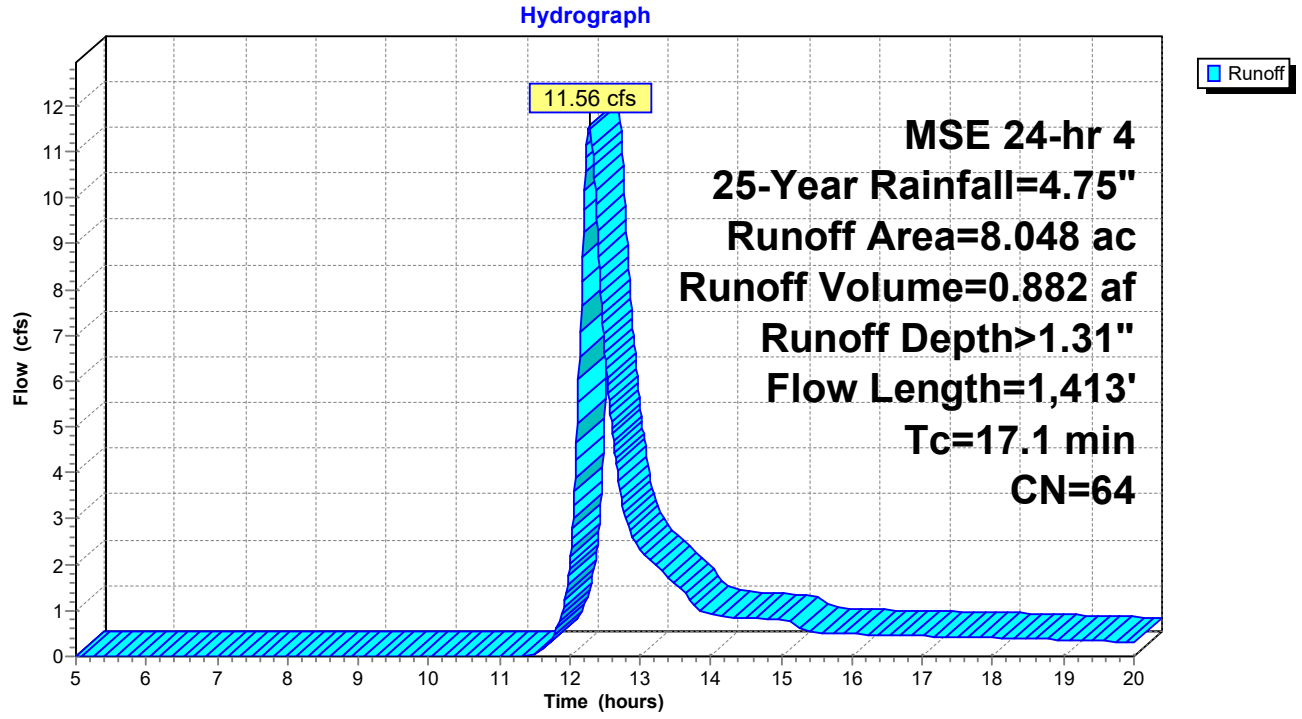
Runoff = 11.56 cfs @ 12.28 hrs, Volume= 0.882 af, Depth> 1.31"
Routed to Pond 9P : Intersection Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	3.177	58	Meadow, HSG B
*	0.625	98	Paved Road, HSG B
*	0.178	75	Residential 1/4 acre, HSG B
*	2.016	65	Residential 2 acre, HSG B
*	2.052	60	Woods Fair, HSG B
	8.048	64	Weighted Average
	7.423		92.23% Pervious Area
	0.625		7.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	1,313	0.0640	1.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	100	0.2089	0.35		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
17.1	1,413	Total			

Subcatchment SWS 3: SSWS 3



Summary for Subcatchment SWS 4: SSWS 4

[47] Hint: Peak is 319% of capacity of segment #1

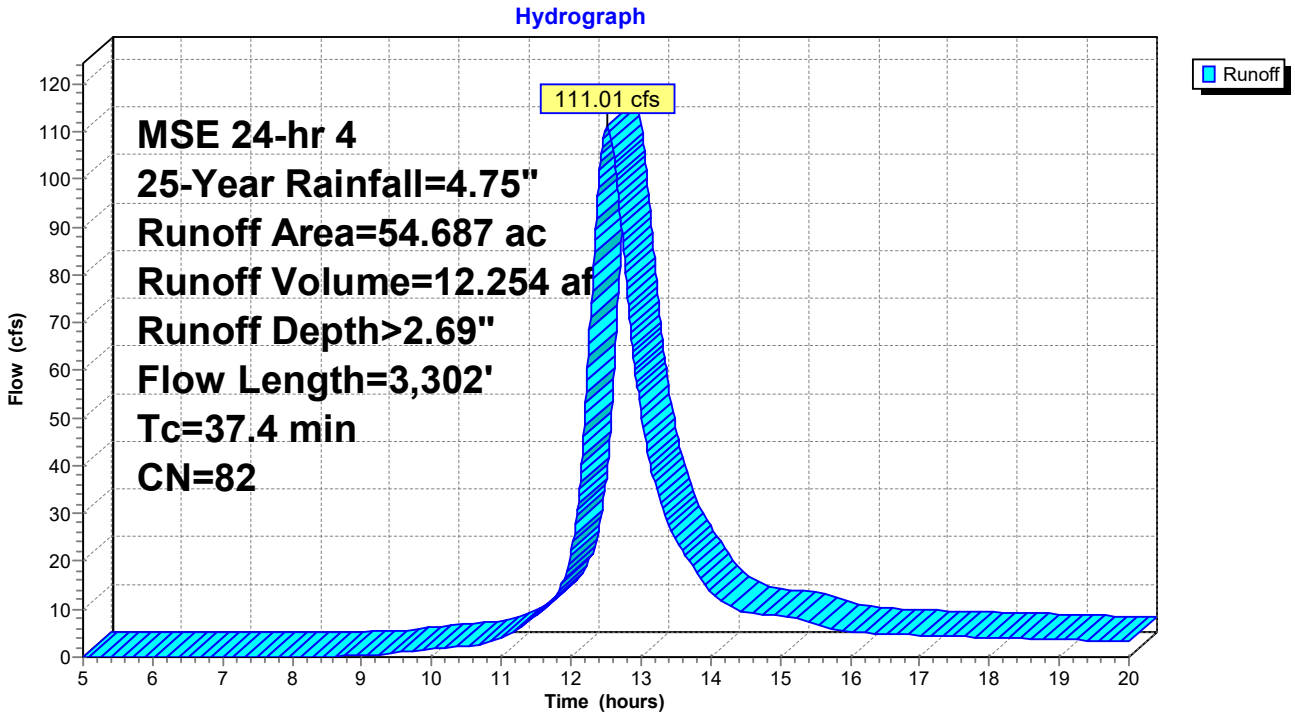
Runoff = 111.01 cfs @ 12.51 hrs, Volume= 12.254 af, Depth> 2.69"
Routed to Pond 4P : Woody Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	1.520	74	Farmstead, HSG B
*	2.673	86	Farmstead, HSG D
*	3.850	69	Pasture, HSG B
*	1.028	84	Pasture, HSG D
*	0.150	84	Pasture, HSG D
*	11.086	84	Pasture, HSG D
*	1.697	98	Paved Road, HSG B
*	0.205	98	Paved Road, HSG D
*	0.009	98	Paved Road, HSG D
*	0.371	98	Paved Road, HSG D
*	0.655	68	Residential 1 acre, HSG B
*	1.292	84	Residential 1 acre, HSG D
*	1.537	89	Row Crop, HSG D
*	0.312	89	Row Crop, HSG D
*	15.167	89	Row Crop, HSG D
*	0.012	98	Water, HSG B
*	1.060	98	Water, HSG D
*	0.004	98	Water, HSG D
*	2.119	55	Woods Good, HSG B
*	0.487	77	Woods Good, HSG D
*	5.143	66	Woods Poor, HSG B
*	0.306	83	Woods Poor, HSG D
*	0.938	83	Woods Poor, HSG D
*	3.066	83	Woods Poor, HSG D
	54.687	82	Weighted Average
	51.329		93.86% Pervious Area
	3.358		6.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	2,000	0.0215	4.64	34.76	**Channel Flow,** Area= 7.5 sf Perim= 14.7' r= 0.51' n= 0.030
18.2	1,202	0.0150	1.10		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
12.0	99	0.0201	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
37.4	3,302	Total			

Subcatchment SWS 4: SSWS 4



Summary for Subcatchment SWS 5: SSWS 5

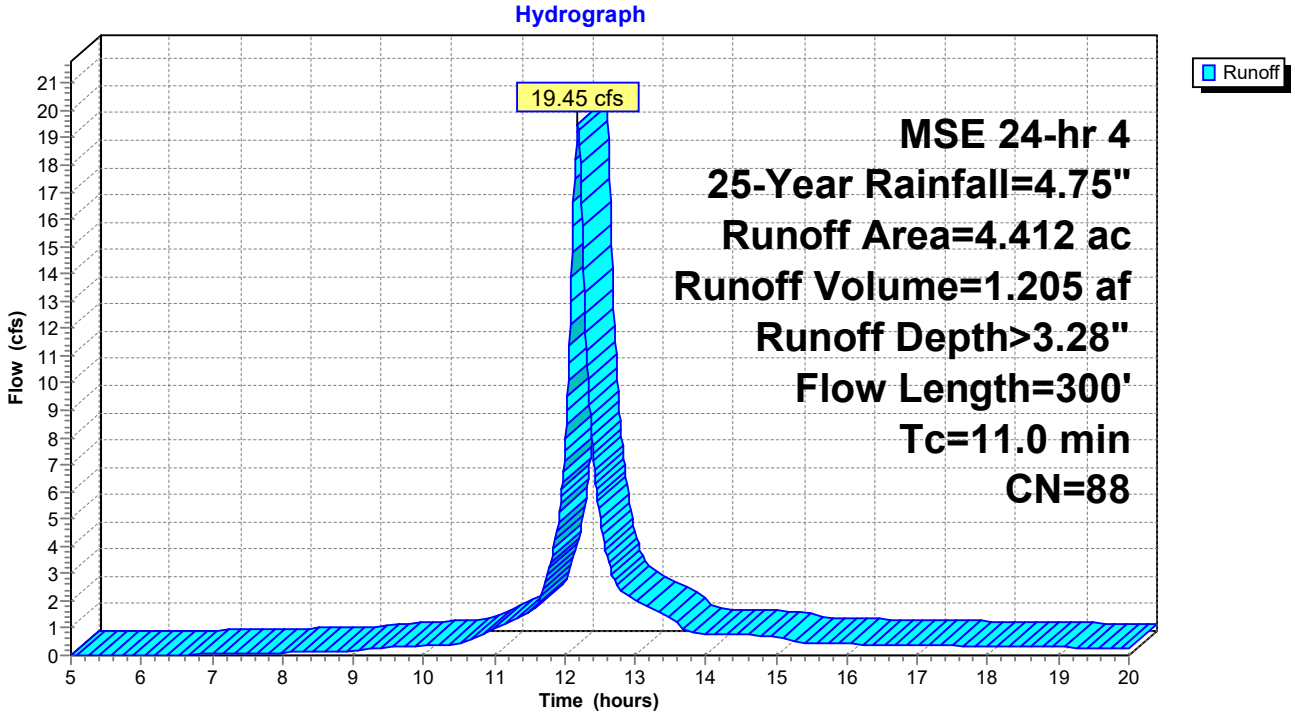
Runoff = 19.45 cfs @ 12.18 hrs, Volume= 1.205 af, Depth> 3.28"
Routed to Pond 5P : Seasonal Farm Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	3.792	89	Row Crop, HSG D
*	0.620	83	Woods Poor, HSG D
	4.412	88	Weighted Average
	4.412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	205	0.0779	2.51		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
9.6	95	0.0317	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
11.0	300	Total			

Subcatchment SWS 5: SSWS 5



Summary for Subcatchment SWS 6: SSWS 6

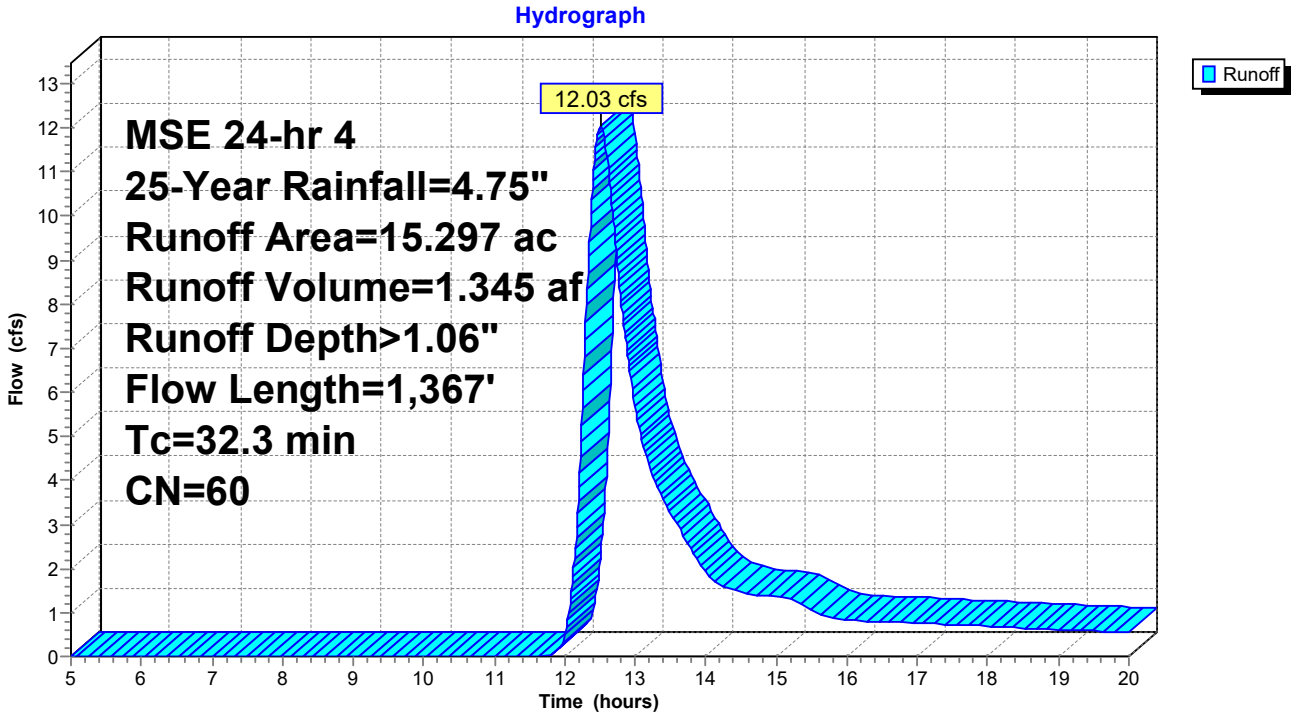
Runoff = 12.03 cfs @ 12.52 hrs, Volume= 1.345 af, Depth> 1.06"
Routed to Pond 11P : Wooded Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	14.428	58	Meadow, HSG B
*	0.659	98	Paved Road, HSG B
*	0.173	65	Residential 2 acre, HSG B
*	0.037	60	Woods Fair, HSG B
	15.297	60	Weighted Average
	14.638		95.69% Pervious Area
	0.659		4.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	1,267	0.0158	0.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.3	100	0.2808	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
32.3	1,367	Total			

Subcatchment SWS 6: SSWS 6



Summary for Subcatchment SWS 7: SSWS 7

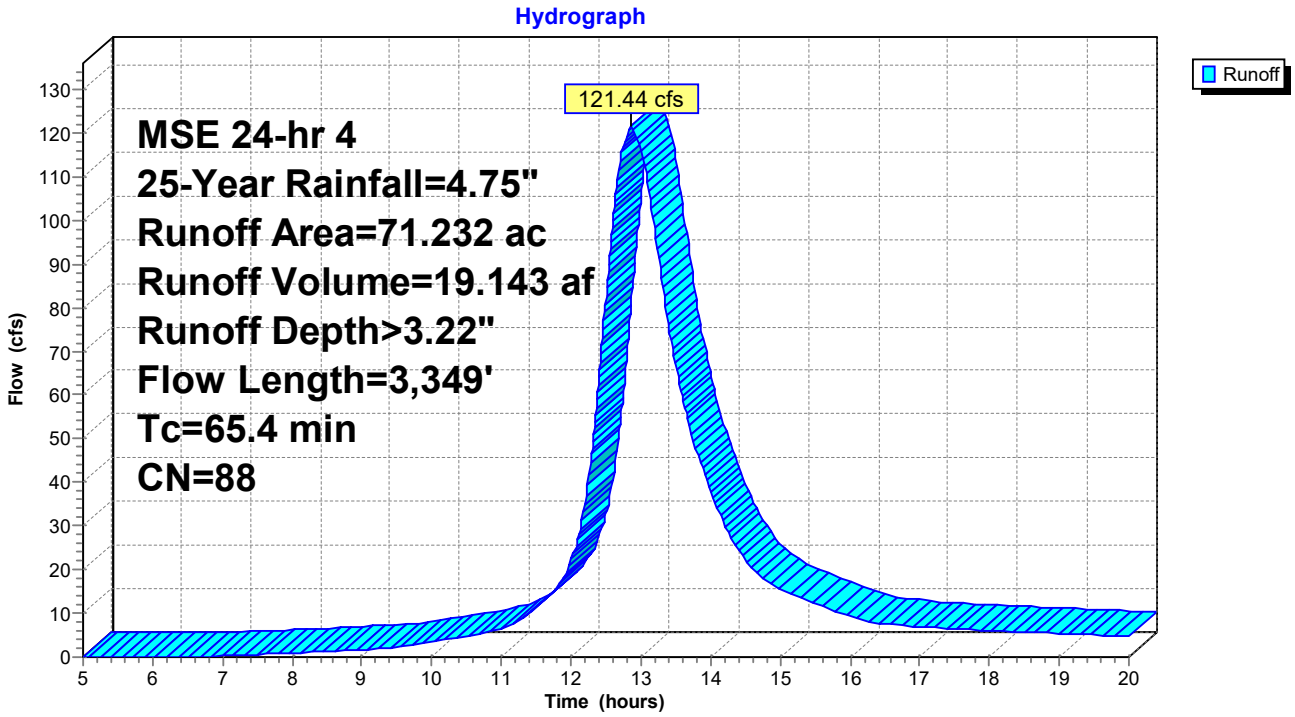
Runoff = 121.44 cfs @ 12.86 hrs, Volume= 19.143 af, Depth> 3.22"
Routed to Pond 3P : P-Trap

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-Year Rainfall=4.75"

	Area (ac)	CN	Description
*	0.242	85	Gravel Road, HSG B
*	0.013	91	Gravel Road, HSG D
*	0.083	91	Gravel Road, HSG D
*	0.813	86	Farmstead, HSG D
*	2.111	86	Farmstead, HSG D
*	0.140	98	Paved Road, HSG B
*	0.071	98	Paved Road, HSG D
*	0.039	98	Paved Road, HSG D
*	0.253	84	Residential 1 acre, HSG D
*	0.102	84	Residential 1 acre, HSG D
*	1.914	84	Residential 1 acre, HSG D
*	6.429	78	Row Crop, HSG B
*	14.978	89	Row Crop, HSG D
*	8.489	89	Row Crop, HSG D
*	35.555	89	Row Crop, HSG D
	71.232	88	Weighted Average
	70.982		99.65% Pervious Area
	0.250		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	3,249	0.0105	0.92		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.6	100	0.0902	0.25		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
65.4	3,349	Total			

Subcatchment SWS 7: SSWS 7



Summary for Pond 3P: P-Trap

Inflow Area = 71.232 ac, 0.35% Impervious, Inflow Depth > 3.22" for 25-Year event
Inflow = 121.44 cfs @ 12.86 hrs, Volume= 19.143 af
Outflow = 19.62 cfs @ 14.64 hrs, Volume= 11.949 af, Atten= 84%, Lag= 106.5 min
Primary = 19.62 cfs @ 14.64 hrs, Volume= 11.949 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 975.44' @ 14.64 hrs Surf.Area= 5.922 ac Storage= 11.674 af

Plug-Flow detention time= 202.7 min calculated for 11.941 af (62% of inflow)
Center-of-Mass det. time= 140.3 min (955.8 - 815.6)

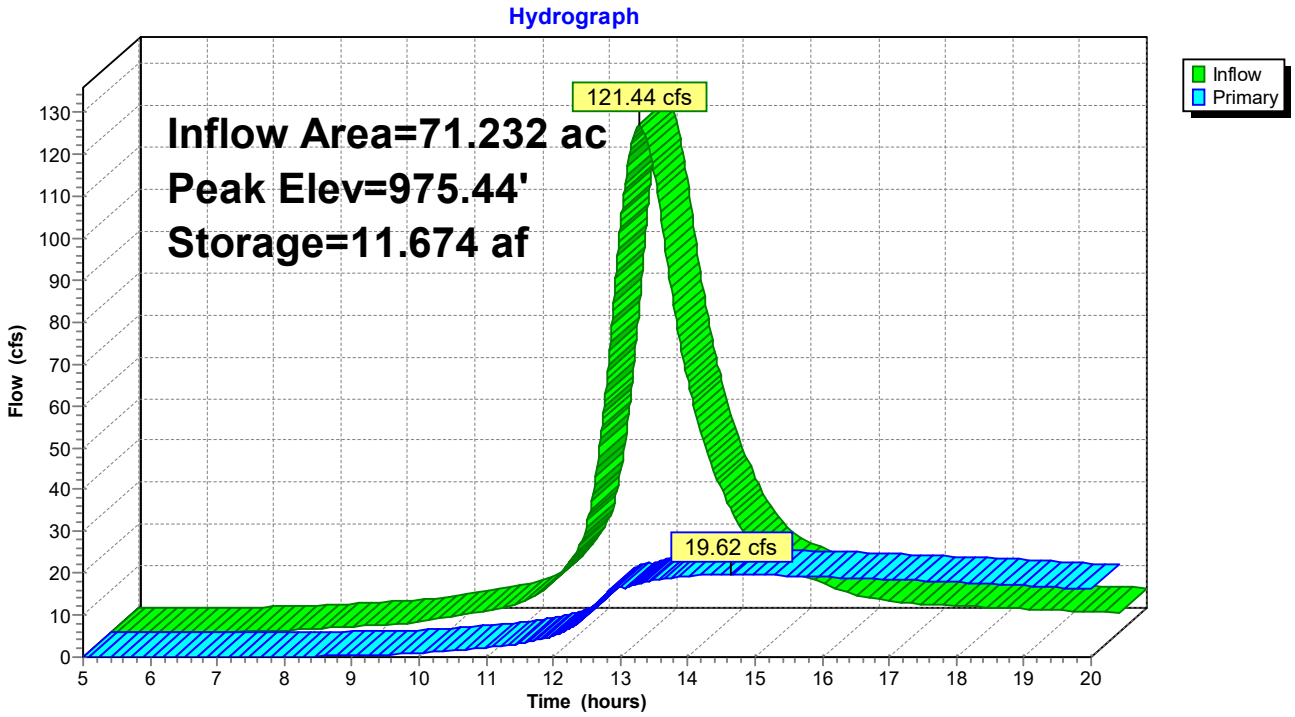
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	14.985 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.250	0.000	0.000
973.00	2.000	1.125	1.125
974.00	4.000	3.000	4.125
975.00	5.860	4.930	9.055
976.00	6.000	5.930	14.985

Device	Routing	Invert	Outlet Devices
#1	Primary	972.00'	**24.0" Round Culvert** L= 55.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 972.00' / 971.00' S= 0.0182 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	975.50'	**160.0' long + 3.0 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=19.62 cfs @ 14.64 hrs HW=975.44' (Free Discharge)
1=Culvert (Barrel Controls 19.62 cfs @ 6.25 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: P-Trap



Summary for Pond 4P: Woody Depression

Inflow Area = 145.628 ac, 2.93% Impervious, Inflow Depth > 2.11" for 25-Year event
Inflow = 130.08 cfs @ 12.55 hrs, Volume= 25.623 af
Outflow = 92.89 cfs @ 12.86 hrs, Volume= 24.576 af, Atten= 29%, Lag= 18.6 min
Primary = 92.89 cfs @ 12.86 hrs, Volume= 24.576 af
Routed to Pond 7P : Project Wetland

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 933.46' @ 12.86 hrs Surf.Area= 0.937 ac Storage= 4.317 af

Plug-Flow detention time= 52.3 min calculated for 24.576 af (96% of inflow)
Center-of-Mass det. time= 39.4 min (918.9 - 879.5)

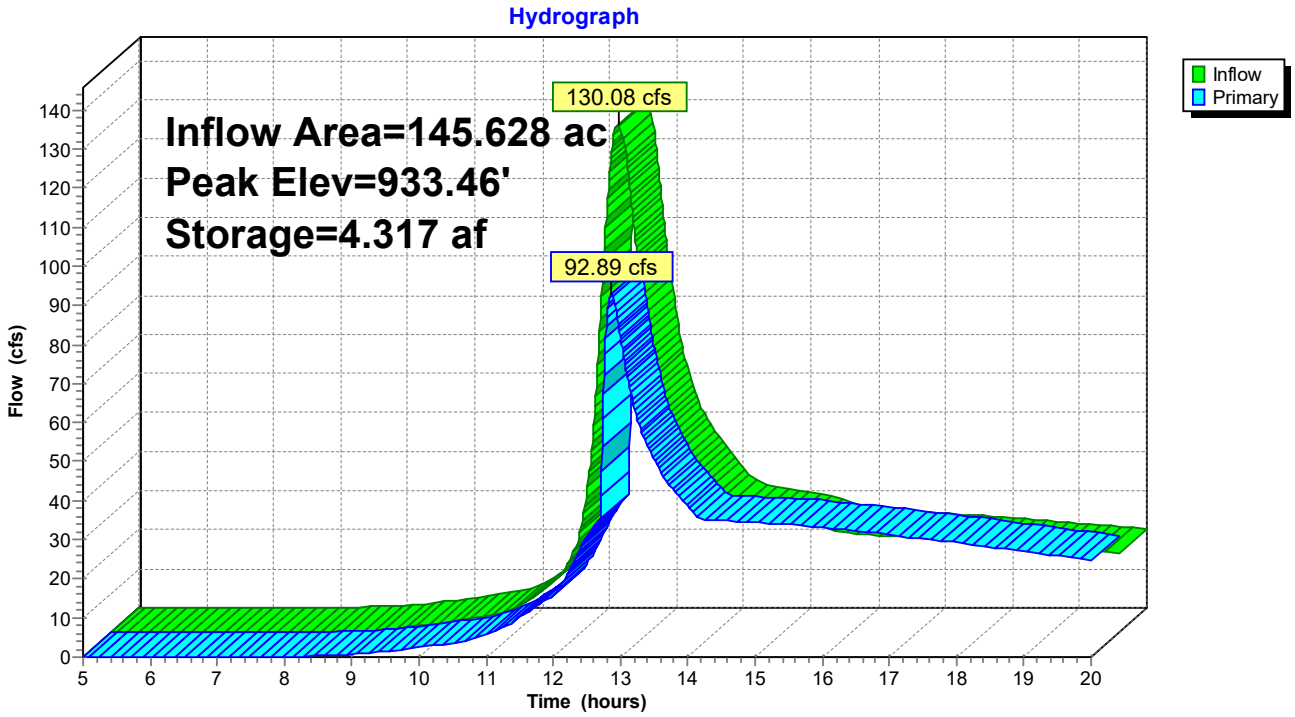
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	4.840 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.003	0.000	0.000
924.00	0.030	0.016	0.016
925.00	0.130	0.080	0.096
926.00	0.220	0.175	0.272
927.00	0.300	0.260	0.531
928.00	0.380	0.340	0.871
929.00	0.460	0.420	1.291
930.00	0.550	0.505	1.796
931.00	0.640	0.595	2.391
932.00	0.750	0.695	3.086
932.50	0.810	0.390	3.476
933.00	0.875	0.421	3.898
934.00	1.010	0.943	4.840

Device	Routing	Invert	Outlet Devices
#1	Primary	923.00'	**24.0" Round CMP_Round 24"** L= 64.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 923.00' / 922.00' S= 0.0156 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	933.00'	**66.0' long + 2.2 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=92.75 cfs @ 12.86 hrs HW=933.46' (Free Discharge)
1=CMP_Round 24" (Barrel Controls 35.97 cfs @ 11.45 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 56.79 cfs @ 1.83 fps)

Pond 4P: Woody Depression



Summary for Pond 5P: Seasonal Farm Pond

Inflow Area = 4.412 ac, 0.00% Impervious, Inflow Depth > 3.28" for 25-Year event
Inflow = 19.45 cfs @ 12.18 hrs, Volume= 1.205 af
Outflow = 0.36 cfs @ 17.47 hrs, Volume= 0.102 af, Atten= 98%, Lag= 317.0 min
Primary = 0.36 cfs @ 17.47 hrs, Volume= 0.102 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 973.52' @ 17.47 hrs Surf.Area= 0.869 ac Storage= 1.106 af

Plug-Flow detention time= 482.7 min calculated for 0.102 af (8% of inflow)
Center-of-Mass det. time= 310.8 min (1,082.6 - 771.8)

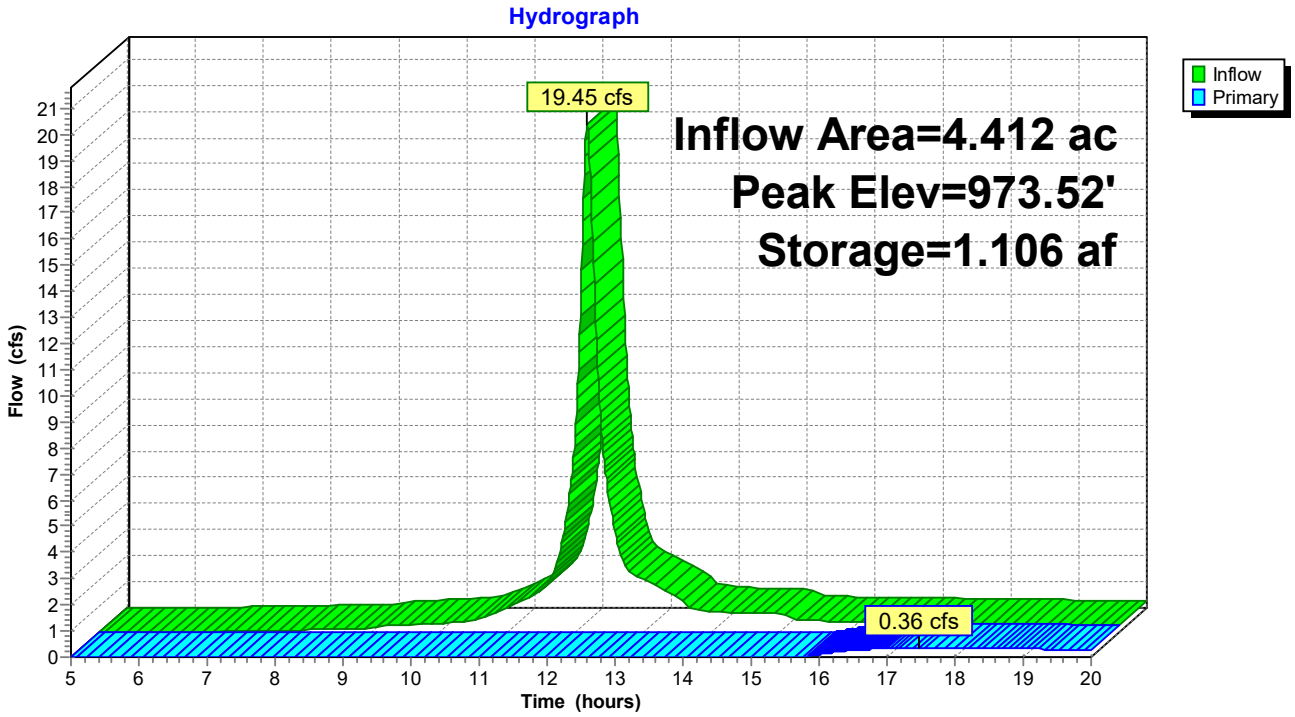
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	1.540 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.570	0.000	0.000
973.00	0.780	0.675	0.675
974.00	0.950	0.865	1.540

Device	Routing	Invert	Outlet Devices
#1	Primary	973.50'	**38.0' long + 28.0 '/' SideZ x 42.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.35 cfs @ 17.47 hrs HW=973.52' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.35 cfs @ 0.40 fps)

Pond 5P: Seasonal Farm Pond



Summary for Pond 7P: Project Wetland

Inflow Area = 152.116 ac, 3.75% Impervious, Inflow Depth > 2.01" for 25-Year event
Inflow = 95.55 cfs @ 12.86 hrs, Volume= 25.512 af
Outflow = 90.98 cfs @ 12.93 hrs, Volume= 24.619 af, Atten= 5%, Lag= 4.7 min
Primary = 90.98 cfs @ 12.93 hrs, Volume= 24.619 af
Routed to Pond 8P : Residential Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 919.69' @ 12.93 hrs Surf.Area= 0.990 ac Storage= 1.246 af

Plug-Flow detention time= 20.8 min calculated for 24.619 af (96% of inflow)
Center-of-Mass det. time= 11.0 min (925.9 - 914.9)

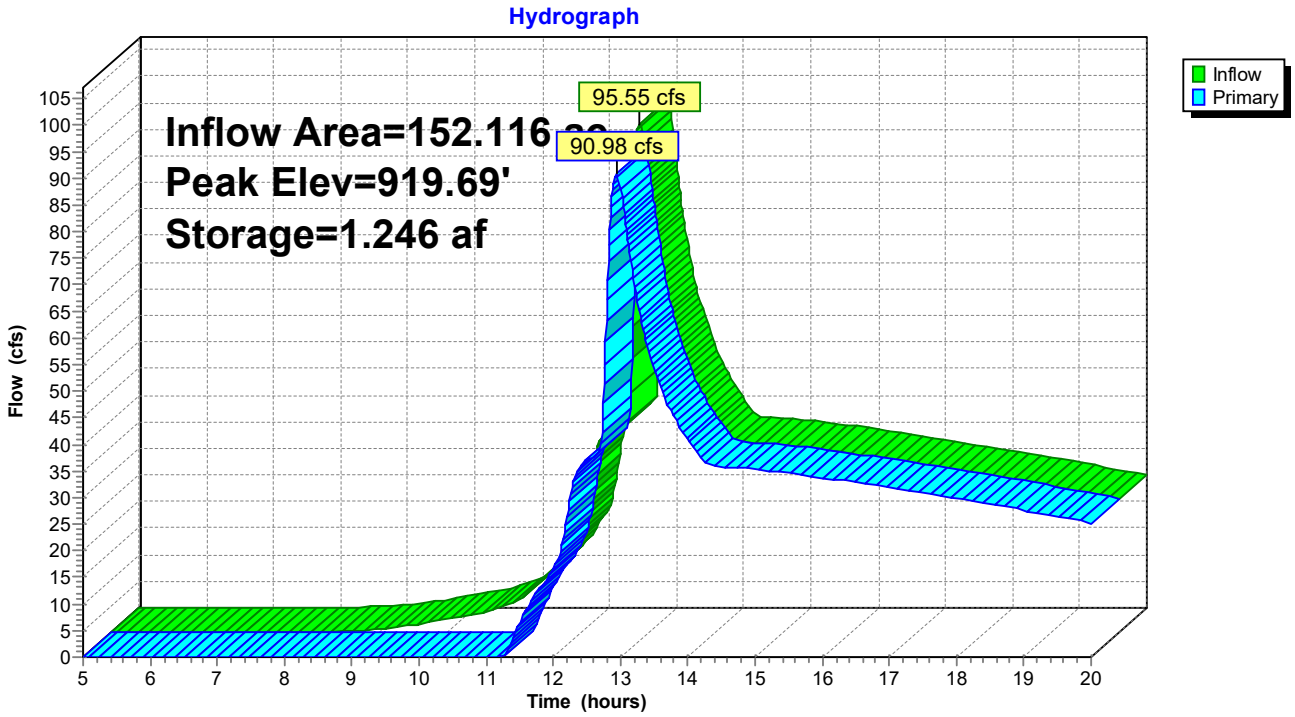
Volume	Invert	Avail.Storage	Storage Description
#1	918.00'	1.560 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.00	0.400	0.000	0.000
919.00	0.830	0.615	0.615
920.00	1.060	0.945	1.560

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**45.0' long + 25.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=90.95 cfs @ 12.93 hrs HW=919.69' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 90.95 cfs @ 2.10 fps)

Pond 7P: Project Wetland



Summary for Pond 8P: Residential Depression

[81] Warning: Exceeded Pond 7P by 1.67' @ 13.40 hrs

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 1.88" for 25-Year event
Inflow = 93.27 cfs @ 12.93 hrs, Volume= 25.535 af
Outflow = 66.61 cfs @ 13.28 hrs, Volume= 23.997 af, Atten= 29%, Lag= 21.0 min
Primary = 66.61 cfs @ 13.28 hrs, Volume= 23.997 af
Routed to Link 6L : Elkhart Lake

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 921.23' @ 13.28 hrs Surf.Area= 0.768 ac Storage= 3.074 af

Plug-Flow detention time= 45.1 min calculated for 23.981 af (94% of inflow)
Center-of-Mass det. time= 28.6 min (950.4 - 921.8)

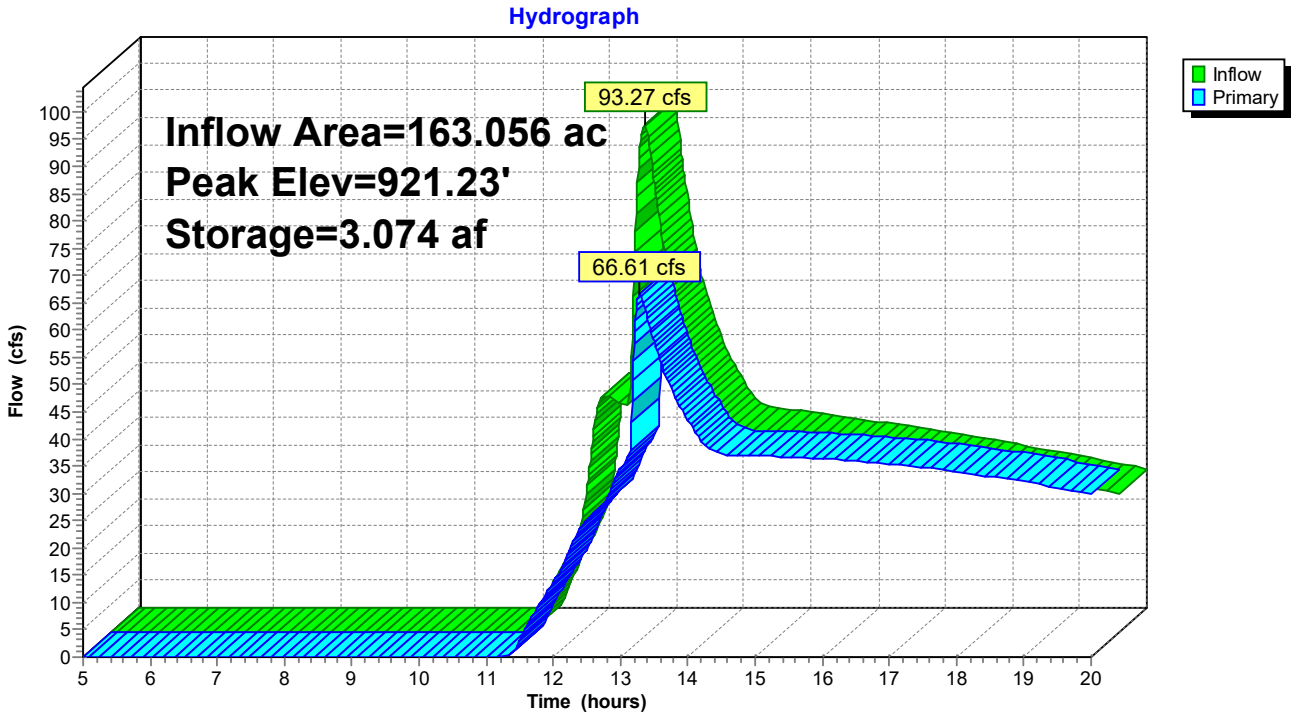
Volume	Invert	Avail.Storage	Storage Description
#1	914.00'	3.701 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.00	0.030	0.000	0.000
915.00	0.120	0.075	0.075
916.00	0.290	0.205	0.280
917.00	0.390	0.340	0.620
918.00	0.490	0.440	1.060
919.00	0.576	0.533	1.593
920.00	0.649	0.612	2.206
921.00	0.742	0.695	2.901
922.00	0.857	0.799	3.701

Device	Routing	Invert	Outlet Devices
#1	Primary	914.00'	**24.0" Round RCP_Round 24"** L= 240.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 914.00' / 909.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Primary	921.00'	**96.5' long + 4.8 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=66.28 cfs @ 13.28 hrs HW=921.23' (Free Discharge)
1=RCP_Round 24" (Inlet Controls 37.75 cfs @ 12.02 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 28.52 cfs @ 1.28 fps)

Pond 8P: Residential Depression



Summary for Pond 9P: Intersection Depression

[57] Hint: Peaked at 931.37' (Flood elevation advised)

Inflow Area = 8.048 ac, 7.77% Impervious, Inflow Depth > 1.31" for 25-Year event
Inflow = 11.56 cfs @ 12.28 hrs, Volume= 0.882 af
Outflow = 11.56 cfs @ 12.28 hrs, Volume= 0.882 af, Atten= 0%, Lag= 0.0 min
Primary = 5.94 cfs @ 12.28 hrs, Volume= 0.461 af
Routed to Pond 8P : Residential Depression
Secondary = 5.62 cfs @ 12.28 hrs, Volume= 0.420 af
Routed to Link 6L : Elkhart Lake

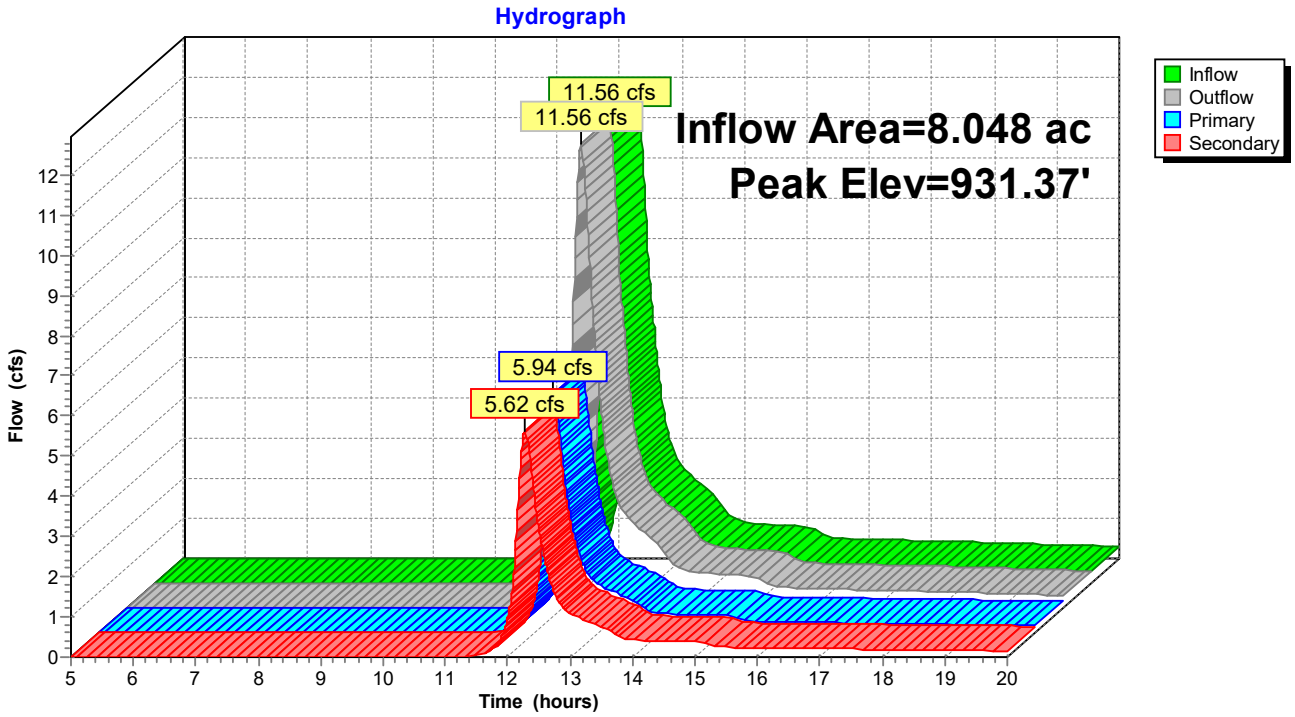
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 931.37' @ 12.28 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	930.00'	**18.0" Round CMP_Round 18"** L= 40.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0250 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf
#2	Secondary	930.00'	**18.0" Round CMP_Round 18"** L= 52.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0192 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=5.94 cfs @ 12.28 hrs HW=931.37' (Free Discharge)
1=CMP_Round 18" (Inlet Controls 5.94 cfs @ 3.51 fps)

Secondary OutFlow Max=5.62 cfs @ 12.28 hrs HW=931.37' (Free Discharge)
2=CMP_Round 18" (Barrel Controls 5.62 cfs @ 4.37 fps)

Pond 9P: Intersection Depression



Summary for Pond 11P: Wooded Pond

Inflow Area = 15.297 ac, 4.31% Impervious, Inflow Depth > 1.06" for 25-Year event
Inflow = 12.03 cfs @ 12.52 hrs, Volume= 1.345 af
Outflow = 10.08 cfs @ 12.68 hrs, Volume= 1.318 af, Atten= 16%, Lag= 9.7 min
Primary = 10.08 cfs @ 12.68 hrs, Volume= 1.318 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 954.15' @ 12.68 hrs Surf.Area= 1.307 ac Storage= 0.188 af

Plug-Flow detention time= 20.4 min calculated for 1.318 af (98% of inflow)
Center-of-Mass det. time= 13.4 min (854.0 - 840.6)

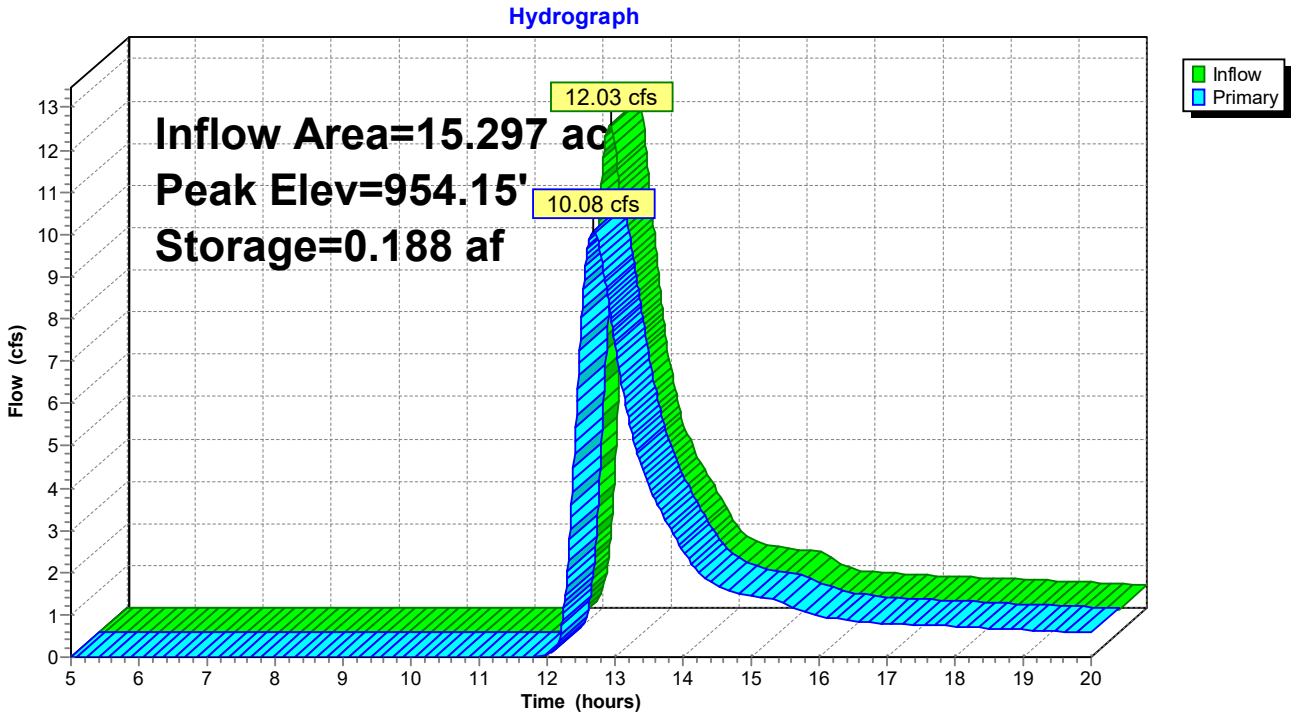
Volume	Invert	Avail.Storage	Storage Description
#1	954.00'	1.395 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
954.00	1.270	0.000	0.000
955.00	1.520	1.395	1.395

Device	Routing	Invert	Outlet Devices
#1	Primary	954.00'	**70.0' long + 9.0 '/' SideZ x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=10.08 cfs @ 12.68 hrs HW=954.15' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 10.08 cfs @ 0.97 fps)

Pond 11P: Wooded Pond

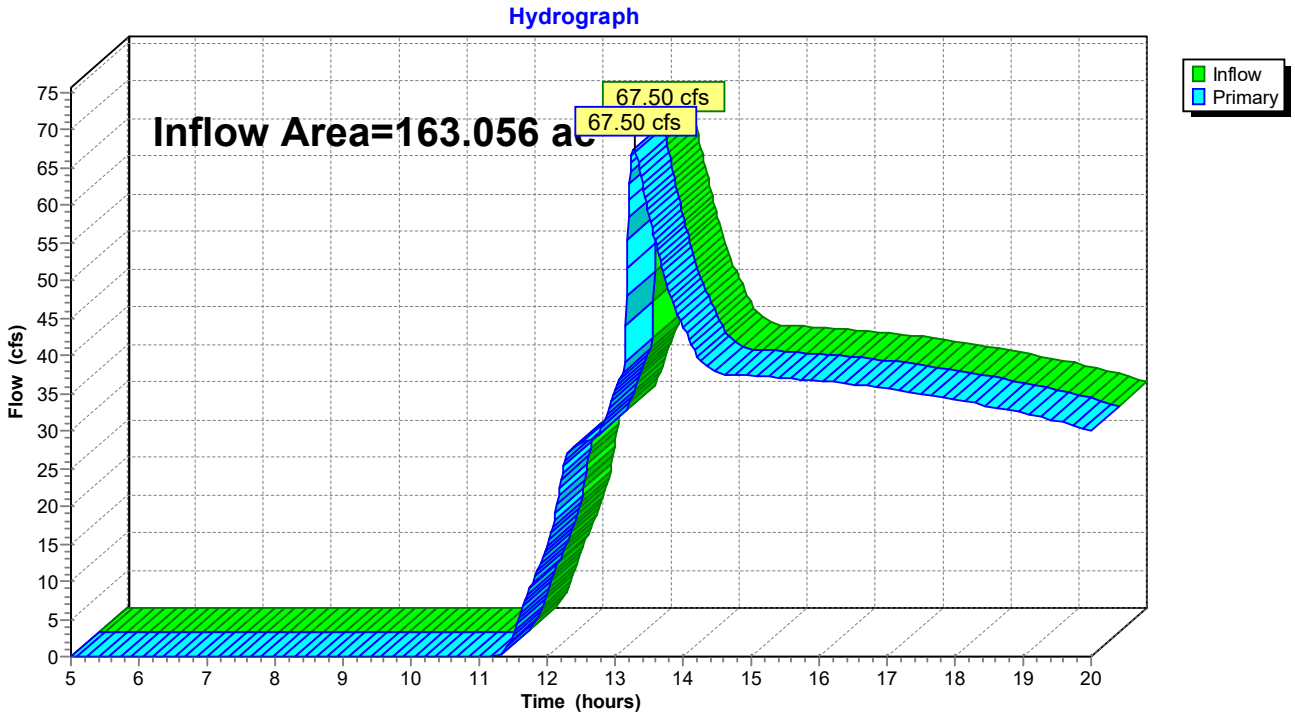


Summary for Link 6L: Elkhart Lake

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 1.80" for 25-Year event
Inflow = 67.50 cfs @ 13.28 hrs, Volume= 24.418 af
Primary = 67.50 cfs @ 13.28 hrs, Volume= 24.418 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Link 6L: Elkhart Lake



Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SWS 1: SSWS 1 Runoff Area=6.488 ac 22.13% Impervious Runoff Depth>3.00"
Flow Length=781' Tc=17.0 min CN=70 Runoff=22.35 cfs 1.624 af

Subcatchment SWS 2: SSWS 2 Runoff Area=2.892 ac 17.12% Impervious Runoff Depth>3.21"
Flow Length=680' Tc=9.5 min CN=72 Runoff=13.73 cfs 0.773 af

Subcatchment SWS 3: SSWS 3 Runoff Area=8.048 ac 7.77% Impervious Runoff Depth>2.44"
Flow Length=1,413' Tc=17.1 min CN=64 Runoff=22.28 cfs 1.638 af

Subcatchment SWS 4: SSWS 4 Runoff Area=54.687 ac 6.14% Impervious Runoff Depth>4.19"
Flow Length=3,302' Tc=37.4 min CN=82 Runoff=171.04 cfs 19.099 af

Subcatchment SWS 5: SSWS 5 Runoff Area=4.412 ac 0.00% Impervious Runoff Depth>4.87"
Flow Length=300' Tc=11.0 min CN=88 Runoff=28.24 cfs 1.792 af

Subcatchment SWS 6: SSWS 6 Runoff Area=15.297 ac 4.31% Impervious Runoff Depth>2.07"
Flow Length=1,367' Tc=32.3 min CN=60 Runoff=25.31 cfs 2.642 af

Subcatchment SWS 7: SSWS 7 Runoff Area=71.232 ac 0.35% Impervious Runoff Depth>4.80"
Flow Length=3,349' Tc=65.4 min CN=88 Runoff=177.75 cfs 28.491 af

Pond 3P: P-Trap Peak Elev=975.81' Storage=13.839 af Inflow=177.75 cfs 28.491 af
Outflow=95.28 cfs 19.844 af

Pond 4P: Woody Depression Peak Elev=933.94' Storage=4.782 af Inflow=209.85 cfs 42.231 af
Outflow=200.02 cfs 40.379 af

Pond 5P: Seasonal Farm Pond Peak Elev=973.61' Storage=1.185 af Inflow=28.24 cfs 1.792 af
Outflow=4.14 cfs 0.685 af

Pond 7P: Project Wetland Peak Elev=920.04' Storage=1.560 af Inflow=207.51 cfs 42.003 af
Outflow=182.50 cfs 40.718 af

Pond 8P: Residential Depression Peak Elev=921.64' Storage=3.399 af Inflow=188.98 cfs 42.345 af
Outflow=175.17 cfs 40.195 af

Pond 9P: Intersection Depression Peak Elev=933.45' Inflow=22.28 cfs 1.638 af
Primary=11.61 cfs 0.854 af Secondary=10.67 cfs 0.784 af Outflow=22.28 cfs 1.638 af

Pond 11P: Wooded Pond Peak Elev=954.25' Storage=0.324 af Inflow=25.31 cfs 2.642 af
Outflow=22.79 cfs 2.603 af

Link 6L: Elkhart Lake Inflow=177.61 cfs 40.979 af
Primary=177.61 cfs 40.979 af

Total Runoff Area = 163.056 ac Runoff Volume = 56.058 af Average Runoff Depth = 4.13"
95.82% Pervious = 156.233 ac 4.18% Impervious = 6.823 ac

Summary for Subcatchment SWS 1: SSWS 1

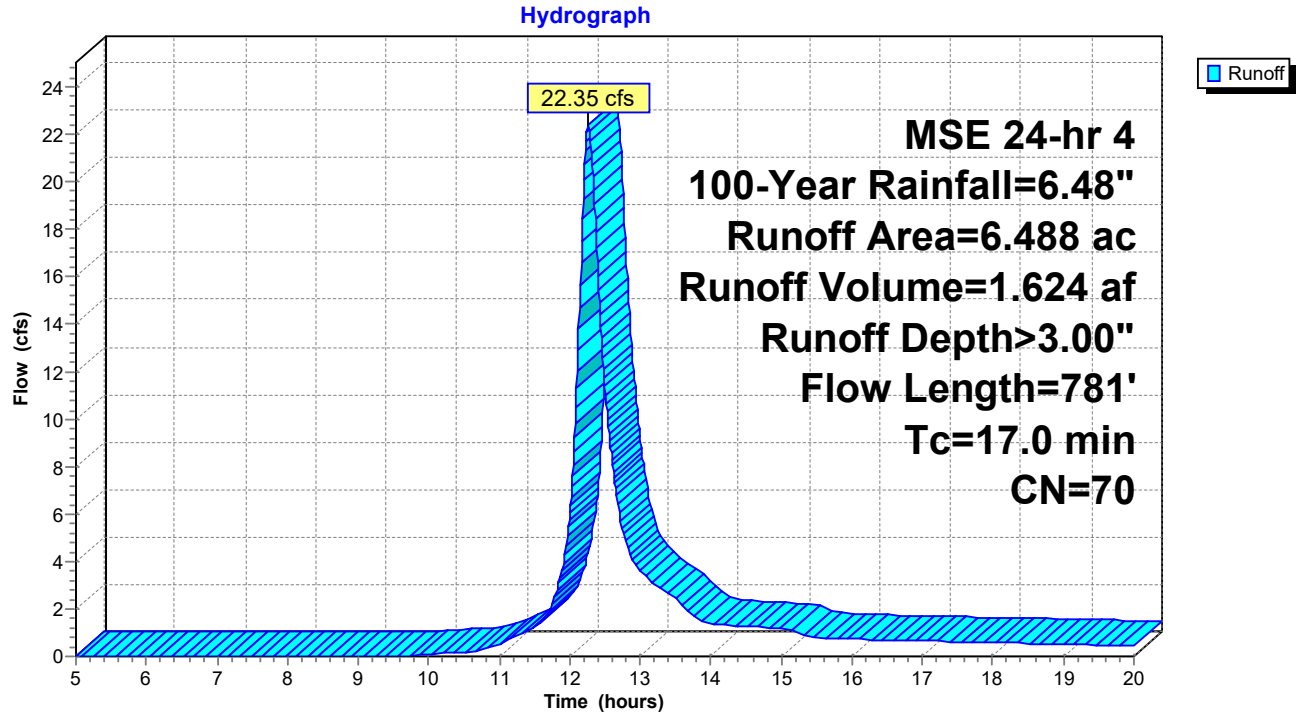
Runoff = 22.35 cfs @ 12.26 hrs, Volume= 1.624 af, Depth> 3.00"
Routed to Pond 7P : Project Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	0.891	98	Paved Road, HSG B
*	2.638	68	Residential 1 acre, HSG B
*	0.096	75	Residential 1/4 acre, HSG B
*	0.545	98	Water, HSG B
*	2.318	55	Woods Good, HSG B
	6.488	70	Weighted Average
	5.052		77.87% Pervious Area
	1.436		22.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	699	0.0558	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	81	0.0984	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.57"
17.0	781	Total			

Subcatchment SWS 1: SSWS 1



Summary for Subcatchment SWS 2: SSWS 2

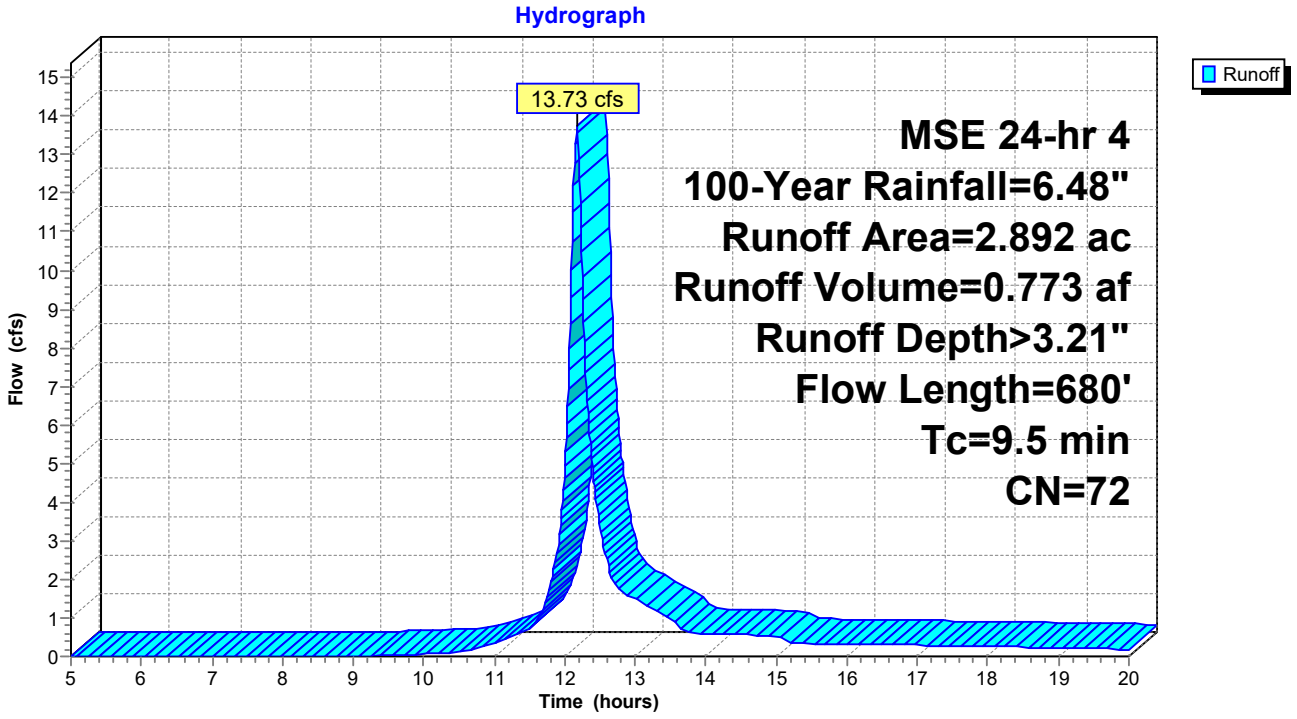
Runoff = 13.73 cfs @ 12.17 hrs, Volume= 0.773 af, Depth> 3.21"
Routed to Pond 8P : Residential Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	0.495	98	Paved Road, HSG B
*	2.073	68	Residential 1 acre, HSG B
*	0.021	75	Residential 1/4 acre, HSG B
*	0.303	55	Woods Good, HSG B
	2.892	72	Weighted Average
	2.397		82.88% Pervious Area
	0.495		17.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	580	0.0638	3.79		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.0	100	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
9.5	680	Total			

Subcatchment SWS 2: SSWS 2



Summary for Subcatchment SWS 3: SSWS 3

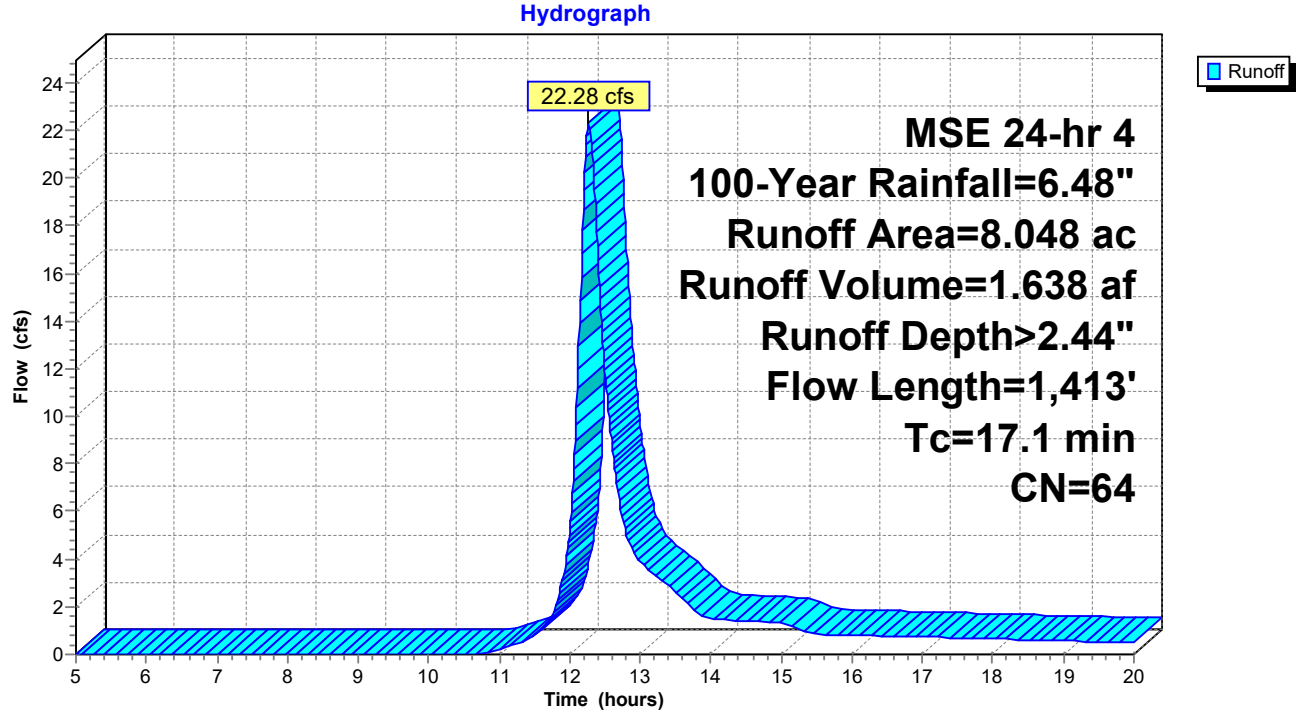
Runoff = 22.28 cfs @ 12.26 hrs, Volume= 1.638 af, Depth> 2.44"
Routed to Pond 9P : Intersection Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	3.177	58	Meadow, HSG B
*	0.625	98	Paved Road, HSG B
*	0.178	75	Residential 1/4 acre, HSG B
*	2.016	65	Residential 2 acre, HSG B
*	2.052	60	Woods Fair, HSG B
	8.048	64	Weighted Average
	7.423		92.23% Pervious Area
	0.625		7.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	1,313	0.0640	1.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	100	0.2089	0.35		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
17.1	1,413	Total			

Subcatchment SWS 3: SSWS 3



Summary for Subcatchment SWS 4: SSWS 4

[47] Hint: Peak is 492% of capacity of segment #1

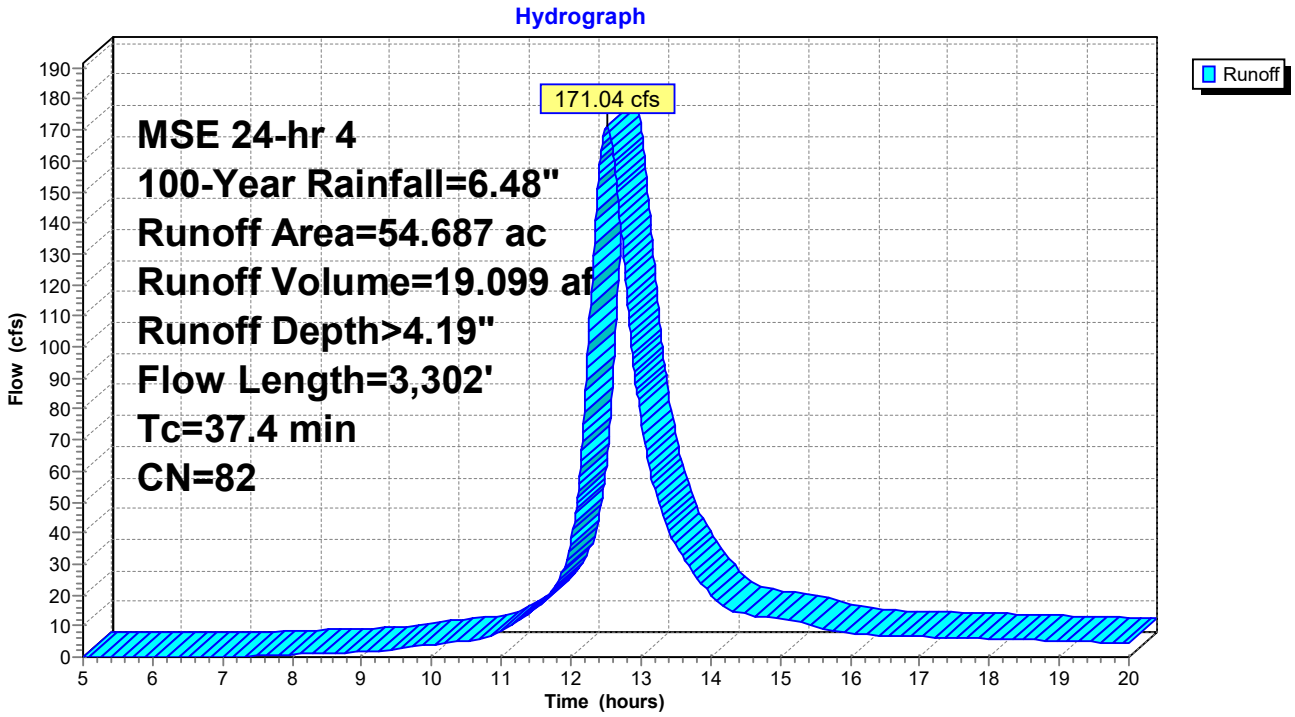
Runoff = 171.04 cfs @ 12.51 hrs, Volume= 19.099 af, Depth> 4.19"
Routed to Pond 4P : Woody Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	1.520	74	Farmstead, HSG B
*	2.673	86	Farmstead, HSG D
*	3.850	69	Pasture, HSG B
*	1.028	84	Pasture, HSG D
*	0.150	84	Pasture, HSG D
*	11.086	84	Pasture, HSG D
*	1.697	98	Paved Road, HSG B
*	0.205	98	Paved Road, HSG D
*	0.009	98	Paved Road, HSG D
*	0.371	98	Paved Road, HSG D
*	0.655	68	Residential 1 acre, HSG B
*	1.292	84	Residential 1 acre, HSG D
*	1.537	89	Row Crop, HSG D
*	0.312	89	Row Crop, HSG D
*	15.167	89	Row Crop, HSG D
*	0.012	98	Water, HSG B
*	1.060	98	Water, HSG D
*	0.004	98	Water, HSG D
*	2.119	55	Woods Good, HSG B
*	0.487	77	Woods Good, HSG D
*	5.143	66	Woods Poor, HSG B
*	0.306	83	Woods Poor, HSG D
*	0.938	83	Woods Poor, HSG D
*	3.066	83	Woods Poor, HSG D
	54.687	82	Weighted Average
	51.329		93.86% Pervious Area
	3.358		6.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	2,000	0.0215	4.64	34.76	**Channel Flow,** Area= 7.5 sf Perim= 14.7' r= 0.51' n= 0.030
18.2	1,202	0.0150	1.10		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
12.0	99	0.0201	0.14		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
37.4	3,302	Total			

Subcatchment SWS 4: SSWS 4



Summary for Subcatchment SWS 5: SSWS 5

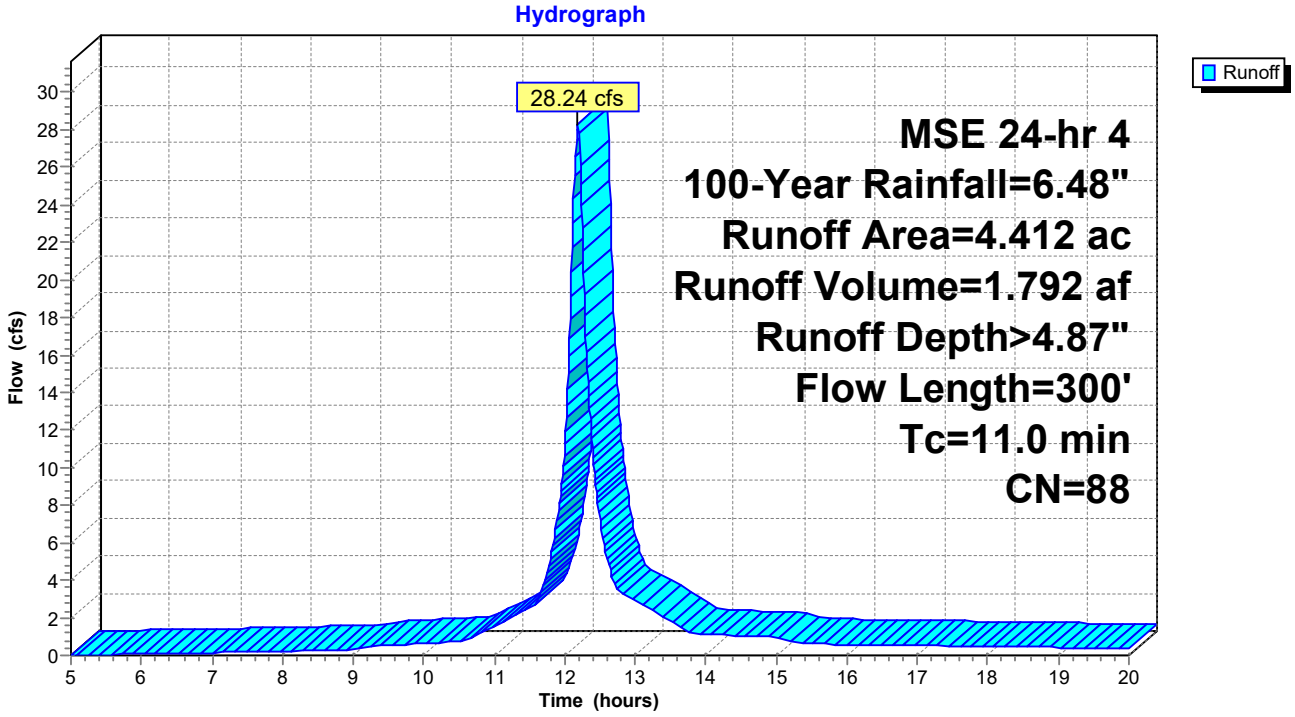
Runoff = 28.24 cfs @ 12.18 hrs, Volume= 1.792 af, Depth> 4.87"
Routed to Pond 5P : Seasonal Farm Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	3.792	89	Row Crop, HSG D
*	0.620	83	Woods Poor, HSG D
	4.412	88	Weighted Average
	4.412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	205	0.0779	2.51		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
9.6	95	0.0317	0.16		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
11.0	300	Total			

Subcatchment SWS 5: SSWS 5



Summary for Subcatchment SWS 6: SSWS 6

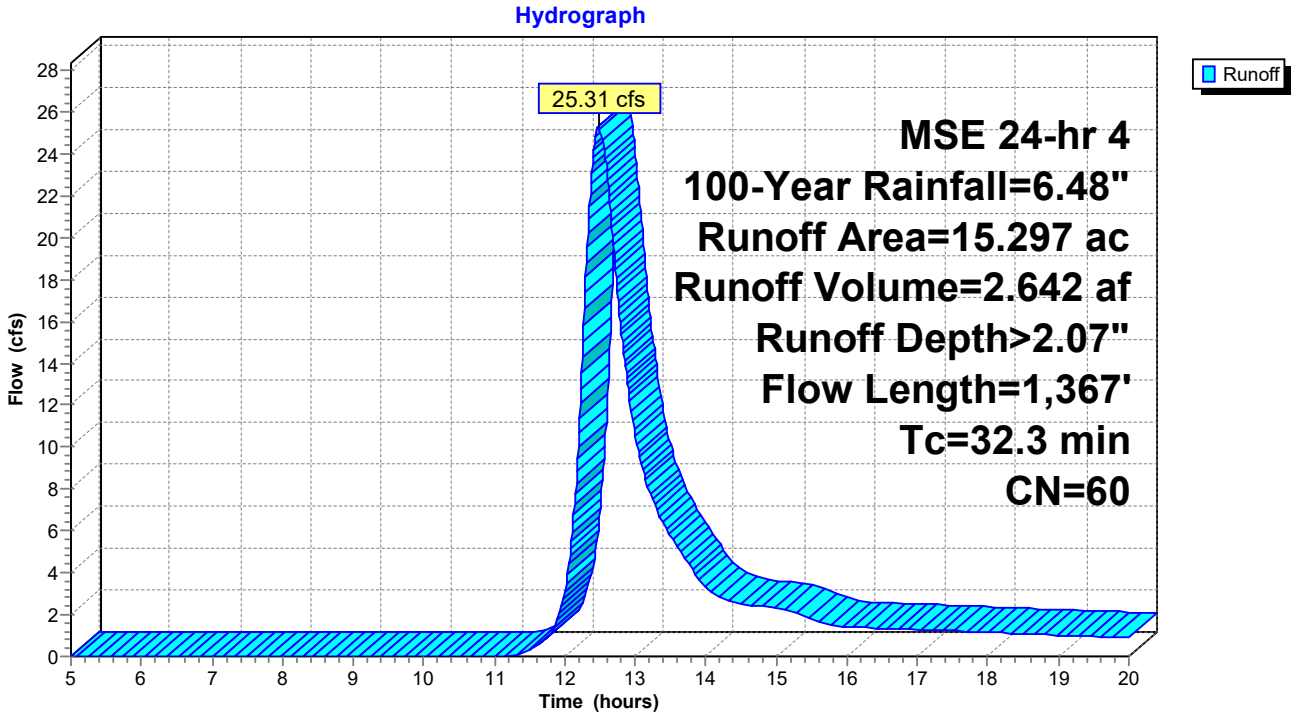
Runoff = 25.31 cfs @ 12.49 hrs, Volume= 2.642 af, Depth> 2.07"
Routed to Pond 11P : Wooded Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	14.428	58	Meadow, HSG B
*	0.659	98	Paved Road, HSG B
*	0.173	65	Residential 2 acre, HSG B
*	0.037	60	Woods Fair, HSG B
	15.297	60	Weighted Average
	14.638		95.69% Pervious Area
	0.659		4.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	1,267	0.0158	0.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.3	100	0.2808	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
32.3	1,367	Total			

Subcatchment SWS 6: SSWS 6



Summary for Subcatchment SWS 7: SSWS 7

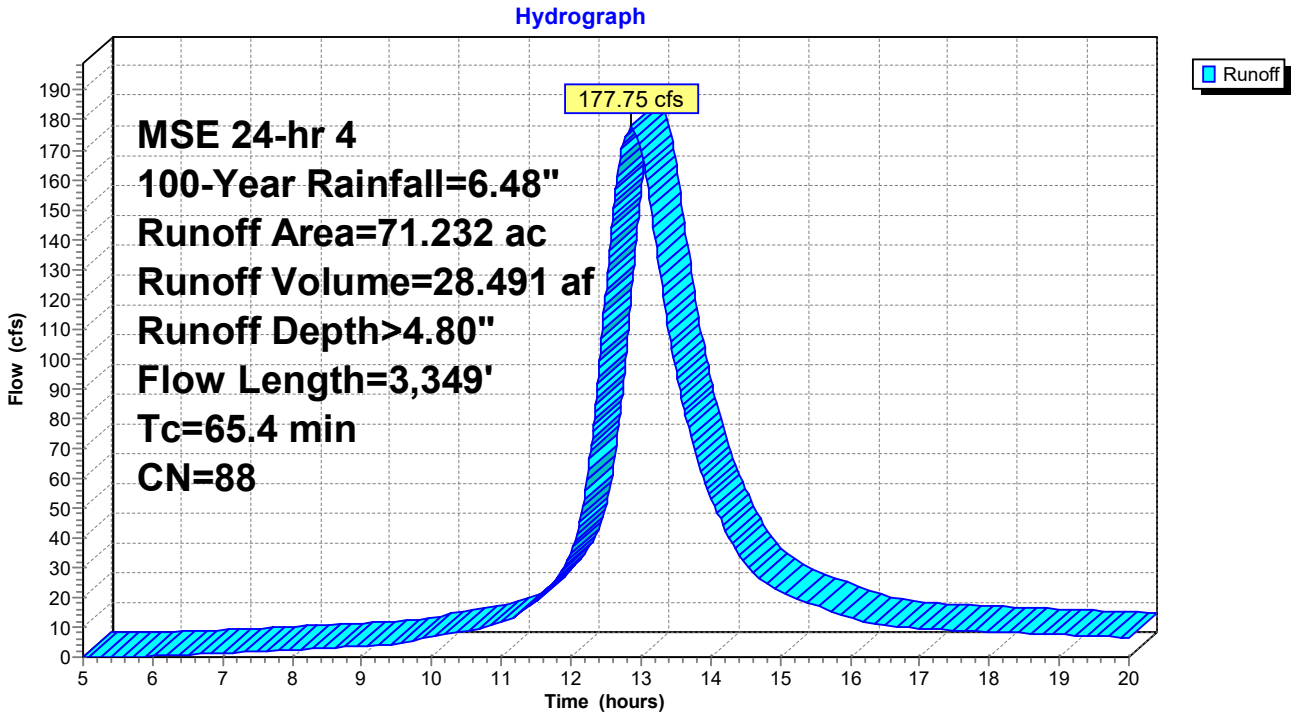
Runoff = 177.75 cfs @ 12.86 hrs, Volume= 28.491 af, Depth> 4.80"
Routed to Pond 3P : P-Trap

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Year Rainfall=6.48"

	Area (ac)	CN	Description
*	0.242	85	Gravel Road, HSG B
*	0.013	91	Gravel Road, HSG D
*	0.083	91	Gravel Road, HSG D
*	0.813	86	Farmstead, HSG D
*	2.111	86	Farmstead, HSG D
*	0.140	98	Paved Road, HSG B
*	0.071	98	Paved Road, HSG D
*	0.039	98	Paved Road, HSG D
*	0.253	84	Residential 1 acre, HSG D
*	0.102	84	Residential 1 acre, HSG D
*	1.914	84	Residential 1 acre, HSG D
*	6.429	78	Row Crop, HSG B
*	14.978	89	Row Crop, HSG D
*	8.489	89	Row Crop, HSG D
*	35.555	89	Row Crop, HSG D
	71.232	88	Weighted Average
	70.982		99.65% Pervious Area
	0.250		0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	3,249	0.0105	0.92		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.6	100	0.0902	0.25		**Sheet Flow,** Cultivated: Residue>20% n= 0.170 P2= 2.57"
65.4	3,349	Total			

Subcatchment SWS 7: SSWS 7



Summary for Pond 3P: P-Trap

Inflow Area = 71.232 ac, 0.35% Impervious, Inflow Depth > 4.80" for 100-Year event
Inflow = 177.75 cfs @ 12.86 hrs, Volume= 28.491 af
Outflow = 95.28 cfs @ 13.51 hrs, Volume= 19.844 af, Atten= 46%, Lag= 38.9 min
Primary = 95.28 cfs @ 13.51 hrs, Volume= 19.844 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 975.81' @ 13.51 hrs Surf.Area= 5.973 ac Storage= 13.839 af

Plug-Flow detention time= 153.0 min calculated for 19.830 af (70% of inflow)
Center-of-Mass det. time= 96.8 min (904.5 - 807.7)

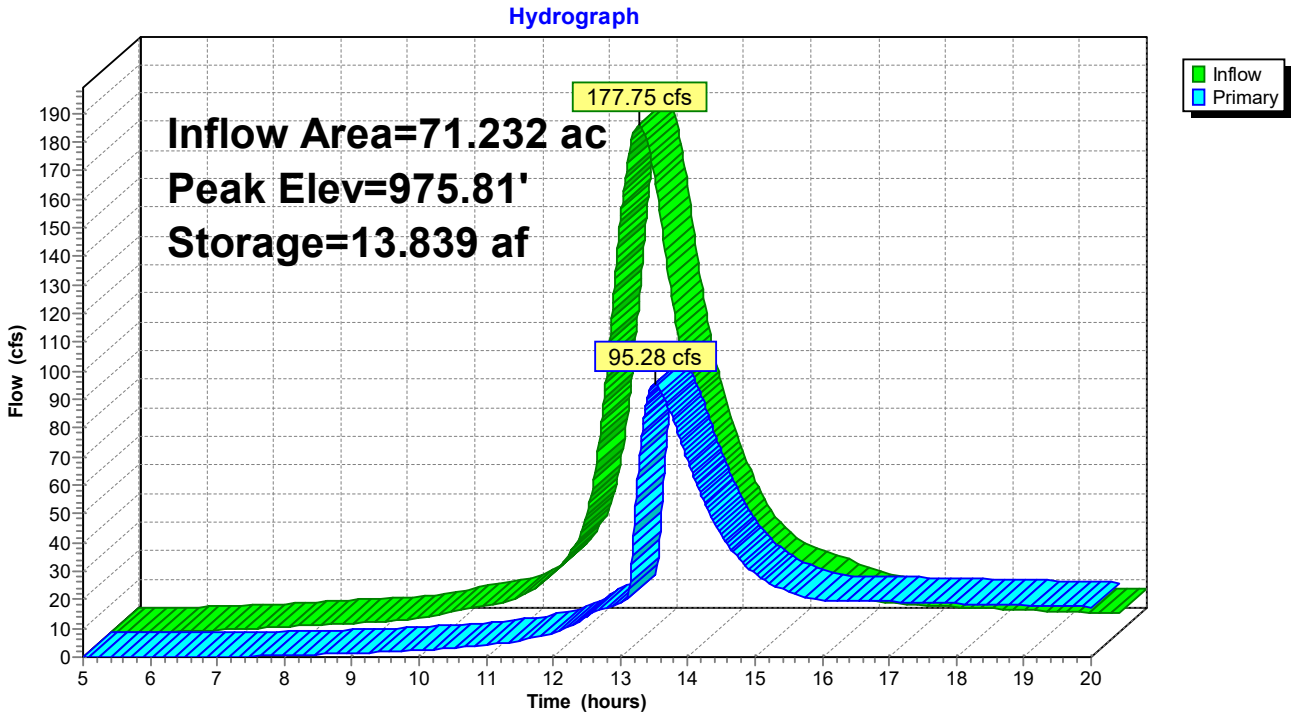
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	14.985 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.250	0.000	0.000
973.00	2.000	1.125	1.125
974.00	4.000	3.000	4.125
975.00	5.860	4.930	9.055
976.00	6.000	5.930	14.985

Device	Routing	Invert	Outlet Devices
#1	Primary	972.00'	**24.0" Round Culvert** L= 55.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 972.00' / 971.00' S= 0.0182 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	975.50'	**160.0' long + 3.0 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=95.19 cfs @ 13.51 hrs HW=975.81' (Free Discharge)
1=Culvert (Barrel Controls 21.03 cfs @ 6.70 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 74.16 cfs @ 1.49 fps)

Pond 3P: P-Trap



Summary for Pond 4P: Woody Depression

Inflow Area = 145.628 ac, 2.93% Impervious, Inflow Depth > 3.48" for 100-Year event
Inflow = 209.85 cfs @ 12.54 hrs, Volume= 42.231 af
Outflow = 200.02 cfs @ 12.64 hrs, Volume= 40.379 af, Atten= 5%, Lag= 5.6 min
Primary = 200.02 cfs @ 12.64 hrs, Volume= 40.379 af
Routed to Pond 7P : Project Wetland

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 933.94' @ 12.64 hrs Surf.Area= 1.002 ac Storage= 4.782 af

Plug-Flow detention time= 39.7 min calculated for 40.352 af (96% of inflow)
Center-of-Mass det. time= 25.0 min (876.6 - 851.6)

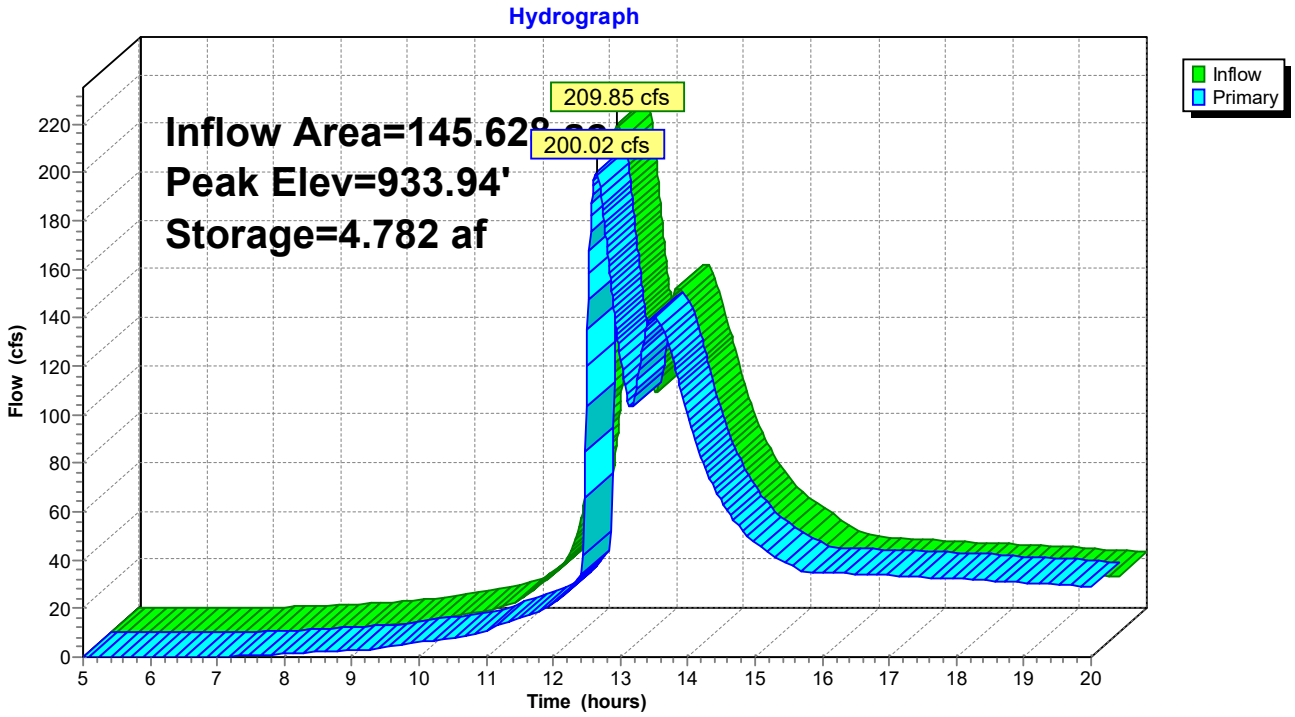
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	4.840 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.003	0.000	0.000
924.00	0.030	0.016	0.016
925.00	0.130	0.080	0.096
926.00	0.220	0.175	0.272
927.00	0.300	0.260	0.531
928.00	0.380	0.340	0.871
929.00	0.460	0.420	1.291
930.00	0.550	0.505	1.796
931.00	0.640	0.595	2.391
932.00	0.750	0.695	3.086
932.50	0.810	0.390	3.476
933.00	0.875	0.421	3.898
934.00	1.010	0.943	4.840

Device	Routing	Invert	Outlet Devices
#1	Primary	923.00'	**24.0" Round CMP_Round 24"** L= 64.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 923.00' / 922.00' S= 0.0156 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	933.00'	**66.0' long + 2.2 '/' SideZ x 22.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=199.75 cfs @ 12.64 hrs HW=933.94' (Free Discharge)
↑—**1=CMP_Round 24"** (Barrel Controls 36.86 cfs @ 11.73 fps)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 162.89 cfs @ 2.54 fps)

Pond 4P: Woody Depression



Summary for Pond 5P: Seasonal Farm Pond

Inflow Area = 4.412 ac, 0.00% Impervious, Inflow Depth > 4.87" for 100-Year event
Inflow = 28.24 cfs @ 12.18 hrs, Volume= 1.792 af
Outflow = 4.14 cfs @ 12.68 hrs, Volume= 0.685 af, Atten= 85%, Lag= 29.7 min
Primary = 4.14 cfs @ 12.68 hrs, Volume= 0.685 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 973.61' @ 12.68 hrs Surf.Area= 0.884 ac Storage= 1.185 af

Plug-Flow detention time= 203.0 min calculated for 0.685 af (38% of inflow)
Center-of-Mass det. time= 116.3 min (880.0 - 763.7)

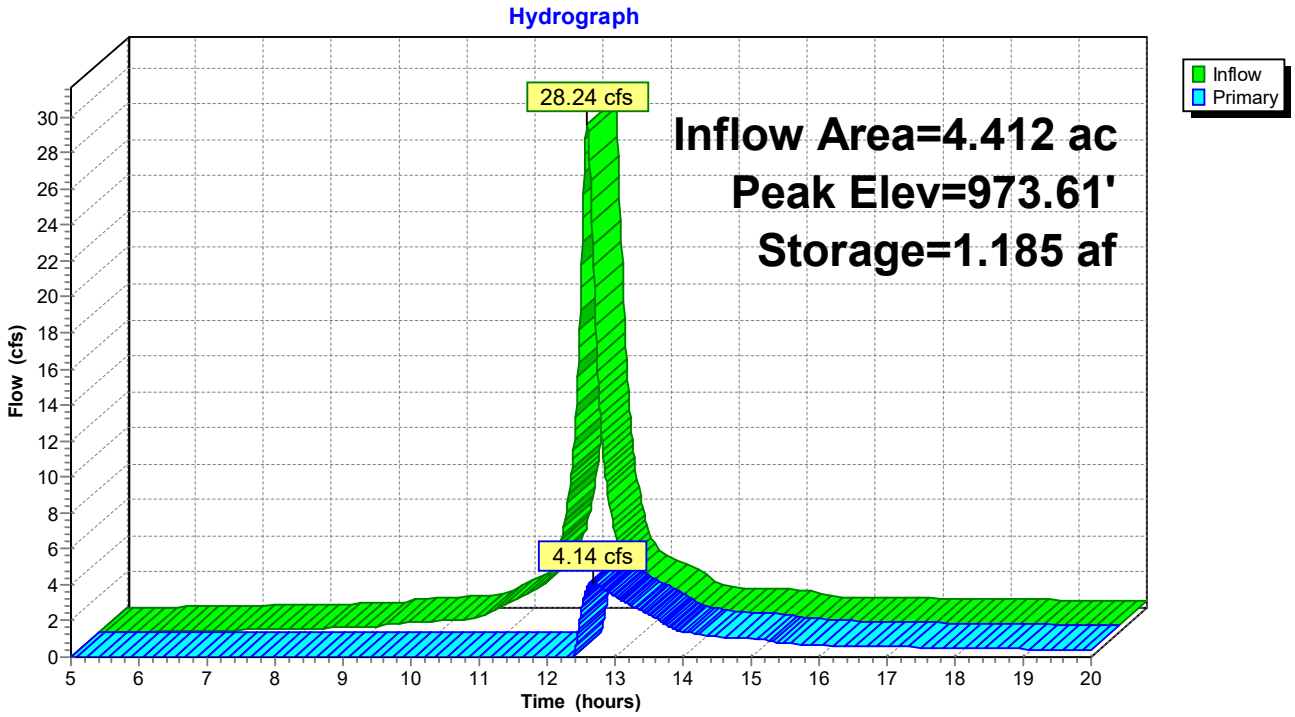
Volume	Invert	Avail.Storage	Storage Description
#1	972.00'	1.540 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
972.00	0.570	0.000	0.000
973.00	0.780	0.675	0.675
974.00	0.950	0.865	1.540

Device	Routing	Invert	Outlet Devices
#1	Primary	973.50'	**38.0' long + 28.0 '/' SideZ x 42.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.12 cfs @ 12.68 hrs HW=973.61' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 4.12 cfs @ 0.89 fps)

Pond 5P: Seasonal Farm Pond



Summary for Pond 7P: Project Wetland

[93] Warning: Storage range exceeded by 0.04'

Inflow Area = 152.116 ac, 3.75% Impervious, Inflow Depth > 3.31" for 100-Year event
Inflow = 207.51 cfs @ 12.63 hrs, Volume= 42.003 af
Outflow = 182.50 cfs @ 12.63 hrs, Volume= 40.718 af, Atten= 12%, Lag= 0.0 min
Primary = 182.50 cfs @ 12.63 hrs, Volume= 40.718 af
Routed to Pond 8P : Residential Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 920.04' @ 12.63 hrs Surf.Area= 1.060 ac Storage= 1.560 af

Plug-Flow detention time= 19.1 min calculated for 40.718 af (97% of inflow)
Center-of-Mass det. time= 9.3 min (883.0 - 873.7)

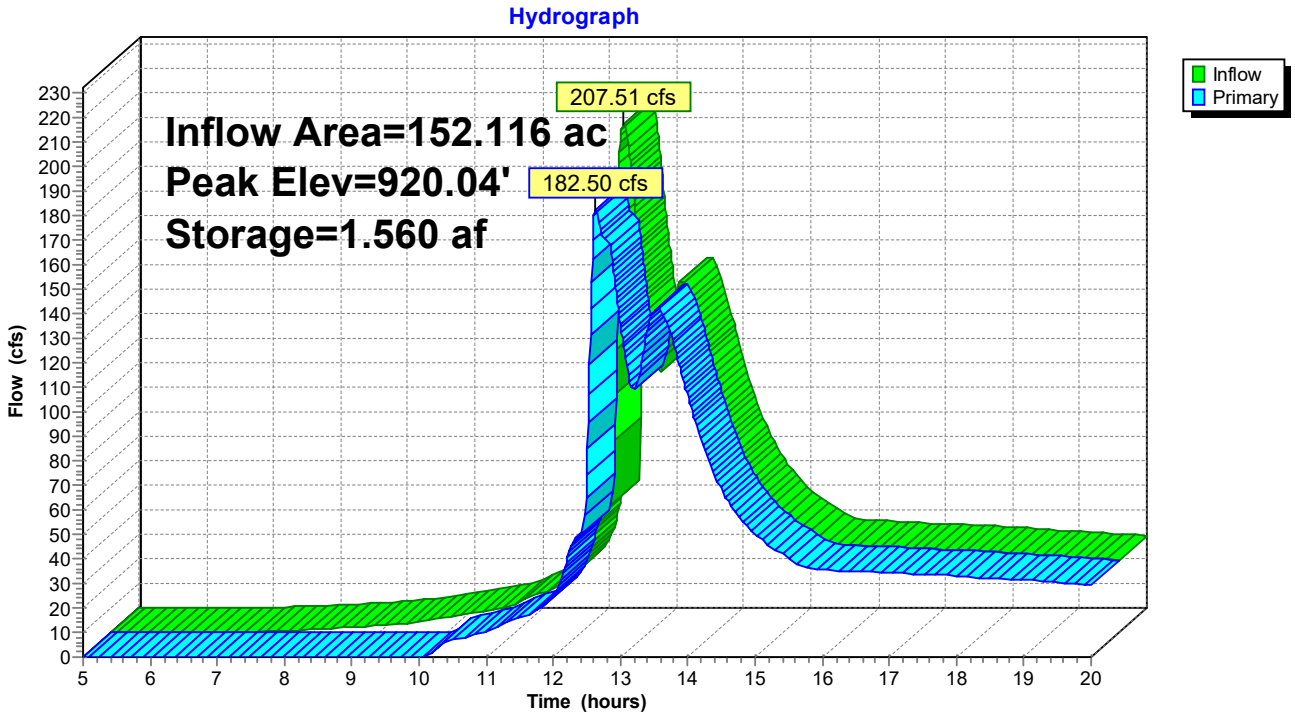
Volume	Invert	Avail.Storage	Storage Description
#1	918.00'	1.560 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.00	0.400	0.000	0.000
919.00	0.830	0.615	0.615
920.00	1.060	0.945	1.560

Device	Routing	Invert	Outlet Devices
#1	Primary	919.00'	**45.0' long + 25.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=182.49 cfs @ 12.63 hrs HW=920.04' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 182.49 cfs @ 2.48 fps)

Pond 7P: Project Wetland



Summary for Pond 8P: Residential Depression

[81] Warning: Exceeded Pond 7P by 1.67' @ 14.45 hrs

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 3.12" for 100-Year event
Inflow = 188.98 cfs @ 12.63 hrs, Volume= 42.345 af
Outflow = 175.17 cfs @ 12.81 hrs, Volume= 40.195 af, Atten= 7%, Lag= 10.9 min
Primary = 175.17 cfs @ 12.81 hrs, Volume= 40.195 af
Routed to Link 6L : Elkhart Lake

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 921.64' @ 12.81 hrs Surf.Area= 0.816 ac Storage= 3.399 af

Plug-Flow detention time= 31.7 min calculated for 40.168 af (95% of inflow)
Center-of-Mass det. time= 16.0 min (895.8 - 879.9)

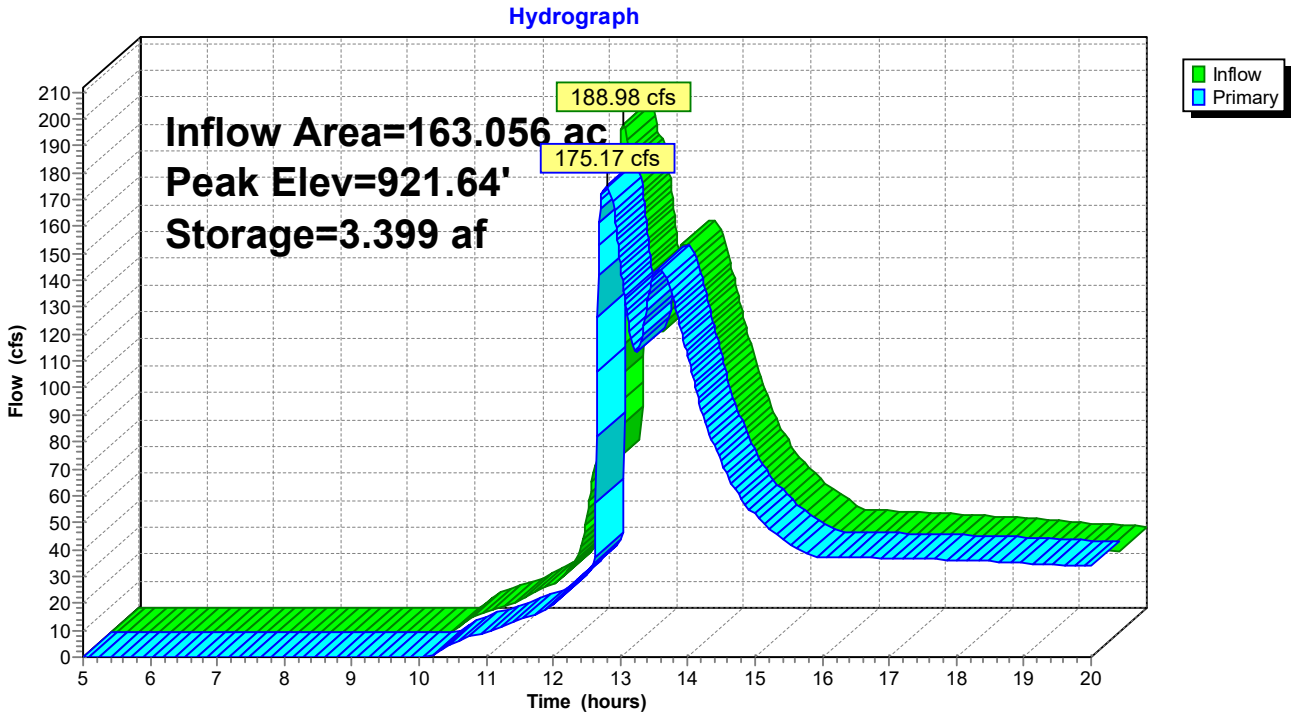
Volume	Invert	Avail.Storage	Storage Description
#1	914.00'	3.701 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.00	0.030	0.000	0.000
915.00	0.120	0.075	0.075
916.00	0.290	0.205	0.280
917.00	0.390	0.340	0.620
918.00	0.490	0.440	1.060
919.00	0.576	0.533	1.593
920.00	0.649	0.612	2.206
921.00	0.742	0.695	2.901
922.00	0.857	0.799	3.701

Device	Routing	Invert	Outlet Devices
#1	Primary	914.00'	**24.0" Round RCP_Round 24"** L= 240.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 914.00' / 909.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Primary	921.00'	**96.5' long + 4.8 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=175.01 cfs @ 12.81 hrs HW=921.64' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 38.80 cfs @ 12.35 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 136.20 cfs @ 2.14 fps)

Pond 8P: Residential Depression



Summary for Pond 9P: Intersection Depression

[57] Hint: Peaked at 933.45' (Flood elevation advised)

Inflow Area = 8.048 ac, 7.77% Impervious, Inflow Depth > 2.44" for 100-Year event
Inflow = 22.28 cfs @ 12.26 hrs, Volume= 1.638 af
Outflow = 22.28 cfs @ 12.26 hrs, Volume= 1.638 af, Atten= 0%, Lag= 0.0 min
Primary = 11.61 cfs @ 12.26 hrs, Volume= 0.854 af
Routed to Pond 8P : Residential Depression
Secondary = 10.67 cfs @ 12.26 hrs, Volume= 0.784 af
Routed to Link 6L : Elkhart Lake

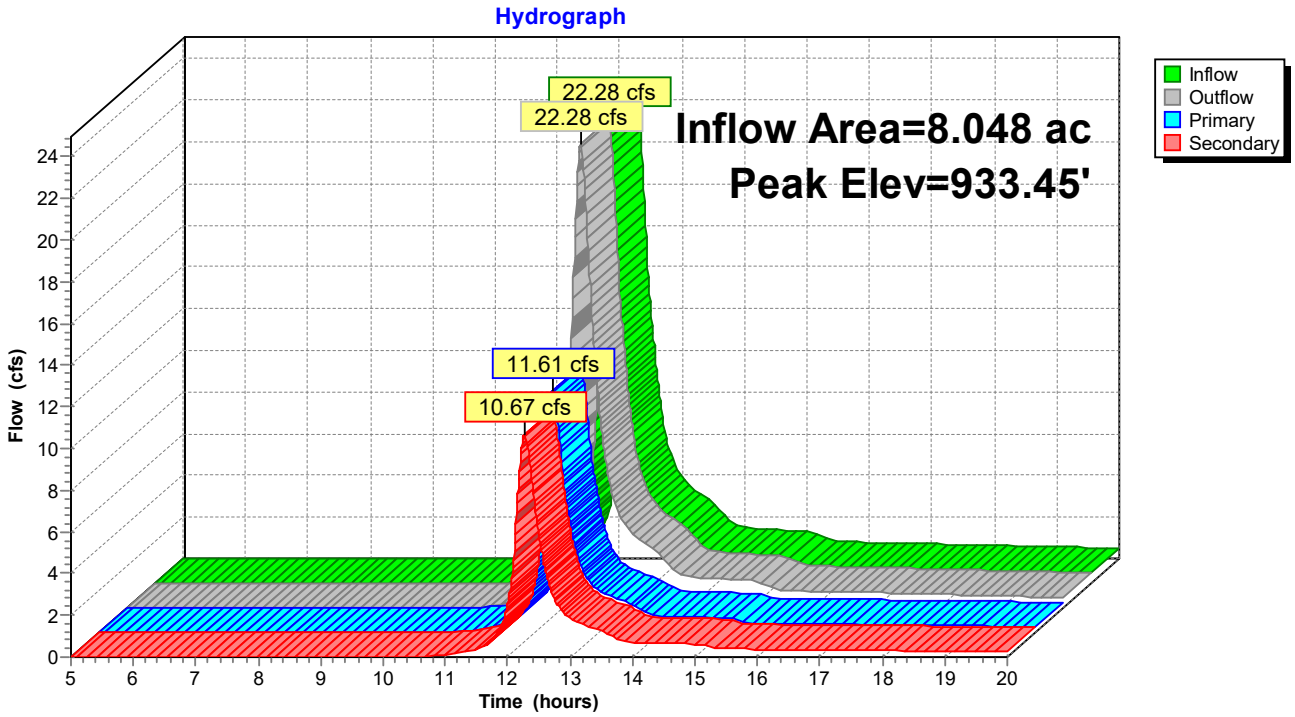
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 933.45' @ 12.26 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	930.00'	**18.0" Round CMP_Round 18"** L= 40.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0250 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf
#2	Secondary	930.00'	**18.0" Round CMP_Round 18"** L= 52.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 930.00' / 929.00' S= 0.0192 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=11.60 cfs @ 12.26 hrs HW=933.45' (Free Discharge)
↑—**1=CMP_Round 18"** (Barrel Controls 11.60 cfs @ 6.56 fps)

Secondary OutFlow Max=10.66 cfs @ 12.26 hrs HW=933.45' (Free Discharge)
↑—**2=CMP_Round 18"** (Barrel Controls 10.66 cfs @ 6.03 fps)

Pond 9P: Intersection Depression



Summary for Pond 11P: Wooded Pond

Inflow Area = 15.297 ac, 4.31% Impervious, Inflow Depth > 2.07" for 100-Year event
Inflow = 25.31 cfs @ 12.49 hrs, Volume= 2.642 af
Outflow = 22.79 cfs @ 12.61 hrs, Volume= 2.603 af, Atten= 10%, Lag= 7.5 min
Primary = 22.79 cfs @ 12.61 hrs, Volume= 2.603 af
Routed to Pond 4P : Woody Depression

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 954.25' @ 12.61 hrs Surf.Area= 1.332 ac Storage= 0.324 af

Plug-Flow detention time= 16.2 min calculated for 2.603 af (99% of inflow)
Center-of-Mass det. time= 10.9 min (838.3 - 827.4)

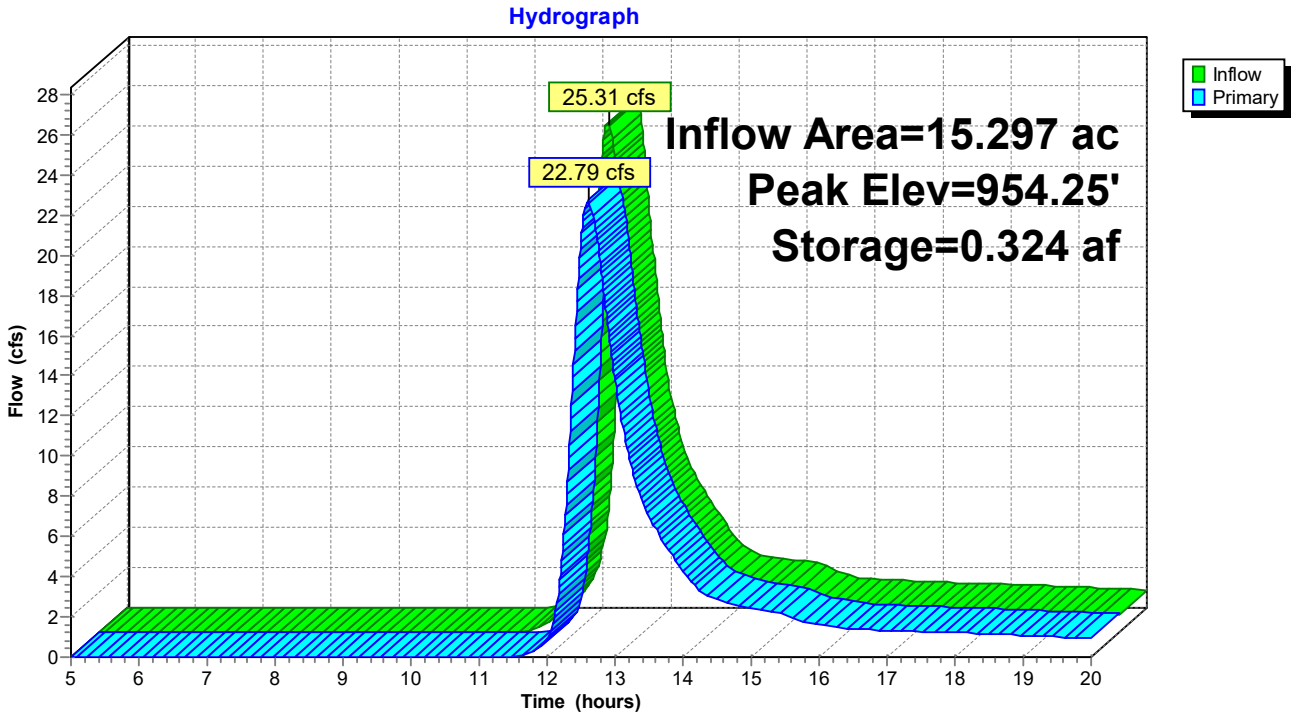
Volume	Invert	Avail.Storage	Storage Description
#1	954.00'	1.395 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
954.00	1.270	0.000	0.000
955.00	1.520	1.395	1.395

Device	Routing	Invert	Outlet Devices
#1	Primary	954.00'	**70.0' long + 9.0 '/' SideZ x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=22.79 cfs @ 12.61 hrs HW=954.25' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 22.79 cfs @ 1.27 fps)

Pond 11P: Wooded Pond

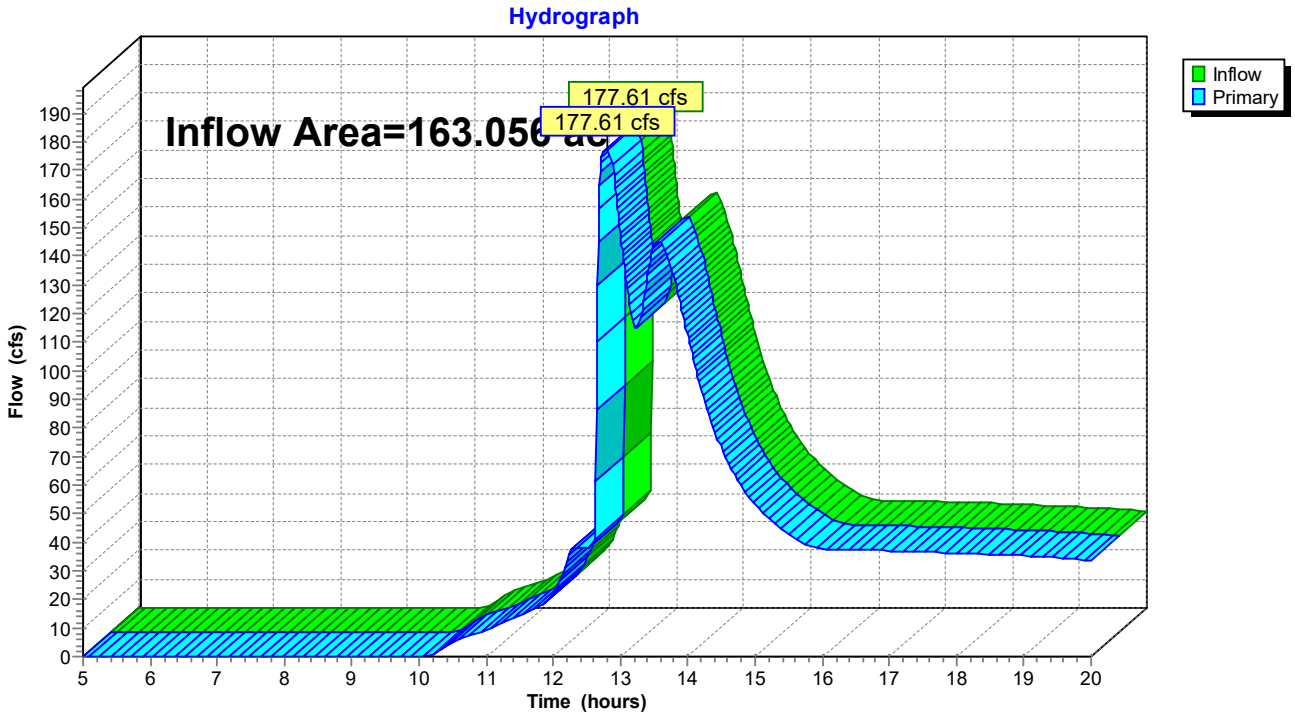


Summary for Link 6L: Elkhart Lake

Inflow Area = 163.056 ac, 4.18% Impervious, Inflow Depth > 3.02" for 100-Year event
Inflow = 177.61 cfs @ 12.79 hrs, Volume= 40.979 af
Primary = 177.61 cfs @ 12.79 hrs, Volume= 40.979 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Link 6L: Elkhart Lake




2023 ELIA
ANNUAL MEETING
Osthoff Resort
Grand Libelle Ballroom
Friday, June 9th, 2023
5:30 p.m.
KEEP
ELKHART
BLUE
Elkhart Lake
Improvement Association

AGENDA – WELCOME!

5:30 PM Registration - Social Time
6:00 PM Opening Comments and Buffet
6:30 PM Meeting Call to Order (Schott)

- Roll call (Elias)
- Approval of agenda
- Review and approval of minutes from 2022 Annual Meeting
- Public Comments from the Floor
- Treasurer's Report (Boeldt)
- Budget review and approval
- Committee Reports
  - Nominating Committee (Froh)
  - Ecology Committee
    - Aquatic Invasives/Clean Boats Clean Water (Hanlon)
    - Water Quality (Majerus, Elias)
- Public Outreach (Strigenz, Sofen)
- Website Update (Boeldt)
- President's Comments

7:00 PM Adjournment

KEEP ELKHART BLUE

- Annual Members Meeting Minutes -

Elkhart Lake Improvement Association (ELIA)

June 23, 2022

Laack's Ballroom, Johnsonville, WI

Opening Comments
John Schott – Welcoming comments were made to the group of approximately 100 attendees.

- Special mention to two Board members we have lost this past year:
  - Tom Nelson – Life Time Director
  - John Fetherston
- Board Changes –
  - Thanks were made to Joe Majerus and Awais Siddique for their service on the Board. - Joe Majerus retirement from board mid-term. Sarah Majerus appointed to fill this open position. Awais Sidique retirement from board end of term. John Steffes – proposed new board member

Presentation – Matt Brauer – Sheboygan County Planning & Conservation -discussed the AIS County Program

Call to Order – (Schott)

Roll Call - (Elias)

Membership Meeting -

1. Approval of minutes from 2021 annual meeting –
   a. It was moved and seconded to approve the minutes as presented from the 2021 Annual Meeting.
   b. Motion passed unanimously.
2. Treasurers Report – Randy Boeldt – An updated report was reviewed for the membership with the overall comment that we are in a strong financial position. Approved.

Committee Reports –

1. **Nomination of Board Members** - for 2025 term (Froh)
   a. Randy Boeldt
   b. Chris Strigenz
   c. Bill Easom
   d. John Steffes
   e. Dee Sheehan

A motion for unanimous consent approval was made and passed unanimously.

Ecology Committee –

3. **Aquatic / Clean Boat Clean Water Program** (Hanlon) – The report is that we have a capable group of young people who are staffing the boat landings and helping boaters better understand their role in Keeping Elkhart Blue through the Clean Boat program. The State continues to be very supportive in subsidizing our time which makes it possible to get as many hours put into the staffing as we can manage.

4. **Lake Water Quality** - (Majerus) -Information concerning weed abatement and algae treatment was presented. Additional information concerning the recent award of a $10,000 County Stewardship grant was discussed as was its use to help us develop our updated Lake Management Plan. In conjunction with reserve funds donated for the purpose of lake management activities, we are looking at gathering additional data concerning our watershed area, inputs to the lake, and coordinating what the county and Lakeshore Natural Resource Partnership, to develop an assessment for the entire Sheboygan River basin, of which we are a part. The level of boating activity was brought forward and the current record of citations and warnings was presented. There was a question as to the concerns being addressed by Crystal and Little Elkhart to address heavy wave activity. Spring 2022 Fish Survey results were shared.

   Shared a summary of the Point Intercept Survey figure with 954 sampling points, a 35 meters sampling interval, and the rake used to collect samples. Results include the number of vegetated sites in 2012 compared to 2021.

5. **Public Outreach - Keep Elkhart Blue** (Strigenz, Sofen) – The role of merchandizing products to help promote our ELIA message to the public was reviewed by Chris. While we make money from the sales, the key point for us to build awareness of who we are and what we do. We also have an active social media presence with a FaceBook page that is frequently updated. We will be staffing a booth on Monday, Aug 9th, for Down Town night. Merchandise samples were shared and purchasing locations.

   QR Code brand awareness was introduced and placed in local businesses.

6. **Website update** - (Elias/Boeldt) -Randy reviewed the current status of our website and outlined the general content available to those who get to our page, and it is an extensive listing!President's comments - (Schott)

Adjourn – Motion was made to adjourn. Motion carried – meeting adjourned at 6:50pm.

12:21 PM
06/04/23
Cash Basis

Elkhart Lake Improvement Association Incorporated
Financial Report/Balance Sheet
As of June 4, 2023

		Jun 4, 23
ASSETS		
Current Assets		
Checking/Savings		
Marketable Securities		
Vanguard Federal Money Market		
Restricted Funds		
Andy Jung Memorial	12,135.00	
Catharine Stayer Fam.Foundation	38,302.89	
Mike Sheehan Memorial	1,487.53	
Total Restricted Funds		51,925.42
Vanguard Federal Money Market - ...		82,073.47
Total Vanguard Federal Money Market		133,998.89
Western Union		
Western Union Cost	14,684.72	
W.U. Unrealized Gain (Loss)	(926.53)	
Total Western Union		13,758.19
Total Marketable Securities		147,757.08
National Exchange Bank & Trust		16,660.23
Total Checking/Savings		164,417.31
Total Current Assets		164,417.31
TOTAL ASSETS		**164,417.31**
LIABILITIES & EQUITY		0.00

KEEP ELKHART BLUE

06/04/23
Cash Basis

Elkhart Lake Improvement Association Incorporated
Budget vs. Actual Income/Expenses
January 1 through June 4, 2023

	Jan 1 - Jun 4, 23	Proposed Budget
Income		
Direct Public Support		
Individual Contributions	7,309.36	16,000.00
Membership Dues Paid	5,200.00	8,000.00
Prepaid PayPal Fees	88.33	100.00
Total Direct Public Support	12,597.69	24,100.00
Government Grants		
Sheboygan County Stewardship	0.00	10,900.00
Lakeshore Natural Resource Part	4,613.98	4,613.98
E.L. Tourism Commission	0.00	1,500.00
Town of Rhine	0.00	1,000.00
Village of Elkhart Lake	0.00	3,550.00
WI DNR		
Clean Boats / Clean Water	1,737.50	3,200.00
LPL185723 - Shoreland RD	0.00	10,000.00
LPT76923 - Osthoff & PE	0.00	2,190.00
LPT79423-Schaff Prairie Restore	11,550.00	46,200.00
Total WI DNR	13,287.50	61,590.00
Total Government Grants	17,901.48	83,153.98
Investments		
Interest & Dividends	2,880.42	3,000.00
Unrealized Gain (Loss)	27.46	0.00
Total Investments	2,907.88	3,000.00
Other Types of Income		
Amazon Smile/Miscellaneous Rev	77.08	0.00
Bring in Stayer Foundation Money from Reserves		20,658.77
Total Other Types of Income	77.08	20,658.77
Program Income		
Keep Elkhart Blue Sales	311.00	2,000.00
Total Program Income	311.00	2,000.00
Total Income	33,795.13	132,912.75
Expense		
Boating Safety		
Boat Maintenance & Storage	452.38	500.00
Boat Registration	0.00	32.00
Boating Regulation Brochures	0.00	300.00
Bouys - New and Maintenance	71.20	500.00
Total Boating Safety	523.58	1,332.00
Business Expenses		
501 (c)(3) Registration Fees	0.00	80.00
Insurance - Liability, D and O	558.00	1,200.00
Technology/Website	29.00	500.00
Total Business Expenses	587.00	1,780.00

06/04/23
Cash Basis

Elkhart Lake Improvement Association Incorporated
Budget vs. Actual Income/Expenses
January 1 through June 4, 2023

	Jan 1 - Jun 4, 23	Proposed Budget
Contract Services		
Attorney Fees	0.00	250.00
Clean Boats / Clean Water	0.00	2,600.00
Invasive Weed Control	2,060.64	10,000.00
Police Water Patrol	4,423.03	4,424.00
Water Quality Testing	0.00	2,000.00
Watershed Study-Lake Planning		
Management Plan	3,296.75	3,296.75
LPL185723-Shoreland RD	0.00	35,900.00
LPT76923-Plantings Osthoff & PE	0.00	2,920.00
LPT79423-Schaff Prairie Restore	0.00	46,200.00
Total Watershed Study-Lake Planning	3,296.75	88,316.75
Total Contract Services	9,780.42	107,590.75
Operations		
Community Outreach		
Andy Jung Memorial	0.00	12,135.00
Booths/Events	25.00	150.00
ELIA Brochures	0.00	300.00
Keep Elkhart Blue Promotions	795.15	2,250.00
Parade & Fireworks	0.00	1,000.00
Total Community Outreach	820.15	15,835.00
Meetings		
Board of Directors	0.00	100.00
General Membership	3,900.00	4,500.00
Total Meetings	3,900.00	4,600.00
Office Supplies	50.69	150.00
Organizational Memberships		
Chamber of Commerce	0.00	175.00
Glacial Lakes Conservancy	0.00	250.00
Wisconsin Lakes	0.00	500.00
Total Organizational Memberships	0.00	925.00
Postage, Mailing Service	68.00	200.00
Total Operations	4,838.84	21,710.00
PayPal Fees	155.16	200.00
Travel and Conferences		
Conferences	0.00	150.00
Travel Expenses	0.00	150.00
Total Travel and Conferences	0.00	300.00
Total Expense	15,885.00	132,912.75
Net Income	17,910.13	0.00

2024-2025 Board Roster (3-year Terms)

Board Members	Term Expires
Mike Froh	2024
Rick Gebhardt	2024
Kim Elias	2024
Sarah Majerus	2024
Mary Jo Vollrath	2024
Randy Boeldt	2025
Chris Strigenz	2025
Bill Easom	2025
John Steffes	2025
Dee Sheehan	2025
Peter Gunther	2026
Kevin Sofen	2026
Nancy Hanlon	2026
Lauren Hall	2026
John Schott	2026

2024-2025 Officers (Annual Election)

Executive Committee	
John Schott	President
Chris Strigenz	Vice President
Kim Elias	Secretary
Randy Boeldt	Treasurer

KEEP ELKHART BLUE

Elkhart Lake Improvement Association

Ecology Committee Updates:

- Aquatic Invasive Species
- Clean Boats Clean Waters
- Comprehensive Lake Management Plan
- Grant Projects
- Water Quality Report

KEEP ELKHART BLUE

2022 Elkhart Lake Public Survey

- 140+ total respondents – THANK YOU!
  - 70% live along the lake shoreline
  - 60% are seasonal residents
  - 69% are ELIA members
- Lake is most utilized for swimming and boating, fishing, wildlife viewing, scenic viewing, entertaining, and solitude
- Majority of respondents report that algae, aquatic plants, and shoreline development has either somewhat or greatly increased over time
- Only 11 percent of respondents reported that aquatic plants and algae never impact their use of Elkhart Lake
- Comments/Concerns:
  - Water Quality and Runoff
  - Boat Traffic and Wake Boats
  - Fishery

KEEP ELKHART BLUE

Elkhart Lake Improvement Association

2022 Comprehensive Lake Management Plan Recommendations

- Continue to monitor the lake water quality
- Continue to monitor dissolved oxygen
- Take sediment cores in the lake to evaluate legacy phosphorus in lake sediment
- Continue Clean Boat Clean Waters (CBCW) program to prevent the spread of AIS*
- Continue efforts to control the spread of AIS
- Perform aquatic plant inventory every 5 years to evaluate the success of AIS control efforts
- Continue WDNR fish survey efforts
- Implement fish habitat improvement projects (fish sticks and tree drops)
- Implement small-scale shoreline projects that capture surface water runoff and promote native habitat*

Stantec LNRP SHEBOYGAN COUNTY WISCONSIN KEEP ELKHART BLUE Elkhart Lake Improvement Association

2022 Comprehensive Lake Management Plan Recommendations

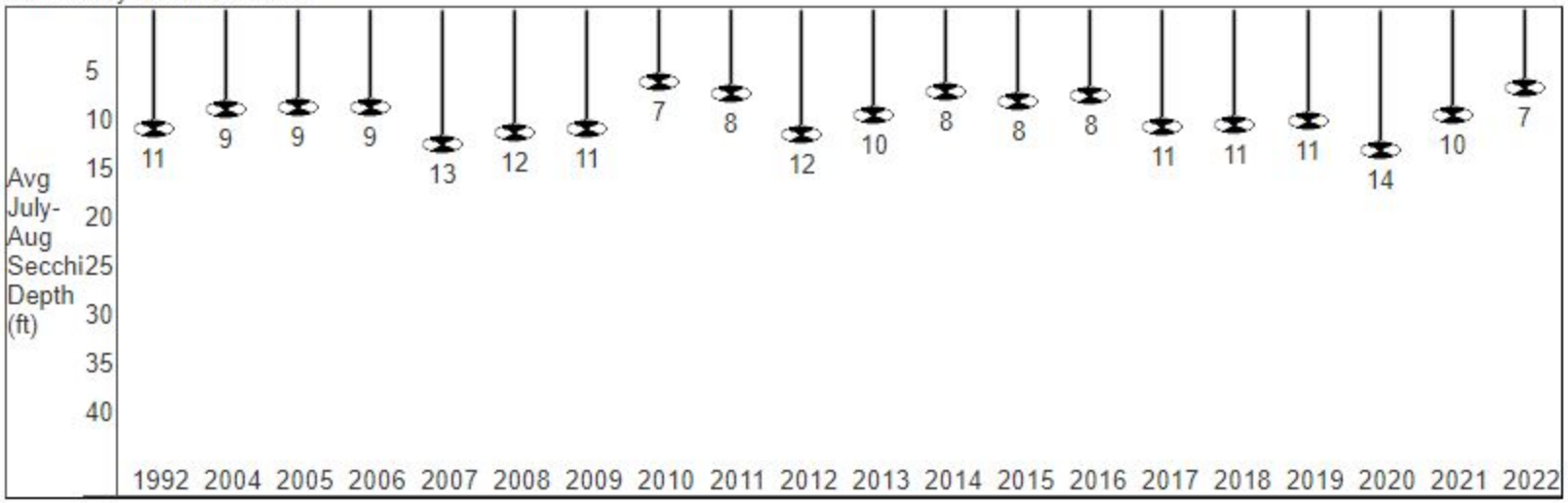
- Continue to support efforts by partners at Sheboygan County and NRCS to implement conservation practices on agricultural lands (no till, cover crops, pollinator habitat)
- Convert marginal farmland to native habitat*
- Build upon Sheboygan County efforts to reduce peak flows and phosphorus loading via design and construction of stormwater management solutions within major tributary areas in the Elkhart Lake watershed (sedimentation basins, habitat restoration, and/or water control structures)*
- Work with partners and property owners to restore, preserve and protect natural habitat within the Elkhart Lake watershed

Stantec LNRP SHEBOYGAN COUNTY WISCONSIN KEEP ELKHART BLUE Elkhart Lake Improvement Association


*2023-2024 Grant Projects
J
Snake Rd
Moraine
Village of Elkhart Lake
E Maple St
Cedar View Dr
Lake View Dr
Esker Ridge Rd
JP
Public Boat Launch
P
Public Beach
67
Native Shoreline Gardens
Lakeside Park Rd
dger Rd
Runoff Management Study & Design
E Shoreland Rd
Shoreland Rd
Golf Course Rd
Garton Rd
Hickory Ln
A
25-acre Prairie Restoration & Tree Planting
Grasshopper Hill Prairie
Race Track Rd
CJ
J

Secchi Depth Averages

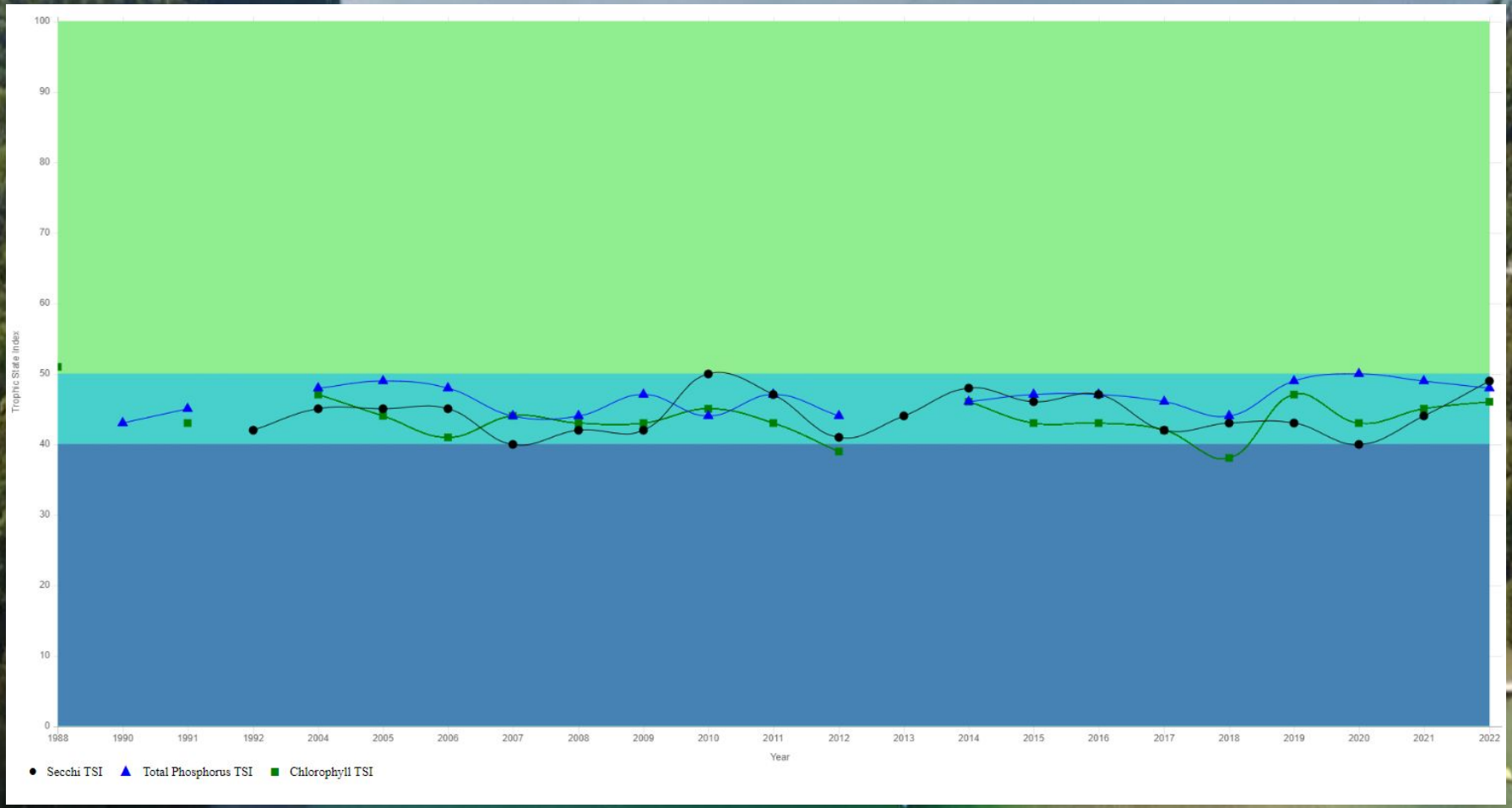
Elkhart Lake
Sheboygan County
Waterbody Number: 59300



Past secchi averages in feet (July and August only).

KEEP ELKHART BLUE

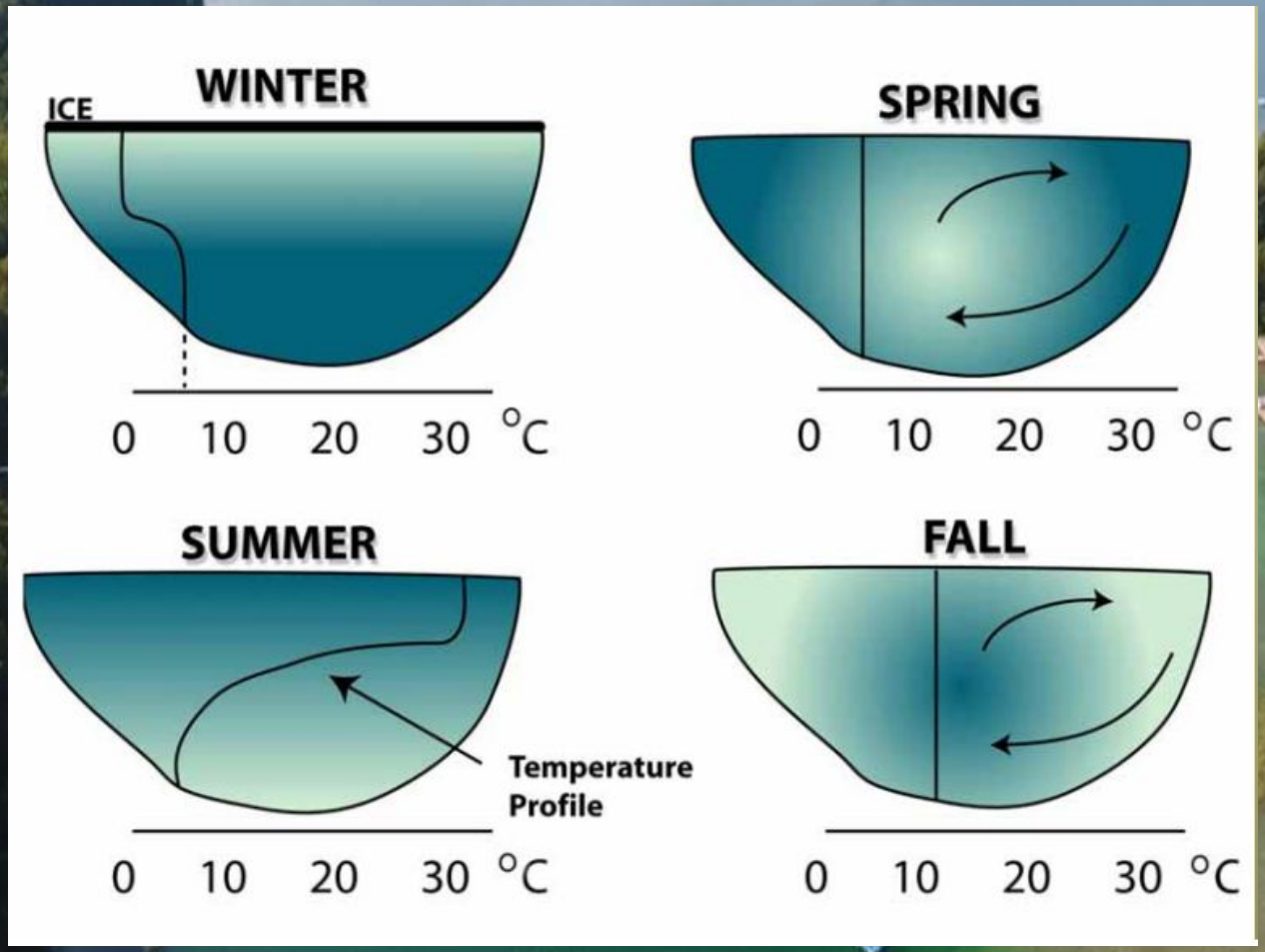
Trophic State Index Graph



KEEP ELKHART BLUE

Elkhart Lake Improvement Association

Annual Lake Mixing



KEEP ELKHART BLUE

Elkhart Lake Improvement Association

Keep Elkhart Blue - Public Outreach

- KEB Local Merchandise
- KEB Special Order Options

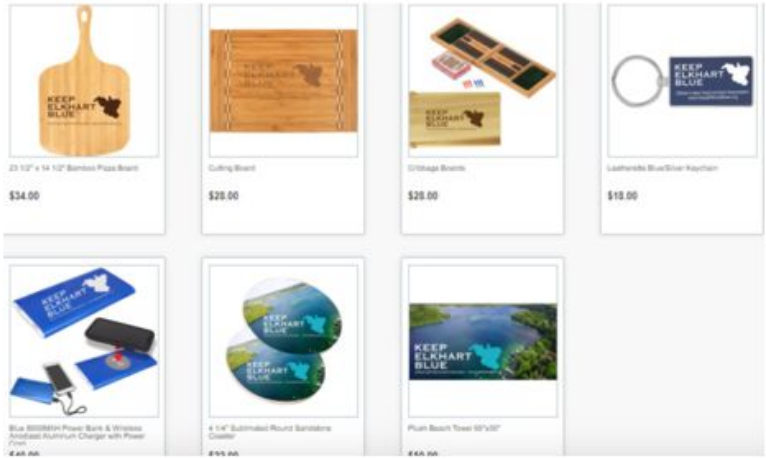
Sticker

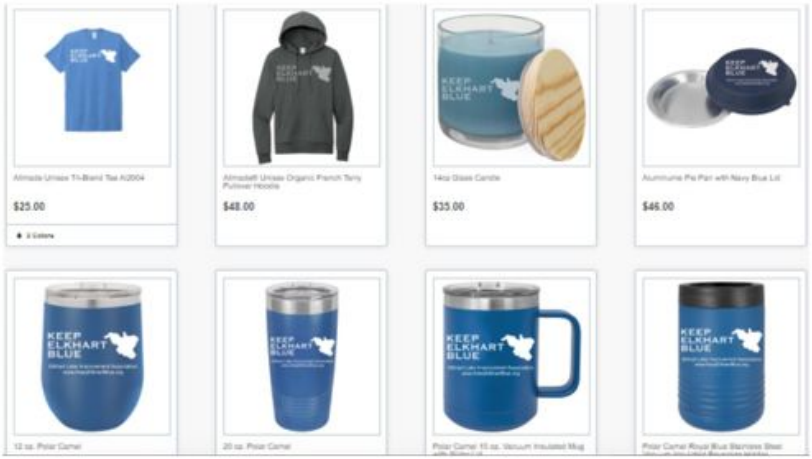

Hat (Front)


Tote Bag


Mugs


Sling Backpack





Keep Elkhart Blue – Public Outreach

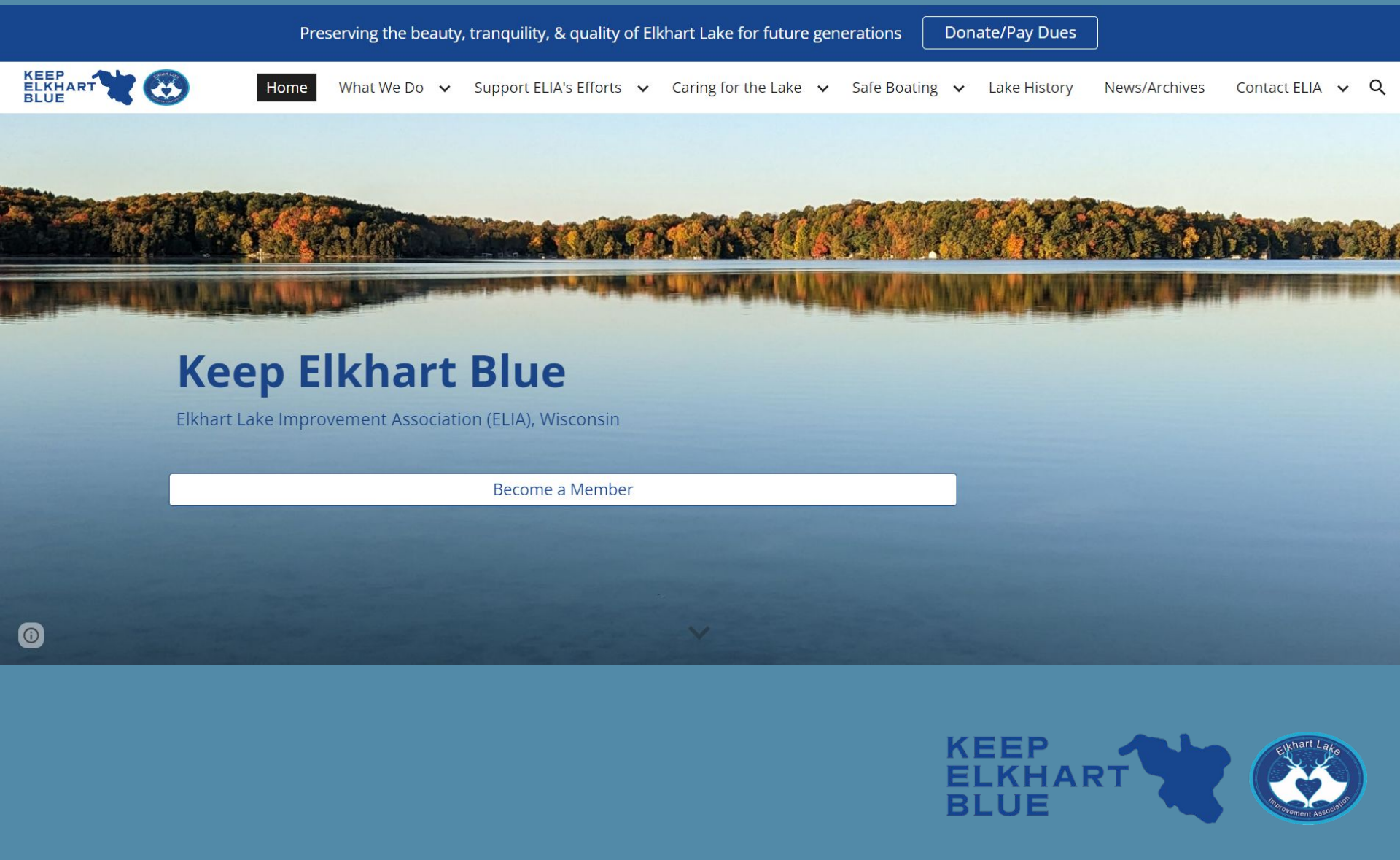
- Facebook Postings
- Webpage
  http://keepelkhartblue.org/

- QR Code – Brand Awareness Builder

KEEP ELKHART BLUE

Elkhart Lake Improvement Association

KeepElkhartBlue.org



KEEP ELKHART BLUE

President's Message

KEEP ELKHART BLUE

Elkhart Lake Improvement Association

Original Board of Directors

Terrett J. Arndt	Elkhart Lake
Floyd Dixon	Elkhart Lake
Alfred Linnemann	Elkhart Lake
Howard P. Kraemer	Elkhart Lake
John Linnehan	Elkhart Lake
William Thieman	Elkhart Lake
Harry Bremer	Elkhart Lake
Ernst Groth	Elkhart Lake

- Founded in 1964
- Articles of Incorporation created July 11, 1968
- Filed with the State July 12, 1968
- Signed by Secretary of State July 17, 1968
- First Annual Meeting July 23, 1968

KEEP ELKHART BLUE

Elkhart Lake Improvement Association

E.L.I.A. Annual Members Meeting Minutes
June 9, 2023
Osthoff Resort, Elkhart Lake, WI

Please review to the PowerPoint Presentation for Meeting outline and details.

Call to Order – (Schott)

John Schott – Welcoming comments were made to the group of approximately 120 attendees**.** Special thanks too to Sue Staum our retiring board member, for putting this annual meeting together and all her years of service on this board. She will be missed!

- **Roll Call** - (Elias) Establishment of a quorum.
- **Approval of Agenda** – dated 06/9/2023
- **Review and Approval of Minutes** – 06/23/2022
    a. It was moved and seconded to approve the minutes as presented from the 2022 Annual Meeting. Motion passed unanimously.
    b. Minutes are posted on ELIA website and approved as presented.
- **Treasurers Report –** (Boeldt)
  An updated report was reviewed for the membership including the receipt of $83,153.98 in government grants. Overall comment that we are in a strong financial position. Approved. (refer to PowerPoint Presentation for details).

Committee Reports:

1. **Nominee of Board of Directors:** (Froh) Presented the recommendations for the slate of Board of Directors for the 2024 – 2026 term:
    a. Renewals for Schott, Hanlon, Sofen and Gunther. Staum has chosen to retire for the board and in her place the nominating committee recommended Lauren Hall.
    b. Motion was made and unanimous approval of the Board of Directors as presented was passed. We thank Sue sincerely for her service to ELIA!
2. **Ecology:**
    a. Invasive Species Committee / Clean Boats/Clean Waters (Hanlon)
    Provided an update regarding Aquatic Invasive Species (AIS); they are the same three; Eurasian Watermilfoil, Curly-Leaf Pondweed and zebra mussels. Continued efforts to control the spread of AIS.
        - The CBCW program is continuing to prevent the spread of AIS. Discussed the employees to support CBCL at the boat launch.
        - Our contract for weed control has been signed and the permits are now in process. Notifications have been made concerning the treatment process. This will again include the Sheboygan Bay algae island.
    b. Lake Water Quality - (Elias / Majerus)
        - **2022 Elkhart Lake Public Survey** – Majerus presented the findings of the survey including 140 respondents. Top concerns are Water Quality and Runoff, Boat Traffic and Wake Boats, Fishery.

- **Grants:** Majerus reviewed the 2022 Comprehensive Lake Management Plan Recommendations including recommended new and continued activities to help manage the lake (refer to PowerPoint Presentation).
  - Native Shoreline Gardens, including 350 sq. ft. native plantings, and/or rain gardens, will be designed and installed in two locations along the lake.
  - Grasshopper Hill Prairie & 25-acre Prairie Restoration & Tree Planting Installation & Tree Planting - install a 25-acre prairie restoration on the Schaff property, a direct drainage area on the south side of Elkhart Lake to reduce runoff into the lake, decreasing nutrient and sediment loading. Will also support GLC prairie maintenance.
  - Runoff Management Study & Design - Completed as part of the CLMP Modelling for the agricultural portion of the watershed analysis. Additional general data collection is in progress.
- **Lake Sampling** – Elias explained the continued use of the Citizen Lake Monitoring Network (CLMN) program to sample and monitor the lake water quality since 1990, including WDNR protocols, schedule, and sampling locations.
- **Lake Water Quality**– Elias summarized the lake's heath including:
  - Historic Secchi disk graphed results explaining water clarity over long periods monitors the health of a lake, noting a slight downward trend but remaining good water quality.
  - Trophic State Index, including Total Phosphorus, 1990-2022 graph. Mesotrophic state (moderate nutrients and productivity); fertile with higher phosphorous levels, and moderately clear water. Biological productivity is elevated including fish production.
  - Phosphorus levels slight increase last few years. Phosphorus can be problematic because excess nutrients can cause algal blooms and excessive plant growth in the lake, impacting the ecological and recreational potential of the lake. This is why ELIA completed the 2022 Comprehensive Lake Management Plan and subsequent Grant Projects.
  - Discussed the lake turnover process being the seasonal mixing of the entire water column.

3 **Public Outreach / Keep Elkhart Blue** (Strigenz / Sofen)

a. Merchandise Support -Strigenz shared KEB local merchandise and special-order items and explained the support and awareness provided through merchandise. Upcoming activities include ELIA 4th of July Float, Downtown Night will be Aug 14 and we will have our booth as usual, and noted KEB Facebook Postings.

b. Sofen showed the newest KEB keychain, explained the QR Code, and importance of KEB and best management practices.

4. **Website Update** (Boeldt)

a. Shared the website, how to renew your membership and DONATE! Check out website and provide suggestions and content!

5. **President's Comments** (Schott)

a. Caring for the lake discussion.

b. Partnerships have made us successful.

c. Questions and Answers.

Adjourn Motion was made to adjourn. Motion carried – meeting adjourned at 7:20pm.