Year 22
Water Quality Monitoring & Assessment Program

Water Quality Testing Report
for Sampling Conducted on
November 6, 2024

Prepared for:

LIBERTYVILLE TOWNSHIP

Libertyville Township
Lake County, IL

Manhard CONSULTING

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I. Introduction

Executive Summary

Libertyville Township developed this Water Quality Monitoring & Assessment Program as required by the Illinois Environmental Protection Agency (IEPA) under the National Pollutant Discharge Elimination System (NPDES) Township Separate Storm Sewer System (MS4) permit program. The NPDES MS4 permit program regulates the discharge of storm water from MS4s based on amendments to the Clean Water Act in 1987 and the subsequent 1990 and 1999 regulations by the United States Environmental Protection Agency (USEPA). In Illinois, the USEPA delegated administration of the federal NDPES MS4 permit program to the IEPA. Under the NPDES MS4 permit program, all MS4s partially or fully in urbanized areas based on the 2000 census are required to obtain storm water permits for their discharges into receiving waters.

On December 20, 1999, the IEPA issued a General NPDES Storm Water Permit for all MS4s (ILR40 permit). The IEPA reissued the ILR40 permit on February 20, 2012, and again on February 10, 2016. In the 2016 permit, a new requirement was included in the ILR40 permit for water quality monitoring and assessment. The Township started water quality testing in 2009 under the previous permit.

This document describes the Water Quality Monitoring & Assessment Program that is implemented by Libertyville Township to evaluate the effectiveness of Best Management Practices (BMPs) implemented by the Township to reduce pollutant loadings and water quality impacts. This is accomplished through annual water quality testing of receiving waters upstream and downstream of the Township.

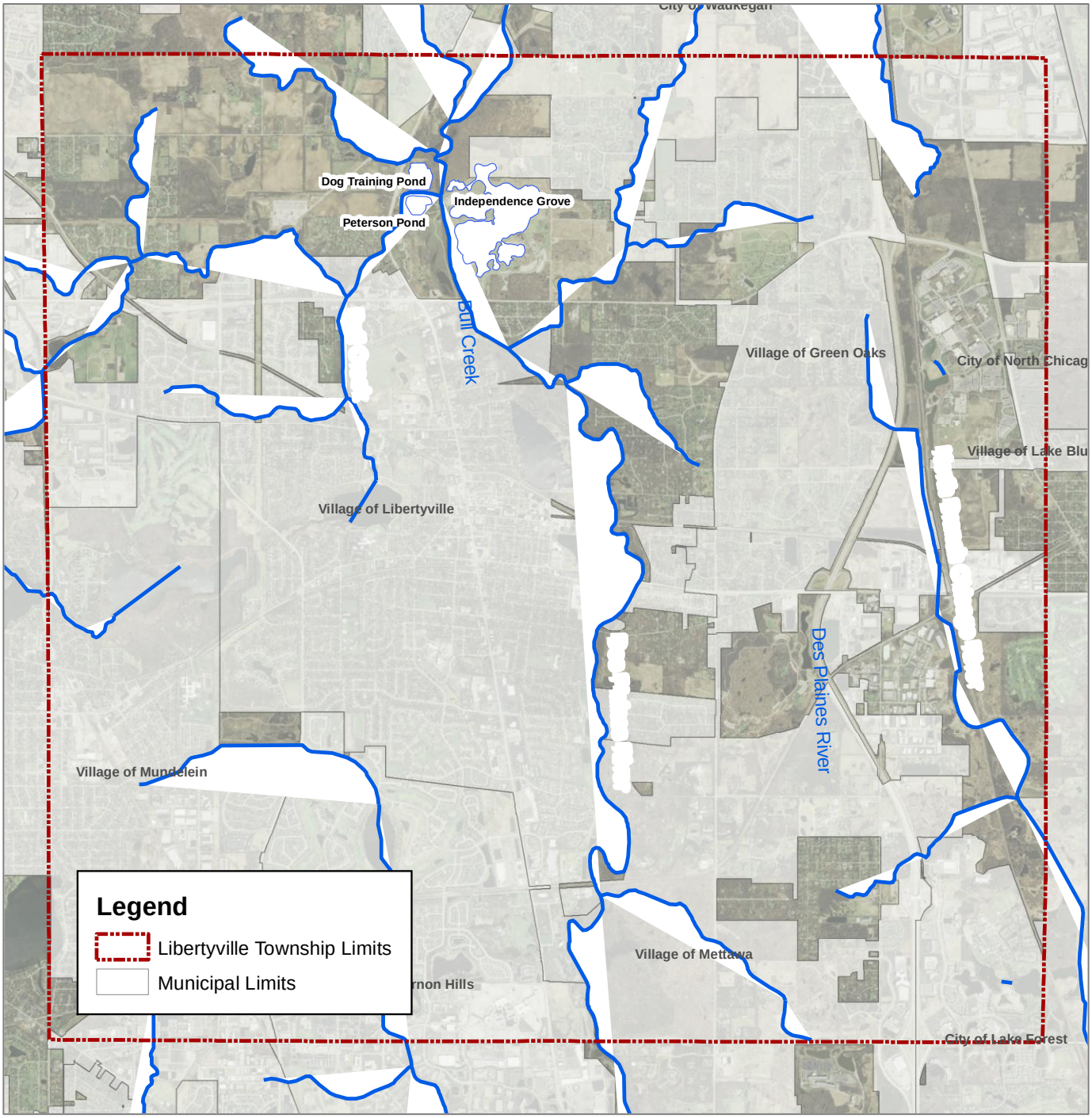
Permit Coverage

As previously noted, the ILR40 permit authorizes the discharge of storm water from MS4s into receiving waters. Storm water is defined in the ILR40 permit as “storm water runoff, snow melt runoff, and surface runoff and drainage”. MS4s contain a conveyance or system of conveyances that are: owned by a state, Village, town, or other public entity that discharges storm water to waters of the U.S.; designed or used to collect or convey storm water (e.g., storm drains, pipes, ditches); not a combined sewer; and not part of a sewage treatment plant, or publicly owned treatment works. Regulated conveyance systems typically include roadway drainage systems, storm sewers, catch basins, gutters, ditches, swales, manmade channels, and storm sewers.

Receiving Waters

A receiving water is a natural or man-made system into which storm water is discharged, including major rivers such as the Chicago and Des Plaines Rivers, their tributary stream systems, and other waterways. Receiving waters within the Township include the Middle Fork North Branch of the Chicago River, Des Plaines River, Bull Creek, Dog Training Pond, Independence Grove and Peterson Pond (see *Figure 1*).

Figure 1 Receiving Waters



Storm Water Pollutants of Concern

Polluted storm water runoff is commonly transported through MS4s, and then often discharged, untreated, into local waterways. Storm water runoff naturally contains numerous constituents; however, urbanization and urban activities (including township activities) typically increase concentrations to levels that may impact water quality. The typical pollutants found in urban storm water include sediment, nutrients, fecal coliform, chlorides, oil and grease, pesticides, herbicides, and metals. Table 1 identifies the pollutants of concern for the Township and their potential sources. Table 2 identifies a list of township activities that have the potential for generating pollutants.

Table 1 Typical Pollutants and Potential Sources

Pollutants	Sources	
Sediment	Construction sites	Streambank erosion
Nutrients	Fertilizers Pet waste	Sanitary sewer overflows
Fecal Coliform	Untreated sewage Pet waste	Improper restaurant practices Excessive organic debris
Chlorides	De-icing salts	Sanitary sewer overflows Illicit connections
Oil & Grease	Parking lots and streets Automotive facilities Illicit discharges	Spills and leaks Motor lubricants Hydraulic fluids
Pesticides & Herbicides	Residential lawn care	Commercial lawn care
Metals	Rust from automobiles Moving engine parts Lubricating oil	Tire and brake lining wear Diesel fuel and gasoline exhaust

Table 2 Township Activities with Potential for Generating Pollutants

Fixed Facilities Activities	Field Program Activities
Building Maintenance and Repair	Street Sweeping and Cleaning
Parking Lot Maintenance	Street Repair and Maintenance
Landscape Maintenance	Bridge and Structure Maintenance
Waste Handling and Disposal	Sidewalk Surface Repair and Cleaning
Storage Tank Filling	Landscape Mowing/Trimming/Planting
Equipment Maintenance and Repair	Fertilizer and Pesticide Application
Vehicle and Equipment Storage	
Vehicle and Equipment Cleaning	
Material Handling and Storage	
Material Loading and Unloading	

Status of Waters

The most recent Integrated Water Quality Report and Section 303(d) List prepared by the IEPA can be found at https://www2.illinois.gov/epa/topics/water-quality/monitoring/Pages/default.aspx.

The assessment completed in 2018 continues to have no TMDL requirements for receiving waters within the Township (see *Table 3*).

Figure 2 Impaired Waters

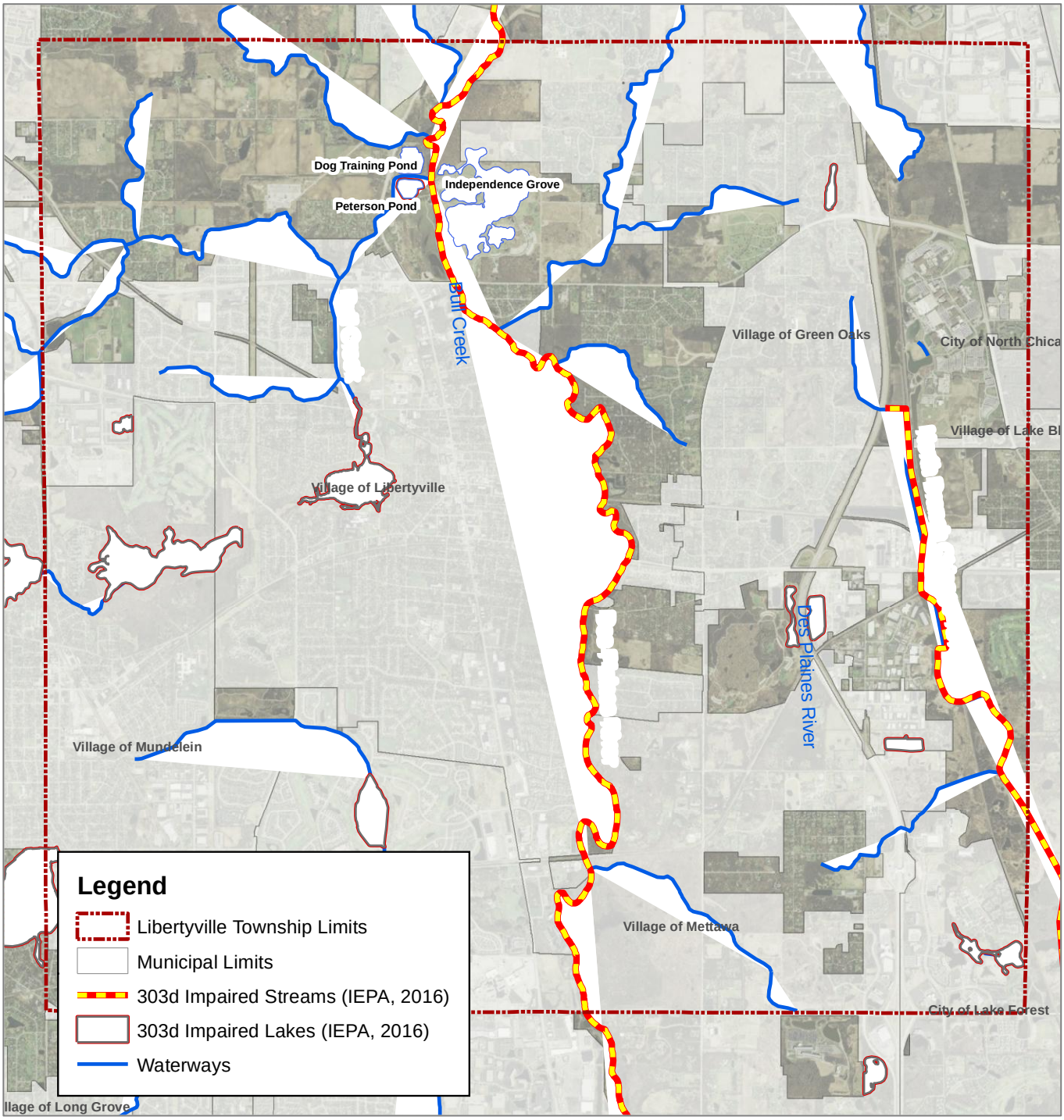


Table 3 IEPA 2018 Assessment Summary

Waterway	Impaired Use	Causes	Sources	TMDL Status
Des Plaines River (IL_G_07)	Aquatic Life	- Arsenic - Chloride - Total Phosphorus - Alteration in stream-side or littoral vegetative covers	- Streambank Modification/Destabilization - Contaminated Sediments - Township Point Source Discharges - Urban Runoff/Storm Sewers - Atmospheric Deposition – Toxics - Source Unknown	None
	Fish Consumption	- Mercury - Polychlorinated Biphenyls		
	Primary Contact Recreation	- Fecal Coliform		
Middle Fork North Branch Chicago River (IL_HCCC02)	Aesthetic Quality	- Bottom Deposits - Total Phosphorus	- Channelization - Loss of Riparian Habitat - Streambank Modification/Destabilization - Urban Runoff/Storm Sewers - Contaminated Sediments	Chicago River-North Branch: Stage 1 Completed
	Aquatic Life	- Chloride - DDT - Hexachlorobenzene - Dissolved Oxygen - Sedimentation/Siltation - Total Suspended Solids		
		- Fecal Coliform		
Peterson Pond (IL_UGI)	Aesthetic Quality	- Unknown	- Source Unknown	None
	Aquatic Life	- Total Phosphorus - Total Suspended Solids		

II. Water Quality Monitoring and Assessment Program

Monitoring

This Water Quality Monitoring & Assessment Program has been developed for the Township for the purpose of demonstrating compliance with the minimum standards required by the ILR40 permit for discharges from MS4s. The ILR40 permit requires annual monitoring of receiving waters upstream and downstream of MS4 discharges, use of indicators to gauge the effects of storm water discharges on the physical/habitat-related aspects of the receiving waters, and/or monitoring of the effectiveness of the BMPs. Per the ILR40 permit, monitoring of storm water discharges must be performed within 48 hours of a precipitation event greater than or equal to 0.25" in a 24-hour period. The ILR40 permit requires analysis of storm water for the following parameters:

- Total suspended solids
- Total nitrogen
- Total phosphorous
- Fecal coliform
- Chlorides
- Oil and grease

Assessment

Illinois' water pollution control program is designed to protect the beneficial uses of water resources. Illinois has set water quality standards (WQS) that protect these beneficial uses, commonly referred to as "designated uses". In Illinois, waters are designated for various uses including aquatic life, wildlife, agricultural use, primary contact (e.g., swimming, water skiing), secondary contact (e.g., boating, fishing), industrial use, drinking water, food-processing water supply, and aesthetic quality. Illinois' WQS provide the basis for assessing whether the beneficial uses of the state's waters are being attained. This Water Quality Monitoring & Assessment Program includes an assessment of the quality of receiving waters based on annual testing.

Annual test results are compared against the water quality standards (WQS) established by the Illinois Pollution Control Program (IPCB). Not all the constituents included in the Township's Water Quality Monitoring & Assessment Program have an established limit under the General Use Water Quality Standard and are therefore compared to an industry accepted standard. The Illinois WQS are located in the Illinois Administrative Rules Title 35, Environmental Protection; Subtitle C, Water Pollution; Chapter I, Pollution Control Board; Part 302, Water Quality Standards. The purpose of these standards is to protect existing uses of all waters of the State of Illinois, maintain above standard water quality, and prevent unnecessary deterioration of waters of the State. Table 4 identifies the section of the IPCB standards (or other reference material) used for the purposes of this analysis. This analysis is in no way meant to identify violations of the IPCB Standards.

III. Test Locations

For proper analysis, six (6) water samples were taken at locations upstream and downstream of the Township's discharge into the Middle Fork North Branch of the Chicago River, Des Plaines River and Bull Creek (see Appendix A). Upstream and downstream results were compared to identify any areas of concern that are potentially contributing to water pollution in receiving waters.

Middle Fork North Branch of the Chicago River - Upstream

The test site is located at the intersection of Waukegan Road and Martin Luther King Junior Drive in Waukegan. The sample was taken from the Middle Fork North Branch of the Chicago River on the east shore southwest of the Peer Chain Company at 2300 Norman Drive. In this report, this site is considered the upstream sampling location for the Middle Fork North Branch of the Chicago River.

Middle Fork North Branch of the Chicago River - Downstream

The test site is located west of the Wildlife Discovery Center operated by the Lake Forest Parks and Recreation Department at 1401 Middlefork Drive. The sample was taken on the west shoreline accessed by an existing trail and footbridge. In this report, the site is considered the downstream sampling location for the Middle Fork North Branch of the Chicago River.

Des Plaines River - Upstream

The test site is located along the Des Plaines River Trail at approximately mile marker 14 north of the Independence Grove Forest Preserve in Unincorporated Lake County. The sample was taken on the east side of the Des Plaines River within the Commonwealth Edison property. In this report, this site is considered the upstream sampling location for the Des Plaines River.

Des Plaines River - Downstream

The test site is located near the intersection of Valley Park Drive and Country Club Drive in Libertyville. The sample was taken from the north end of the Libertyville Golf Course along the western banks of the Des Plaines River. In this report, this site is considered the downstream sampling location for the Des Plaines River.

Bull Creek - Upstream

The test site is located on North Countryside Drive between Valley Court and Bull Creek Drive in Unincorporated Lake County. The sample was taken from the east side of the road at the downstream location of the roadway culvert along the West Branch of Bull Creek at the residence located at 30805 North Countryside Drive, Libertyville. In this report, this site is considered the upstream sampling location for Bull Creek.

Bull Creek - Downstream

The test site is located approximately 120 feet south of the intersection of N. Milwaukee Avenue and Brookhill Road in Unincorporated Lake County. The sample was taken from Bull Creek at the upstream side of the roadway culvert and is considered the downstream sampling location for Bull Creek.

IV. Testing Parameters

Water samples are collected at each location once per year (within 48 hours of a 0.25" rain event). Each sample is sent to a lab and analyzed for the following parameters: total suspended solids; total nitrogen; total phosphorous; fecal coliform; chlorides; and fats, oils, and grease.

While not specifically required by the ILR40 permit, the following on-site measurements are completed based on common practice for evaluating general water quality: temperature, dissolved oxygen, total dissolved solids, conductivity, turbidity, and pH.

Sampling is conducted in accordance with EPA standard protocols. Parameters are analyzed according to Standard Methods, 17th and 18th Editions, and USEPA methods.

Table 4 Accepted Limits for Each Water Quality Parameter

Water Quality Parameters	Illinois Water Pollution Control Board WQS[1]	IPCB Standards or Accepted Limits
Total Suspended Solids	304 Effluent Standards	15.0-30.0 mg/L
Total Nitrogen	United States Environmental Protection Agency Volunteer Stream Manual	<6.0 mg/L
Total Phosphorus	302.205	0.05 mg/L
Fecal Coliform	Illinois Administrative Code. Title 35: Environmental Protection; Subtitle C: Water Pollution; Chapter I: Pollution Control Board; Part 302 Water Quality Standards Section 302.209	200 cfu/100 ml geometric mean based on a minimum of 5 samples taken over any 30-day period; 400 cfu/100 ml maximum not to be exceeded in more than 10% of samples taken during any 30-day period.
Chlorides	302.304	500.0 mg/L
Fats, Oils and Grease	Federation of Sewage Works Associations (now known as the Water Environment Federation [WEF]) published a Manual of Practice (MOP) (1949)	100 mg/L
On-Site Testing		
Temperature (°F)	302.211	December – March 60.0°F Max April – February 90.0°F Max
Dissolved Oxygen	302.206	March - July at least 5.0 mg/L August – February at least 3.5 mg/L
Total Dissolved Solids	302.304	1,000 ppm
Conductivity	USEPA Volunteer Stream Monitoring Manual	50.0 – 1500.00 µs/cm
Turbidity	D.H. Franklin, J.L. Steiiner and G.Wheeler (2001)	<50 NTU
pH	302.304	6.5 – 9.0

[1]Title 35 Part 302 Water Quality Standards unless otherwise noted.

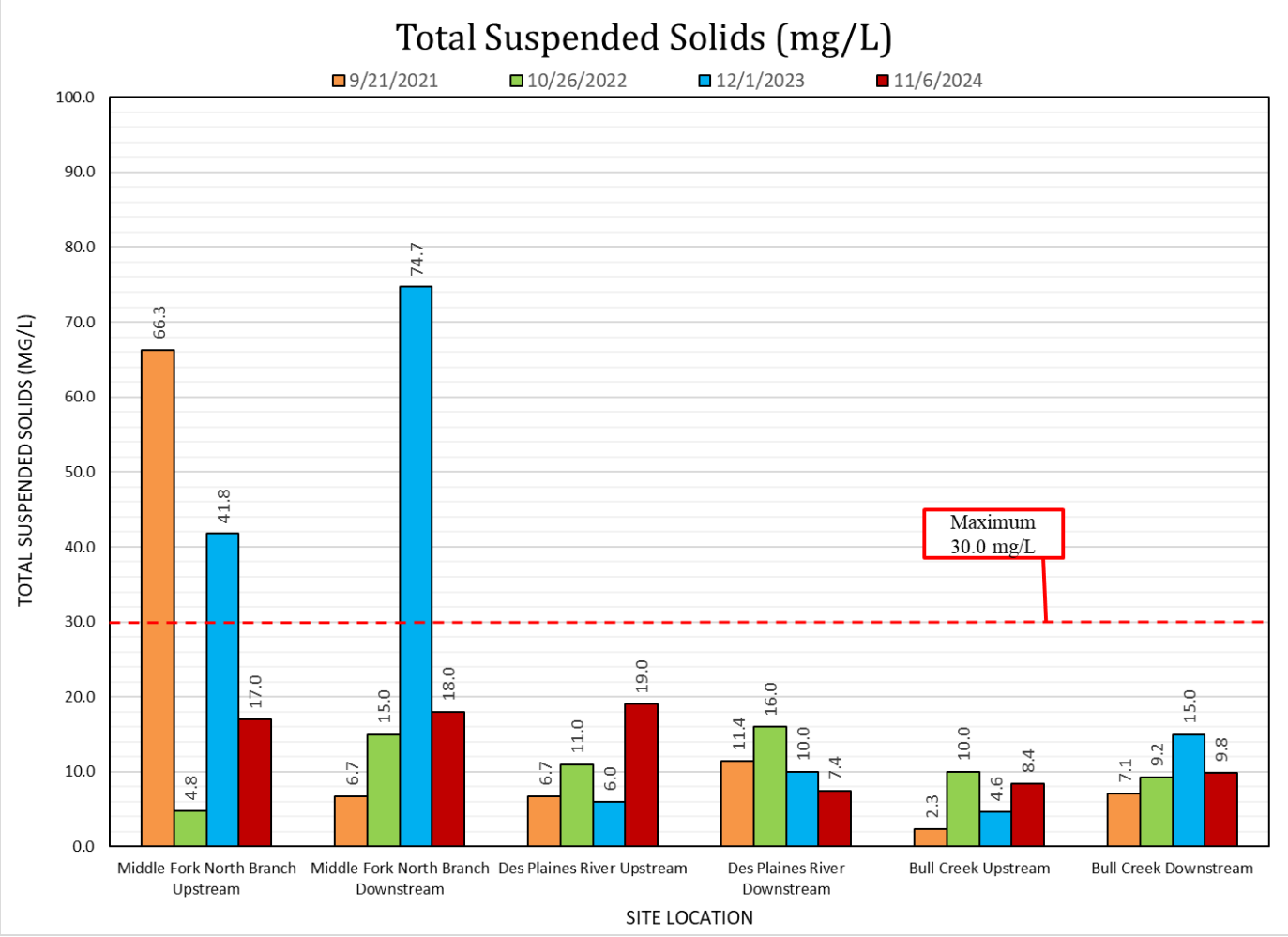
V. Results

On November 6, 2024, Aquatic Ecosystems Management collected water samples at six (6) designated locations. The sampling was conducted within forty-eight hours of a rain event greater than 0.25". The total rainfall was equal to 0.50". The following is a summary of each water quality parameter tested and the results.

Total Suspended Solids (TSS)

Total suspended solids (TSS) are particulate solid materials (organic and inorganic) that have relatively low density and are too small to settle. Usually TSS includes silt, plankton, mud, and industrial wastes. As TSS increases, turbidity increases (meaning the transparency of the water decreases). High concentrations of TSS can lower water quality by absorbing light which raises the temperature of the water thereby decreasing DO levels. The combination of warmer water, less light, and less oxygen makes it difficult for some forms of life to exist. The Middle Fork North Branch Chicago River and Peterson Pond are impaired for TSS.

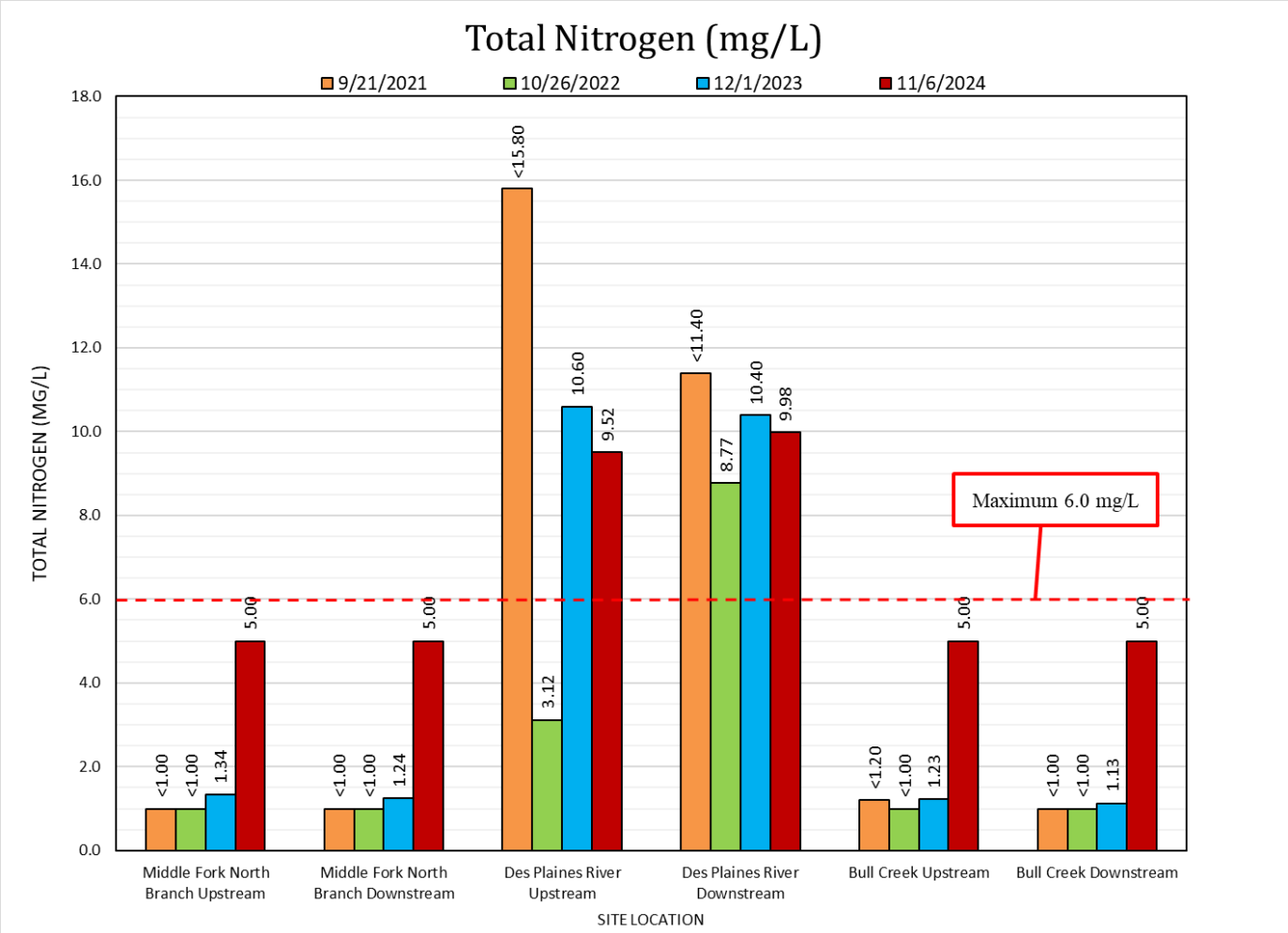
The established limit for TSS is 15.0 – 30.0 mg/L (effluent limit under Part 304 Effluent Standards). Results of the TSS testing conducted from 2021-2024 are provided in the graph below. In 2024, none of the test locations exceeded the 30 mg/L threshold.



Total Nitrogen

Total nitrogen is an essential nutrient for plants and animals. However, an excess amount of nitrogen in a waterway may lead to low levels of dissolved oxygen and negatively alter various plant life and organisms. Sources of nitrogen include wastewater treatment plants, runoff from fertilized lawns, runoff from animal manure and storage areas, and industrial discharges that contain corrosion inhibitors. None of the receiving waters within the Township are designated as impaired for nitrogen.

An acceptable range of total nitrogen is 2 mg/L – 6 mg/L. Results of the total nitrogen testing conducted from 2021-2024 are provided in the graph below. In 2024, two of the test locations (Des Plaines River Upstream/Downstream) exceeded the 6 mg/L threshold, similar to 2023 test results.

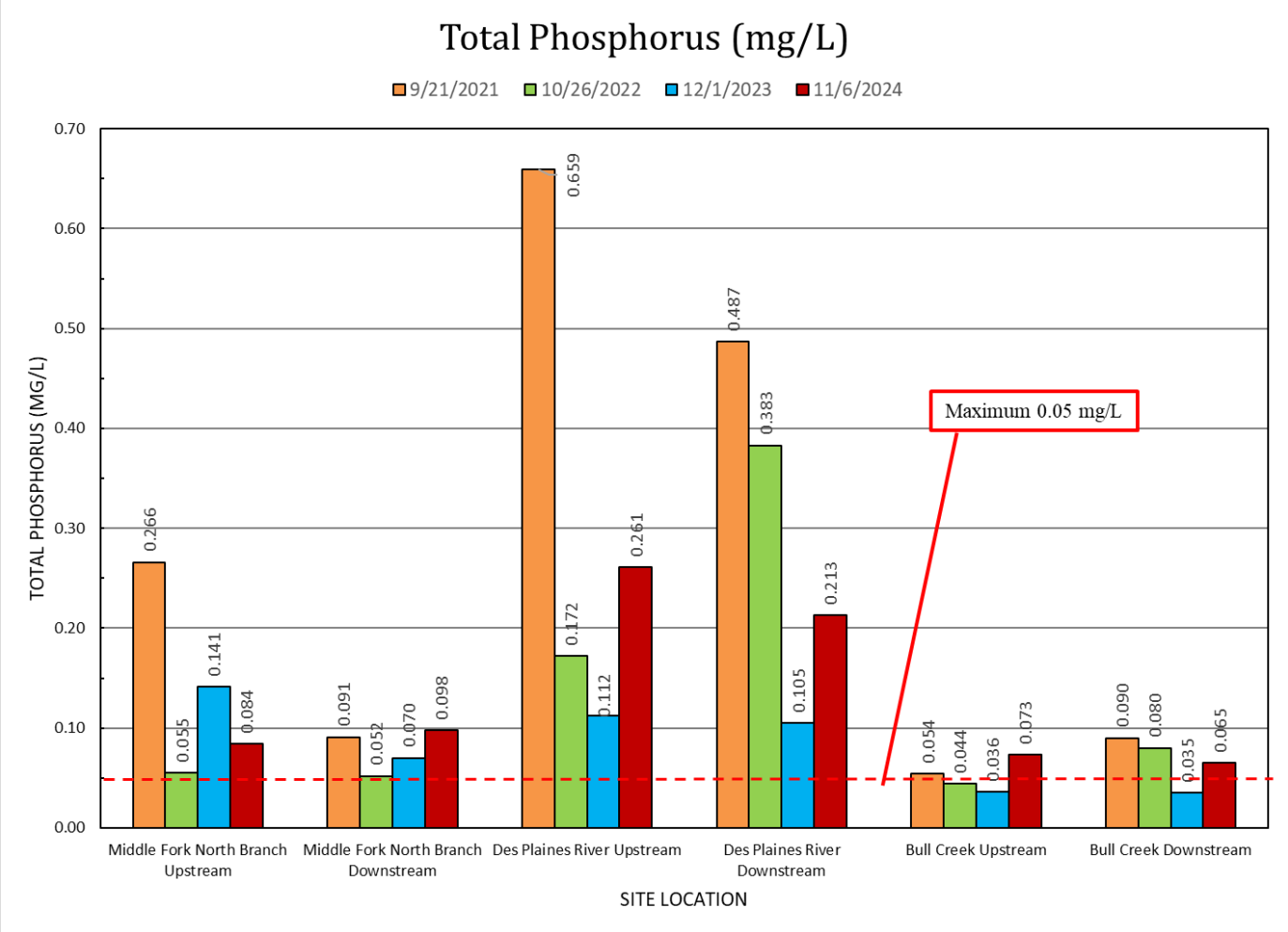


Total Phosphorus

Total phosphorus is one of the key elements necessary for animal and plant growth. Phosphates (PO43-) are formed chemically through oxidation. Rainfall causes varying amounts of phosphates and phosphorus to wash away from farm soils and certain pesticides into waterways in the form of run-off.

Phosphates stimulate the growth of algae and aquatic plants that provide food for fish. This may cause an increase in the fish population. However, excess phosphates may cause disproportionate growth in algae and aquatic plants, choking waterways and using up large amounts of oxygen (eutrophication).

The established limit for total phosphorous is 0.05 mg/L for any reservoir or lake with a surface area of ≥ 20.0 acres, or in any stream at the point where it enters any such reservoir or lake. Results of the phosphorus testing conducted from 2021-2024 are provided in the graph below. In 2024, all locations exceeded the 0.05 mg/L threshold.

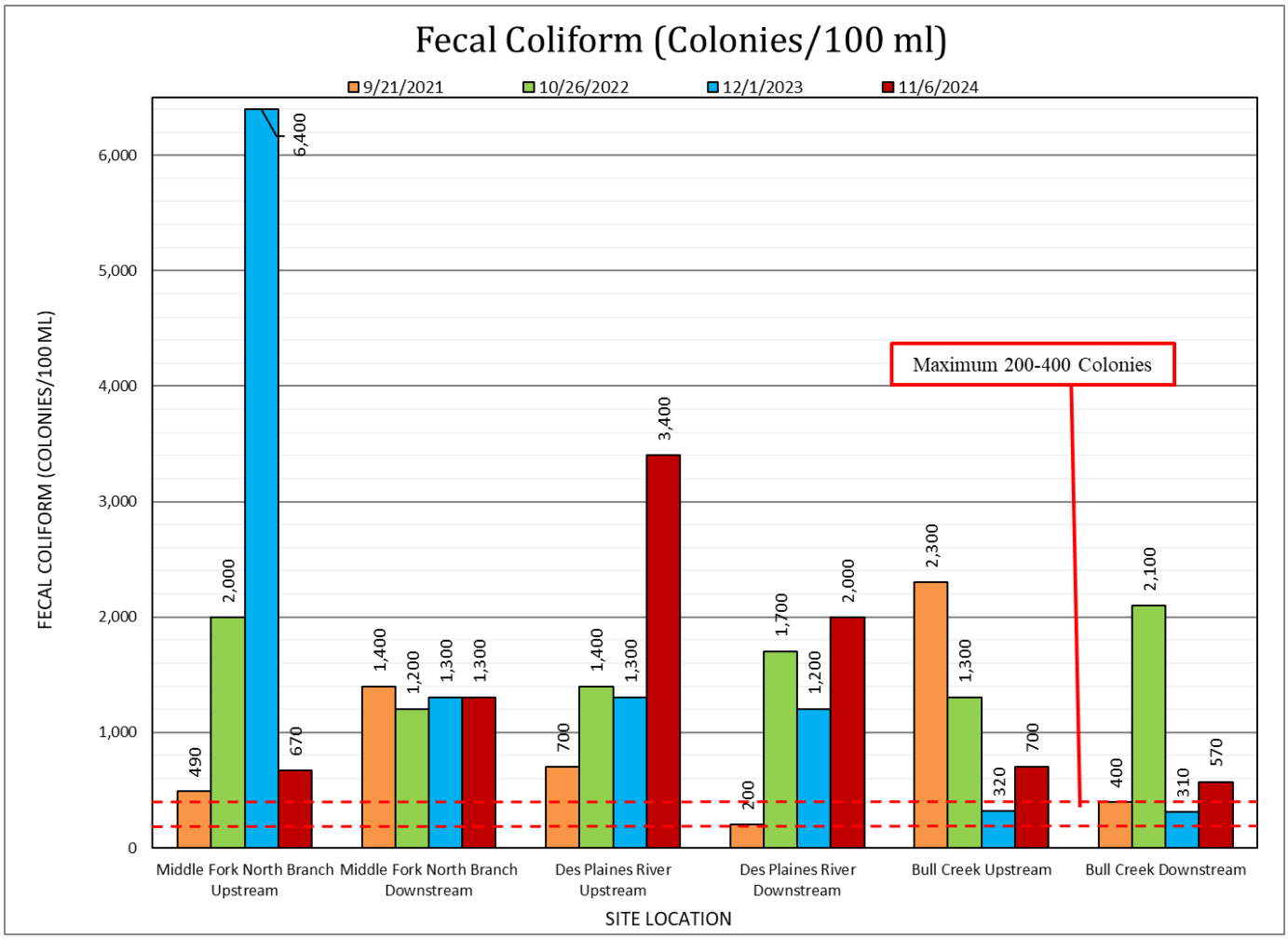


Fecal Coliform

E. coli is an anaerobic bacterium that grows in the intestinal track of animals. Its presence is an indication of fecal contamination and other disease -causing organisms, which are more difficult to identify and quantify, may also be present. The accepted limits for fecal coliform in Illinois are expressed in colony forming units (cfus) per 100 milliliters of water. Fully Supporting Use or "Good Water Quality" for designated beneficial uses, such as recreation or primary contact, is observed when the following limits are not exceeded:

- 200 cfu/100 ml geometric mean based on a minimum of 5 samples taken over any 30-day period;
- 400 cfu/100 ml maximum not to be exceeded in more than 10% of samples taken during any 30-day period.

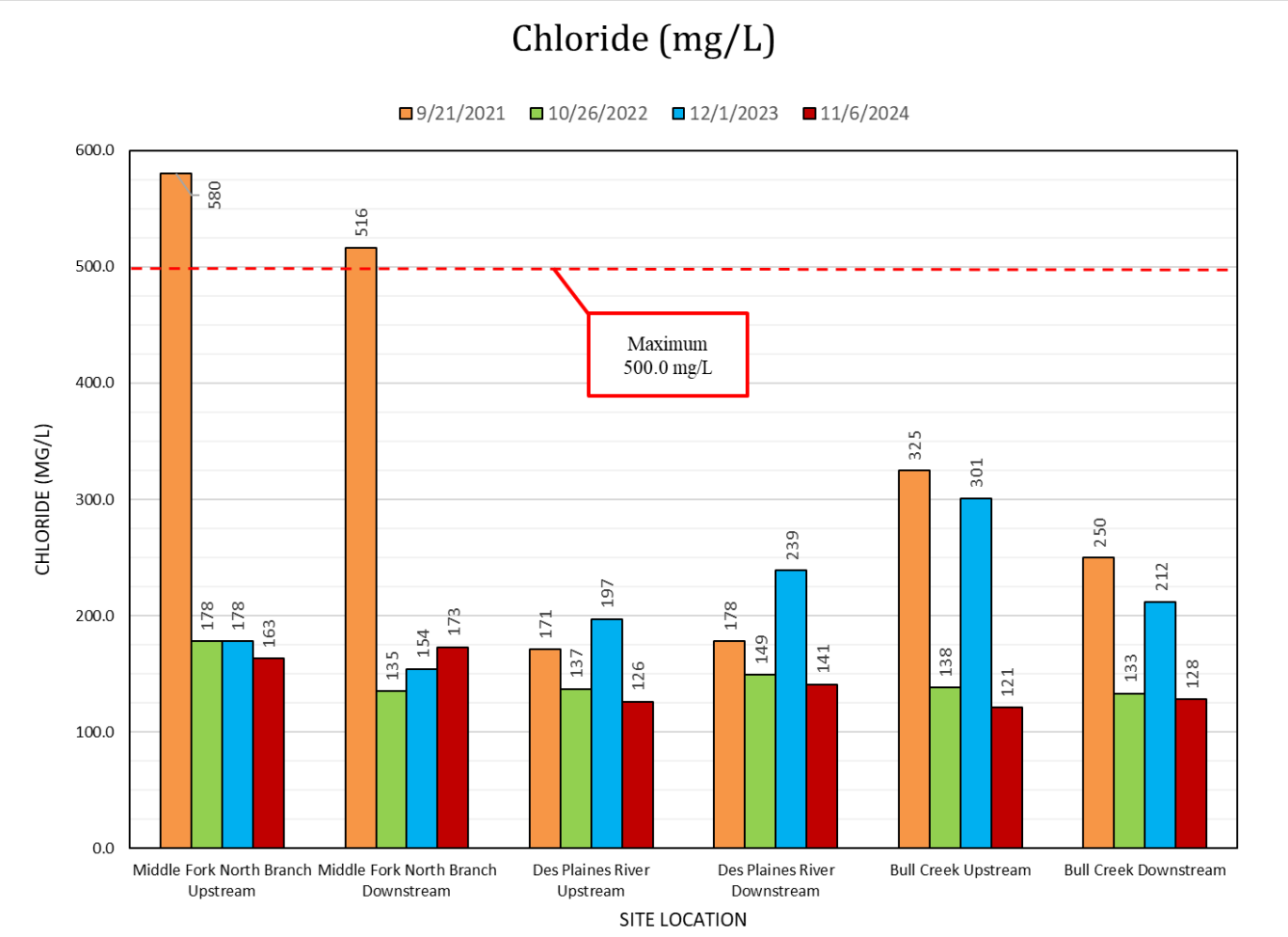
The Des Plaines River Upstream, the Middle Fork North Branch Chicago River, and Bull Creek are impaired for fecal coliform. Fecal coliform testing began in 2016 to meet the monitoring requirements of the 2016 NPDES ILR40 permit. Results of the fecal coliform testing conducted from 2021-2024 are provided in the graph below. In 2024, all of the sites exceeded the 400 cfu threshold. Libertyville Township should consider evaluating if any activities occurring between the upstream and downstream testing locations may be causing an elevated reading.



Chloride

Chloride is essential to life in small doses. Chloride may enter a water system from rocks containing chlorides, agricultural runoff, industrial wastewater, oil well wastes, wastewater treatment plant effluents, and road salts. However, when chloride builds up in large quantities, it can have negative impacts on the survival of aquatic life. The Des Plaines River and the Middle Fork North Branch Chicago River are impaired for Chloride.

The established limit for chloride is 500.0 mg/L (IPCB limits for Public and Food Processing Water Supply Standards). Results of the chloride testing conducted from 2021-2024 are provided in the graph below. In 2024, all test results were within the allowable threshold and did not exceed the 500 mg/L threshold.

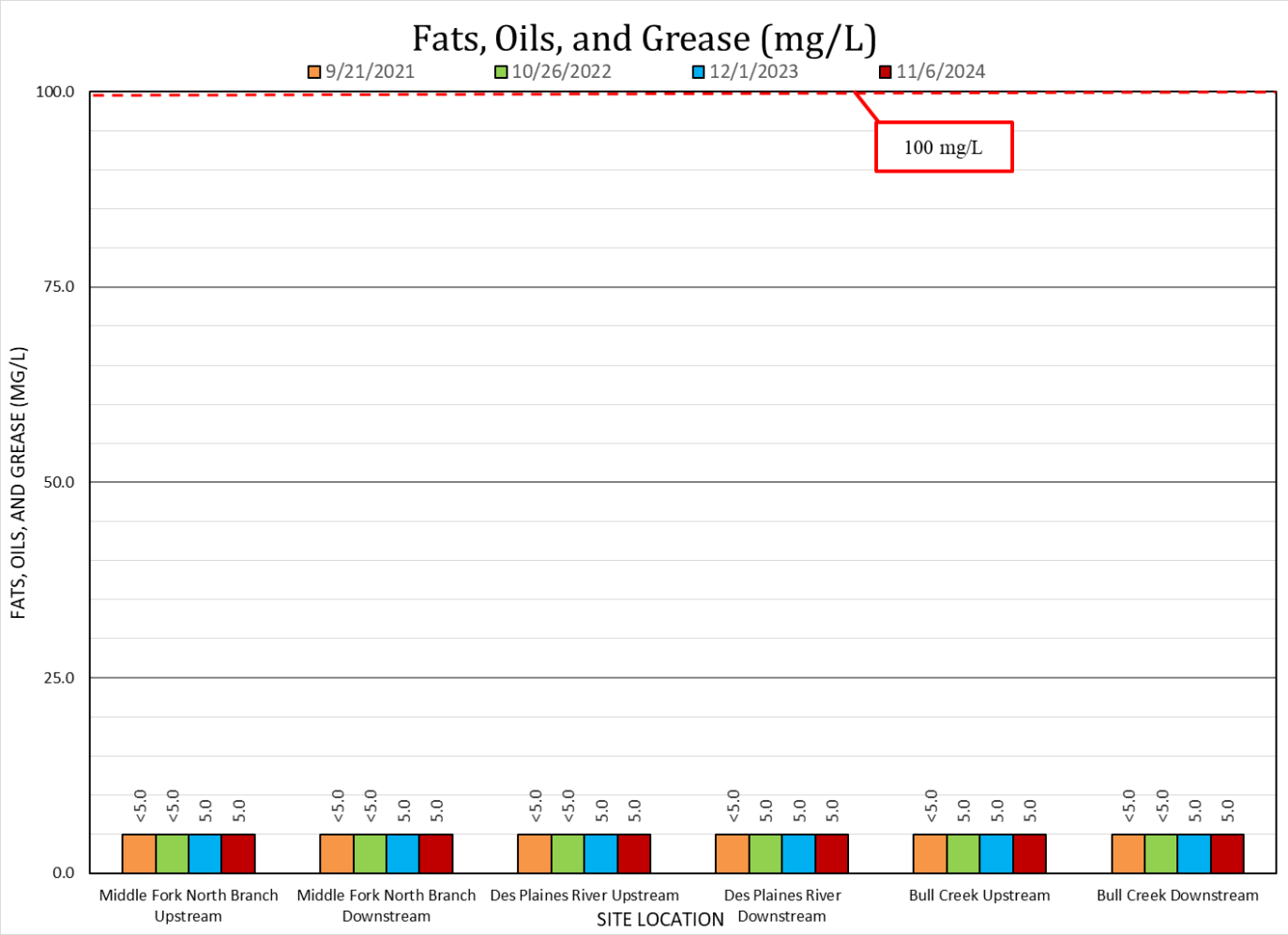


Fats, Oils, and Grease

Oil and grease are found in wastewater and storm water either as an emulsion or as free-floating agglomerates. Chemicals, such as detergents and solvents, and mechanical agitation can cause oil and grease to become emulsified. According to the Water Environment Federation's Pretreatment of Industrial Wastes, Manual of Practice FD-3, "Grease is a general classification for grouping such materials as fats, oils, waxes, and soaps according to their effect on wastewater collection and treatment systems or their physical (semisolid) forms." For the purpose of this document, the acronym "FOG" will be used as a general term for fats, oils, and grease.

By its very nature, grease will adhere to many types of surfaces, with sewers especially vulnerable to grease build-up. Over a period of time, clumps of grease will build up to the point that the sewer is completely choked. Grease also accumulates due to cooling and dilution of surfactants. None of the receiving waters within the Township are designated as impaired for fats, oils, and grease.

The most commonly used numerical limit for FOG is 100 mg/L. This limit does not appear to be based upon any empirical evidence but rather on general correlations and an industry consensus that this level limits the build-up of FOG in the collection system. FOG testing began in 2016 to meet the monitoring requirements of the 2016 NPDES ILR40 permit. Results of the FOG testing conducted from 2021-2024 are provided in the graph below. In 2024, none of the sites exceeded the 100 mg/L threshold.

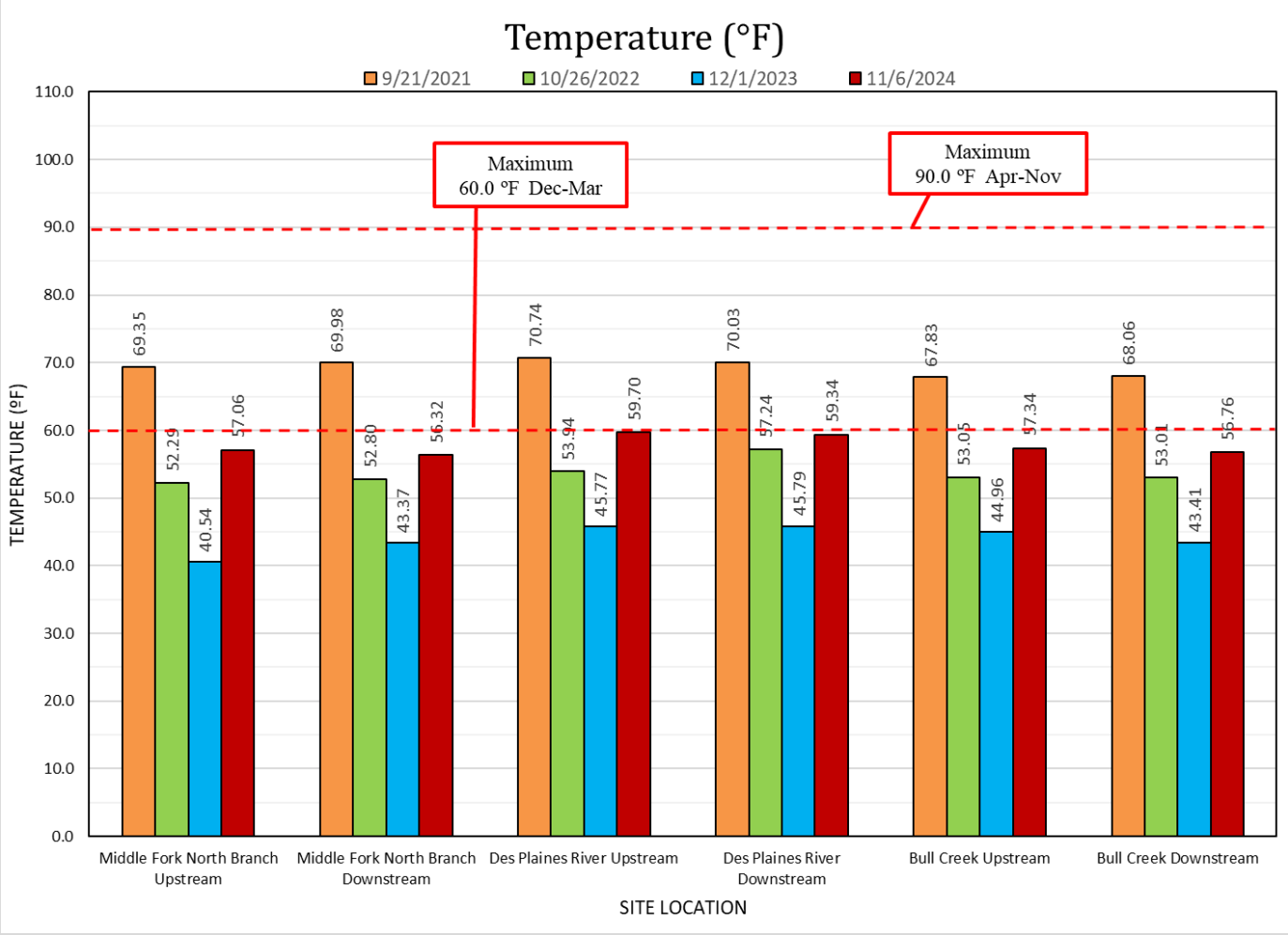


Temperature

The rates of biological and chemical processes depend on temperature. Organisms are dependent on certain temperature ranges for their optimal health. Optimal temperatures for fish depend on the species: some survive better in colder water, whereas others prefer warmer water. Benthic macroinvertebrates are also sensitive to temperature and will relocate to find their optimal temperature. If temperatures are outside this optimal range for a prolonged period, organisms become stressed and can die.

Temperature also affects the oxygen content of the water (oxygen levels become lower as temperature increases), the rate of photosynthesis by aquatic plants, the metabolic rates of aquatic organisms, and the sensitivity of organisms to toxic wastes, parasites, and diseases. Causes of temperature change include weather, removal of shading streambank vegetation, impoundments, discharge of cooling water, and urban storm water inflows to the stream. None of the receiving waters within the Township are designated as impaired for temperature.

The established limit for temperature is a maximum of 60º F from December through March and 90° F from April through November. Temperature readings from 2021-2024 are provided in the graph below. In 2024, all locations were within the normal temperature range.

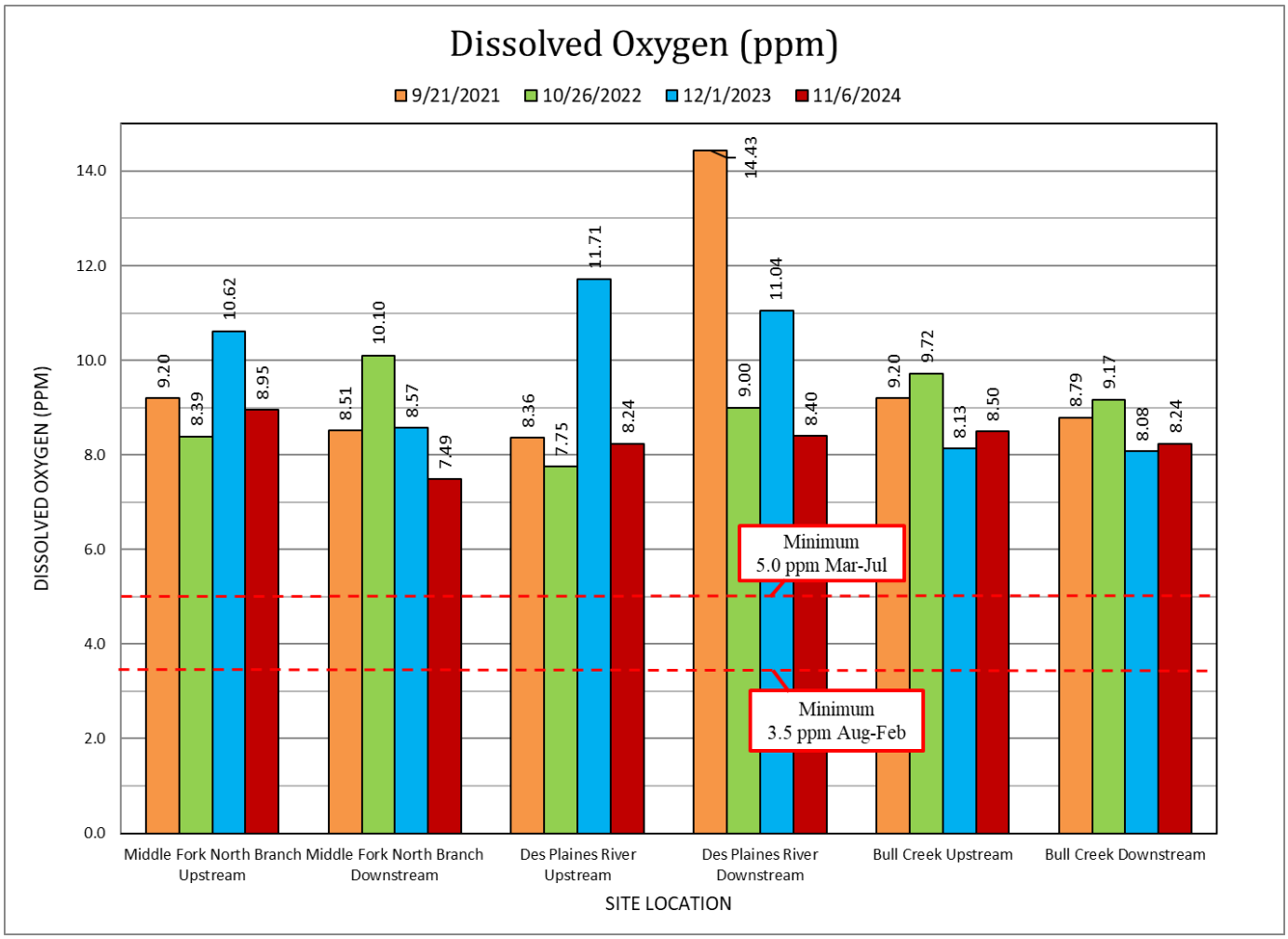


Dissolved Oxygen (DO)

One of the most important measures of the health of a stream is the amount of available dissolved oxygen (DO) in the water. Oxygen gas (O2) dissolves in water through the mixing of the water surface with the atmosphere. Oxygen is vital to fish and other animals for respiration. If the levels of DO fall too low, many species of fish, macroinvertebrates, and plants cannot survive.

The level of DO in the water is inversely related to water temperature. The lower the temperature, the more oxygen can dissolve in the water. Aquatic animals are most vulnerable to lowered DO levels in the early morning on hot summer days when stream flows are low, water temperatures are high and aquatic plants have not been producing oxygen since sunset. Upstream and downstream DO levels were measured to identify changes in the level of oxygen in the water as it flows through The Township. The Middle Fork North Branch Chicago River is impaired for DO.

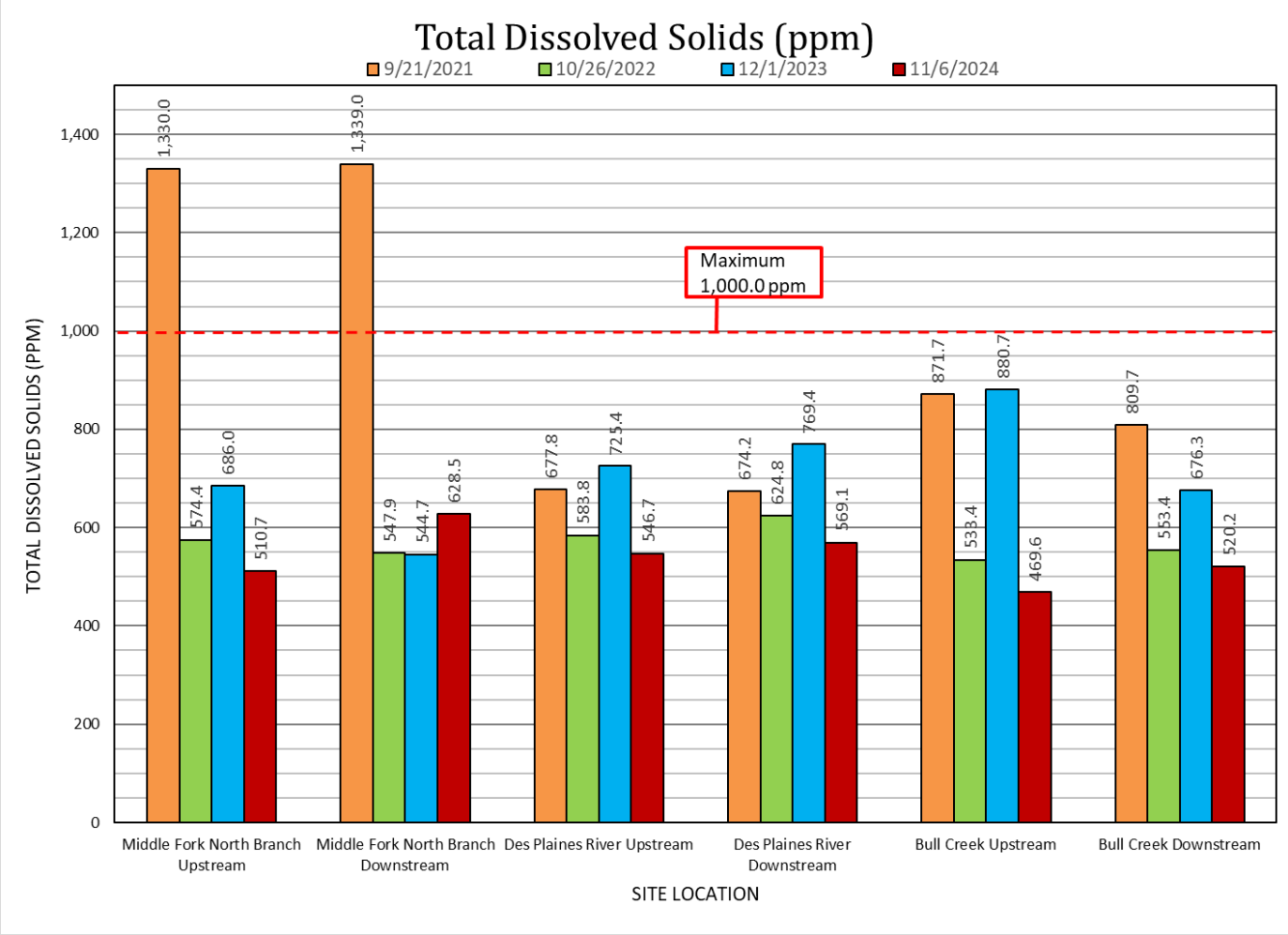
The established minimum for DO is 5.0 parts per million (ppm) between March and July and 3.5 ppm between August and February. Results of the DO testing conducted from 2021-2024 are provided in the graph below. In 2024, all of the test results met the minimum threshold requirements.



Total Dissolved Solids (TDS)

Total dissolved solids (TDS) comprise of inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that are dissolved in water. While not a health hazard, elevated TDS levels decrease the aesthetic quality of water and can cause the water to become corrosive. Additionally, elevated TDS concentrations in water can cause a salty or brackish taste, interference & decreased efficiency of hot water heaters and lime-scale formation. Elevated TDS concentrations indicate elevated levels of ions that are above the Primary or Secondary Drinking Water Standards. None of the receiving waters in the Township are impaired for TDS.

The established limit for TDS is 1,000.0 mg/L. Results of the TDS testing conducted from 2021-2024 are provided in the graph below. In 2024, all locations did not exceed the maximum 1,000 mg/L threshold.



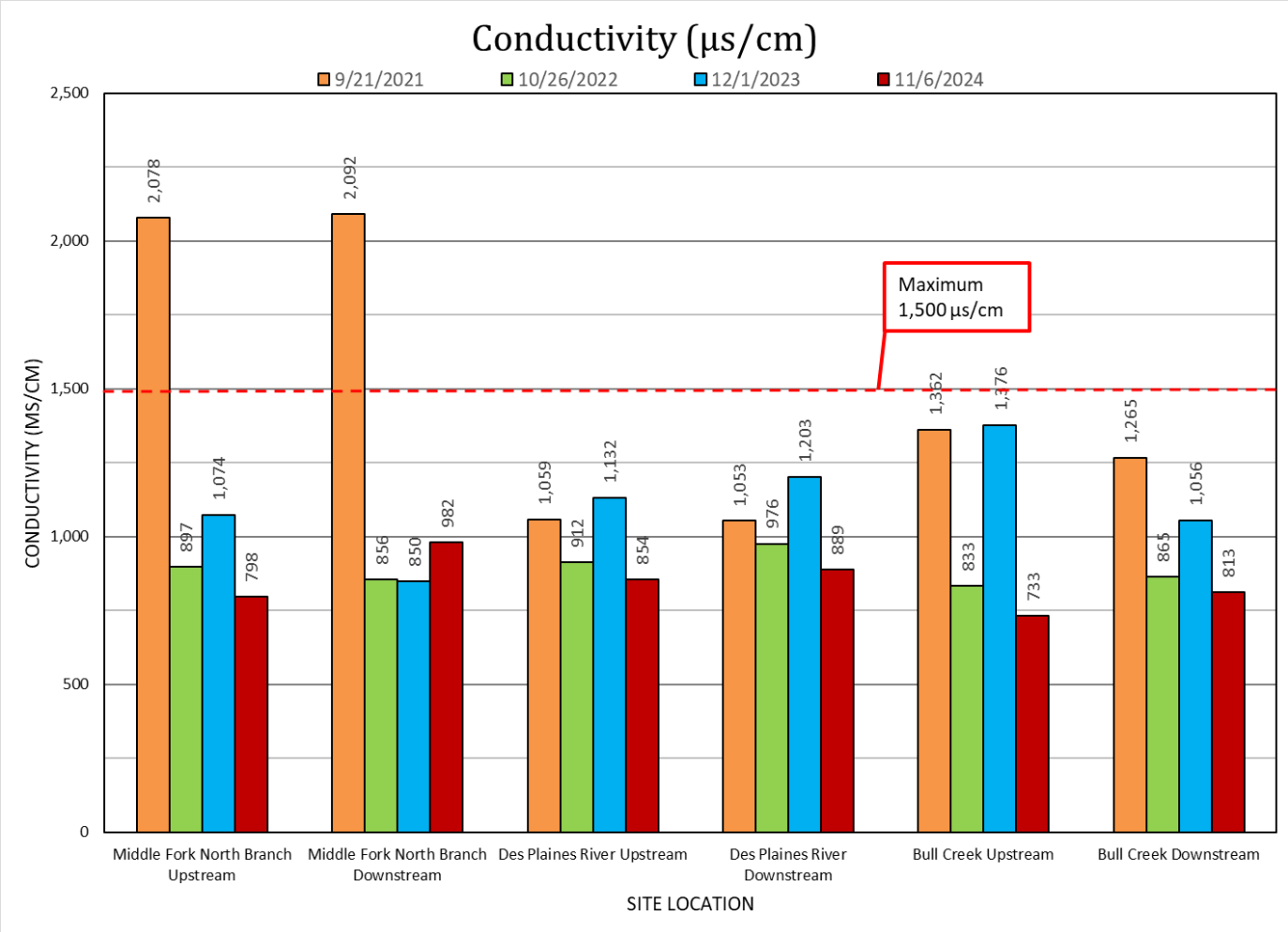
Conductivity

Conductivity is the measure of water's ability to carry an electrical current. Conductivity in water bodies is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron and aluminum cations (ions that carry a positive charge). Organic compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity level in water. Conductivity is also affected by temperature: the warmer the water, the higher the conductivity.

Discharges to streams can change the conductivity depending on their composition. For example, a failing sewage system would raise conductivity due to the presence of chloride, phosphate and nitrate, while an oil spill would lower conductivity.

The basic unit of measurement of conductivity is the mho or siemens, where one mho or siemens (S) is equal to the reciprocal of one-ohm Ω (measurement of electrical resistance named after Georg Simon Ohm). Conductivity is measured in micromhos per centimeter (µmhos/cm) or micro-siemens per centimeter (µs/cm). Two of the receiving waters in the Township are impaired for conductivity.

The established range for conductivity is 50-1,500 µs/cm. Results of the conductivity testing from 2021-2024 are provided in the graph below. In 2024, none of the locations exceeded the 1,500 µs/cm threshold.

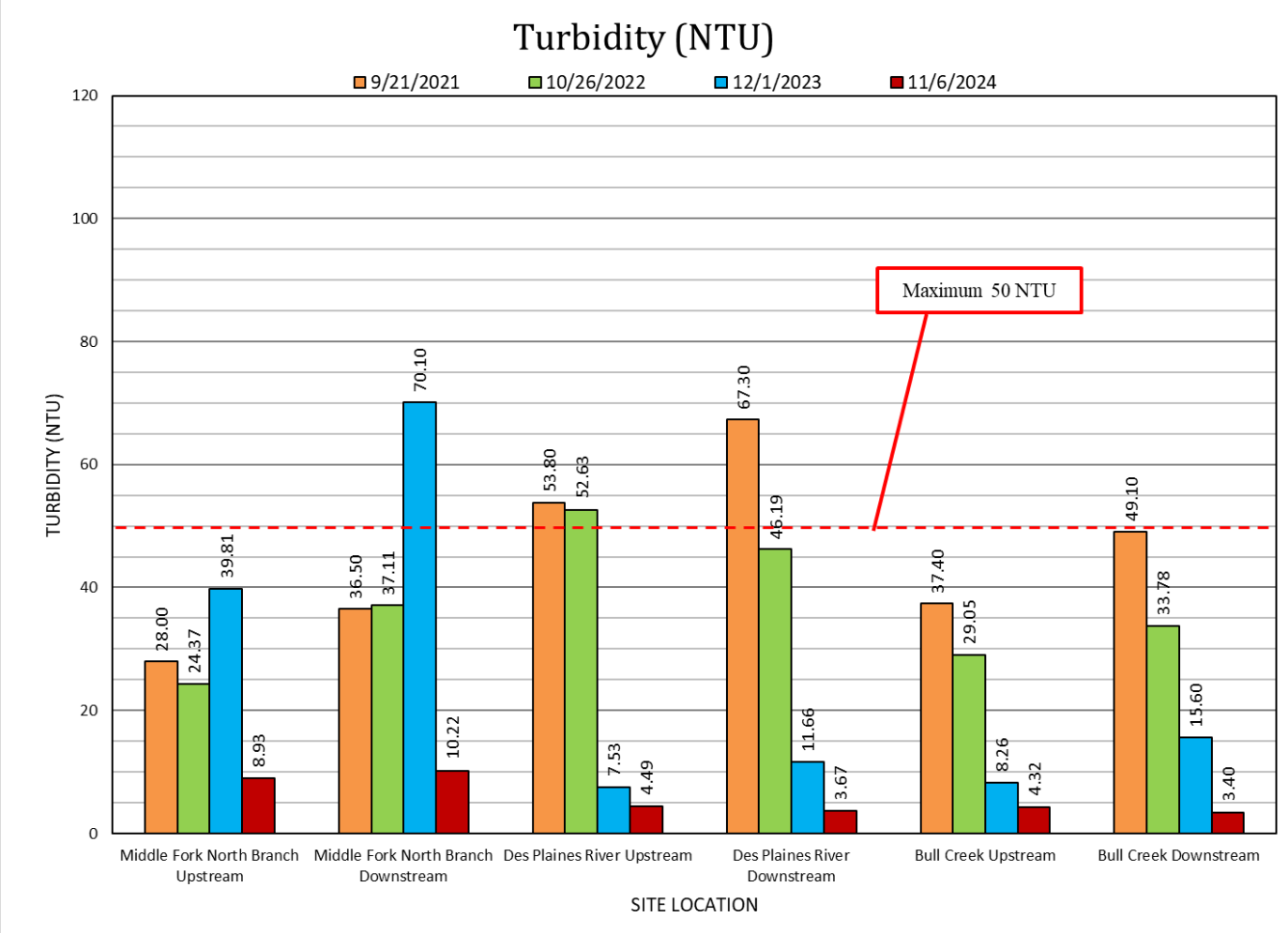


Turbidity

Turbidity is the measure of the relative clarity of a liquid. Material that causes water to be turbid includes clay, silt, finely divided inorganic and organic matter, algae, soluble colored organic compounds, and other microscopic organisms.

High concentrations of particulate matter affects light penetration and productivity, recreational values, and habitat quality. In streams, increased sedimentation and siltation can occur, which can result in harm to habitat areas for fish and other aquatic life. Particles also provide attachment places for other pollutants (e.g. metals and bacteria). For this reason, turbidity readings can be used as an indicator of potential pollution in a water body. None of the receiving waters within the Township are designated as impaired for turbidity.

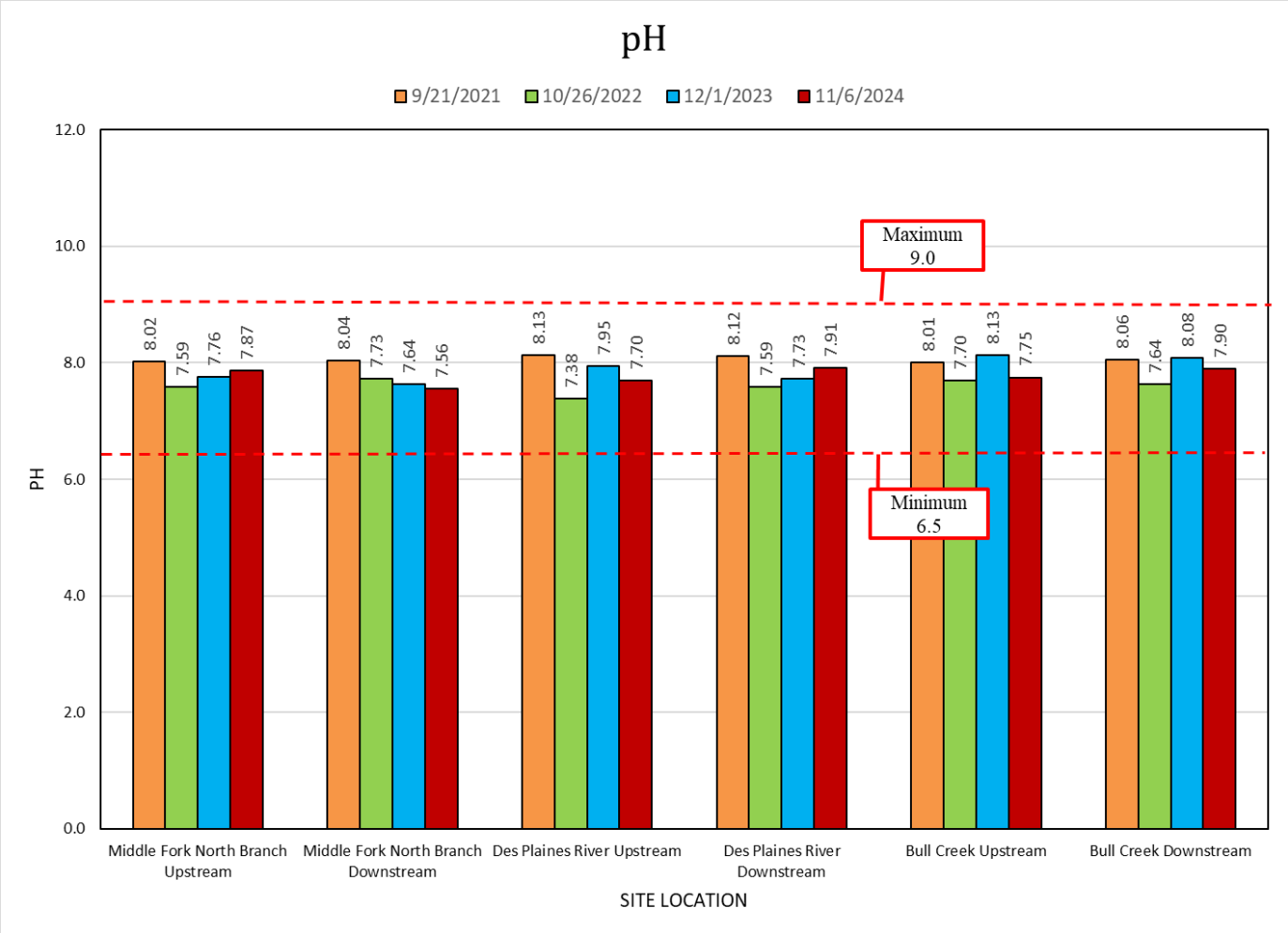
While there is no water quality standard in Illinois for turbidity, other states have ambient water quality standards ranging from 10 NTU to 50 NTU, depending on the water body. Therefore, a value of 50 NTU is established for turbidity in this analysis. Turbidity testing began in 2016 to meet the monitoring requirements of the 2016 NPDES ILR40 permit. Results of the turbidity testing conducted from 2021-2024 are provided in the graph below. In 2024, none of the locations (Middle Fork North Branch Downstream) exceeded the 50 NTU threshold.



pH

Most discharge flow types are neutral, having a pH value of approximately 7.0, (although groundwater concentrations can be somewhat variable). pH is a reasonably good indicator for liquid wastes from industries, which can have very high or low pH (ranging from 3.0 to 12.0). The pH of residential wash water tends to be rather basic (pH of 8.0 or 9.0). Although pH data is often not conclusive by itself, it can identify problem areas that merit follow-up investigations using more effective indicators. None of the receiving waters in the Township are impaired for pH.

The established range for pH is 6.5-9.0 (General Use WQS). The pH readings from 2021-2024 are provided in the graph below. All results were recorded within the established range.



VI. Summary

Middle Fork North Branch Upstream
The test site is located at the intersection of Waukegan Road and Martin Luther King Junior Drive in Waukegan. The sample was taken from the Middle Fork North Branch of the Chicago River on the east shore southwest of the Peer Chain Company at 2300 Norman Drive. In 2024, Phosphorous and Fecal Coliform are the only samples in excess of the allowable thresholds. Despite the excess of colonies, Fecal Coliform decreased nearly 10x from 2023. Phosphorous, Chloride, Dissolved Oxygen, Total Dissolved Solids, Conductivity, pH all changed marginally within their allowable thresholds. Total Nitrogen increased over 4x while not exceeding the allowable mg/L. Total Suspended Solids and Turbidity decreased to nearly half that of the 2023 test results.

Middle Fork North Branch Downstream
The test site is located west of the Wildlife Discovery Center operated by the Lake Forest Parks and Recreation Department at 1401 Middle Fork Drive. The sample was taken on the west shoreline accessed by an existing trail and footbridge. In 2024, Phosphorous and Fecal Coliform are the only samples in excess of their allowable thresholds. Suspended Solids decreased 4x and Turbidity decreased 7x that of 2023 and are now within the maximum thresholds. Conductivity marginally increased along with Total Dissolved Solids, Dissolved Oxygen, and Chloride.

Des Plaines River Upstream
The test site is located along the Des Plaines River Trail at approximately mile marker 14 north of the Independence Grove Forest Preserve in Unincorporated Lake County. The sample was taken on the east side of the Des Plaines River within the Commonwealth Edison property. Total Phosphorus and Fecal Coliform continue to exceed the allowable thresholds. Whereas Total Suspended Solids, Nitrogen increased within their allowable thresholds. The most notable results compared to 2023 are Phosphorus, Nitrogen, and Total Suspended Solids which doubled.

Des Plaines River Downstream
The test site is located near the intersection of Valley Park Drive and Country Club Drive in Libertyville. The sample was taken from the north end of the Libertyville Golf Course along the western banks of the Des Plaines River. In 2024, Total Nitrogen, Total Phosphorous, Fecal Coliform exceeded the maximum threshold. Total Suspended Solids, Chloride, Dissolved Oxygen, Total Dissolved Solids, Conductivity, Turbidity all decreased within their limits. The samples continued on previously identified trends, in 2024 no notable results were identified. Continued monitoring is recommended.

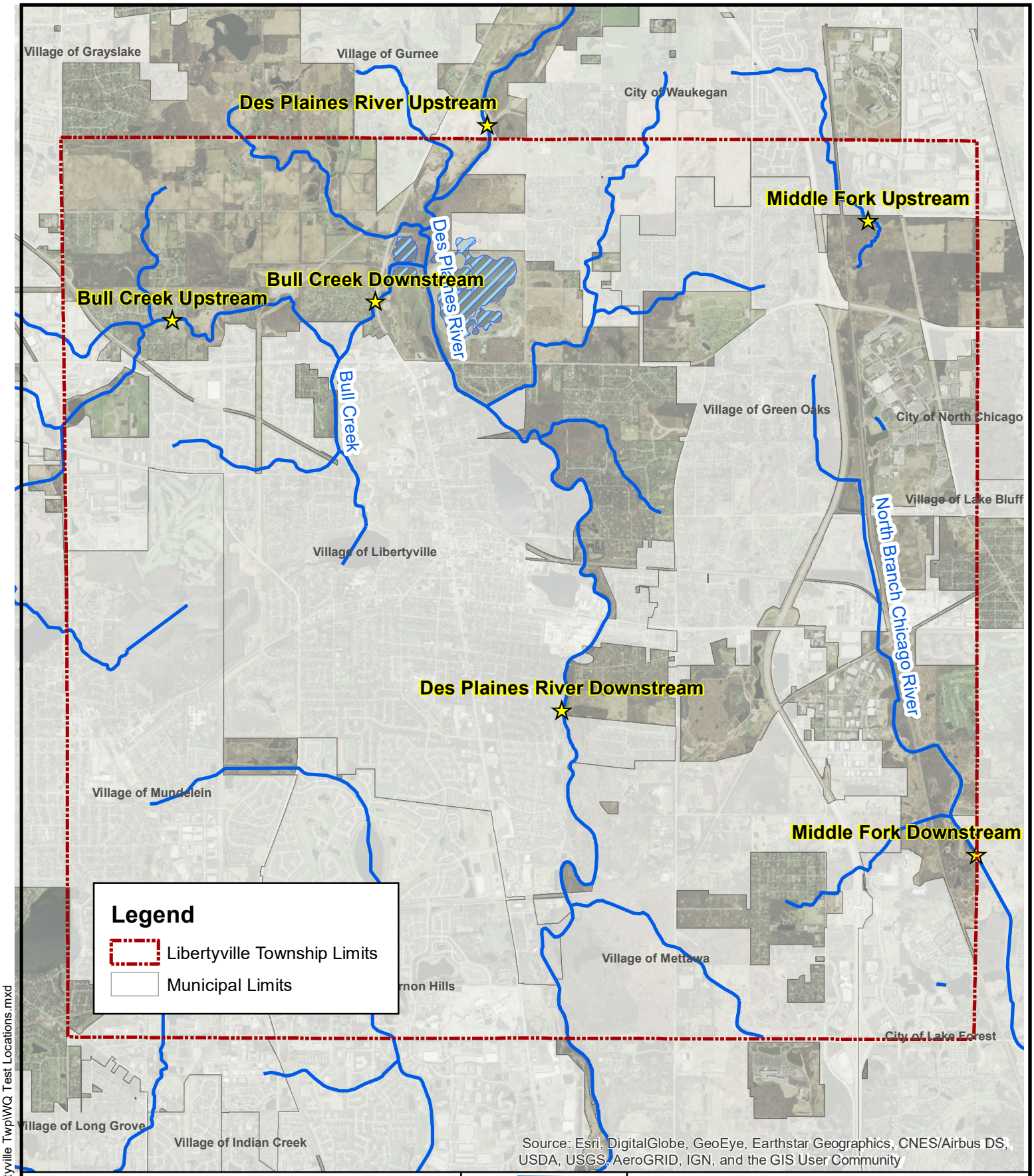
Bull Creek Upstream
The test site is located on North Countryside Drive between Valley Court and Bull Creek Drive in Unincorporated Lake County. The sample was taken from the east side of the road at the downstream location of the roadway culvert along the West Branch of Bull Creek at the residence located at 30805 North Countryside Drive, Libertyville. In 2024, Phosphorous and Fecal Coliform are the only samples in excess of the allowable thresholds, having increased from 2023. Nitrogen increased to over 4x the previous year's samples but remains in an acceptable range. Chloride and Conductivity more than halved from 2023 while Turbidity and Total Dissolved Solids nearly did the same. The 2024 testing did not identify any immediate concerns.

Bull Creek Downstream

The test site is located approximately 120 feet south of the intersection of N. Milwaukee Avenue and Brookhill Road in Unincorporated Lake County. The sample was taken from Bull Creek at the upstream side of the roadway culvert and is considered the downstream sampling location for Bull Creek. In 2024, Phosphorous and Fecal Coliform are the only samples in excess of the allowable thresholds, having increased from 2023. Despite Total Phosphorous nearly doubling, the overall trend appears to be shifting towards compliance. Total Dissolved solids, Conductivity, FOG, Chloride, and pH are all observed in a fluctuating cycle that should continued to be monitored. No immediate action is required at this time.

Appendix A

Location Map



Manhard CONSULTING
900 Woodlands Parkway, Vernon Hills, Illinois 60061
ph: 847-634-5550 manhard.com

NORTH

03/23/2017

Date: 03/23/2017

WATER QUALITY TESTING LOCATIONS LIBERTYVILLE TOWNSHIP LAKE COUNTY

Proj: 000.0LTLT2.01

L:\GIS\Illinois\Municipality\Libetyville Twp\WQ Test Locations.mxd

Appendix B

Lab Report

LAKE COUNTY
HEALTH DEPARTMENT AND
COMMUNITY HEALTH CENTER

Lake County Environmental Laboratory
IDPH Registry # 17541
IEPA Certification # 100267
847 377-8030

REQUEST FOR
MICROBIOLOGICAL AND CHEMICAL ANALYSIS

Project: Libertyville Township NPDES Project - Mike Perkaus
Collection Date: 11-6-2024
Collected by: Matt Rudy
First and Last name

Received Date: 11/6/24
Received Time: 11:44
Received By: AB HL24588

Lab Sample ID	Sample Site:		Collection Time:	Sample Point	TEMPERATURE: FIELD TESTED	TOTAL CHLORINE: FIELD TESTED
* 24K0083-01	Libertyville Township #1 (LT #1) TRAIL		9:20 Am	Per map	56.32°	
* 24K0083-02	Libertyville Township #2 (LT #2) PARK		11:15 Am	Per map	59.34°	
* 24K0083-03	Libertyville Township #3 (LT #3) MLK		9:45 Am	Per map	57.06°	
* 24K0083-04	Libertyville Township #4 (LT #4) BROOKHILL		10:55 Am	Per map	56.76	
* 24K0083-05	Libertyville Township #5 (LT #5) VALLEY		10:30 Am	Per map	57.34°	
* 24K0083-06	Libertyville Township #6 (LT #6) RIVER		10:15 Am	Per map	59.70°	

Analyses requested, please check:

MICROBIOLOGY:
Fecal Coliform _____

CHEMICAL ANALYSIS:
TSS _____
Total Nitrogen _____
Total Phosphorus _____
Chloride _____
Fats/Oils/Greases _____

Container:	2L	M	N	PLAS	Other:

Preservation: *750µl H_2SO_4 pH = ≤2.0 SC 11/6/24

Field / BYK0108

scanned / emailed by:
date: 12/20/24 MB

Email Address/Fax # mike@h2oeco.com

LakeCounty

Sample Must Reach Laboratory within 24 Hr. after Collection.

Lake County Environmental Laboratory
IEPA Certification # 100194
IDPH Registry # 17541

MICROBIOLOGICAL AND CHEMICAL ANALYSES REPORT FORM

Date and Time in Laboratory: 11/6/24 11:45 AB

LAB NO. 24LC0083-C1

Mail Report To:
Name: Aquatics Ecosystems Management
Attn: Mike Perkaus
Address: 1801 Holste Rd
Post Office: Northbrook, IL 60062 State: Zip code:
Phone: Area Code: 847-414-7663 Number:

Collection Date: 11-6-24 **Time:** 9:20
Collected by: Matt Rody
Sample Address: Per map Trail #1
LAT _____ LONG _____

Facility or File No.:
PIN No.:
Sampling Point: ☐ Beach ☐ Final Effluent ☒ Other: LT #1 Trail
Residual Chlorine: Free _____ ppm Total _____ ppm

Remarks:
Recent Rain: 0.50 Inches in Past 24 Hrs.
Wind: Direction NW Velocity: 9
Temp: Air 50 Water 56
Algae:
Wave Height: ☐ (S) ☐ (WC) ☐ (R) ☐ (C)

Indicate Type of Microbiological Test to be Performed: ☐ Total Coli ☒ Fecal Coli ☒ Fecal Strep
Indicate Type of Chemical Test to be Performed: ☐ Dye Test ☐ Detergent ☐ Other

Microbiological Results: (All Analyses Are Performed Same Day Received)

	E.coli	Fecal Coliforms	Fecal Streptococci
Volume, mL:		3	
No. of Colonies:		40	
Membrane Filter Count/100 mL:		1300	

MICROBIOLOGICAL REPORT:
☐ **SATISFACTORY** This Analysis Does Not Show Bacterial Levels Indicative of Pollution.
☐ **UNSATISFACTORY** This Analysis Shows the Presence of Bacteria Indicative of Pollution.
☐ **OTHER** _____

CHEMICAL REPORT:
Fluorescein Dye Test: ☐ Detected ☐ Not Detected **Date Tested:** _____
Test Method Used: Spectrophotometric Scan @ 494 nm

Detergent: **Concentration:** _____ mg/L **Date Tested:** _____
Reported Units: Milligrams of Alkyl Benzene Sulfonate per Liter
Test Method Used: "Detergent Detection" Method Reported by Jesse M. Cohen
Minimum Detection Limit: 0.2 mg/L

☐ **Other:** (See Attached Report)

Report Prepared by: _____ Laboratory Review by: _____

Date Reported: 11/7/24 Sanitarian Review by: _____

Notification for Unsatisfactory Results: Person Notified: _____ Date: _____ By: _____

Batch# BYK0126 Analysis start time 11/6/24 1455 TCS GREEN SHEET 010517

Analysis ended: 11/7/24 1435 TCS

NON-POTABLE WATER

Email Address/Fax # mike@h2oeco.com

LakeCounty

Sample Must Reach Laboratory within 24 Hr. after Collection.

Lake County Environmental Laboratory
IEPA Certification # 100194
IDPH Registry # 17541

MICROBIOLOGICAL AND CHEMICAL ANALYSES REPORT FORM

Date and Time in Laboratory: 11/6/24 11:45 AM

LAB NO. 24KA083-02

Mail Report To:
Name: Aquatics Ecosystems Management
Attn: Mike Perkaus
Address: 1801 Holste Rd
Post Office: Northbrook, IL 60062 State: Zip code:
Phone: Area Code: 847-414-7663 Number:

Collection Date: 11-6-24 **Time:** 11:15
Collected by: Matt Rudy
Sample Address: per map
Park #2
LAT _____ LONG _____

Facility or File No.:
PIN No.:
Sampling Point: ☐ Beach ☐ Final Effluent ☑ Other: LT #2 Park
Residual Chlorine: Free _____ ppm Total _____ ppm

Remarks:
Recent Rain: 0.50 Inches in Past 24 Hrs.
Wind: Direction NW Velocity: 9
Temp: Air 51 Water 59
Algae:
Wave Height: ☐ (S) ☐ (WC) ☐ (R) ☐ (C)

Indicate Type of Microbiological Test to be Performed: ☐ Total Coli ☒ Fecal Coli ☒ Fecal Strep
Indicate Type of Chemical Test to be Performed: ☐ Dye Test ☐ Detergent ☐ Other

Microbiological Results: (All Analyses Are Performed Same Day Received)

	E.coli	Fecal Coliforms	Fecal Streptococci
Volume, mL:		3	
No. of Colonies:		59	
Membrane Filter Count/100 mL:		2000	

MICROBIOLOGICAL REPORT:
☐ **SATISFACTORY** This Analysis Does Not Show Bacterial Levels Indicative of Pollution.
☐ **UNSATISFACTORY** This Analysis Shows the Presence of Bacteria Indicative of Pollution.
☐ **OTHER** _____

CHEMICAL REPORT:
Fluorescein Dye Test: ☐ Detected ☐ Not Detected **Date Tested:** _____
Test Method Used: Spectrophotometric Scan @ 494 nm

Detergent: **Concentration:** _____ mg/L **Date Tested:** _____
Reported Units: Milligrams of Alkyl Benzene Sulfonate per Liter
Test Method Used: "Detergent Detection" Method Reported by Jesse M. Cohen
Minimum Detection Limit: 0.2 mg/L

☐ **Other:** (See Attached Report)

Report Prepared by: _____ Laboratory Review by: _____

Date Reported: 11/7/24 Sanitarian Review by: _____

Notification for Unsatisfactory Results: Person Notified: _____ Date: _____ By: _____

AJ TCS

Batch# BYK0126 Analysis start time 11/6/24 1455 TCS GREEN SHEET 010517

Analysis ended: 11/7/24 1435 TCS

NON-POTABLE WATER

Email Address/Fax # mike@h2oeco.com

LakeCounty

Sample Must Reach Laboratory within 24 Hr. after Collection.

Lake County Environmental Laboratory
IEPA Certification # 100194
IDPH Registry # 17541

MICROBIOLOGICAL AND CHEMICAL ANALYSES REPORT FORM

Date and Time in Laboratory: 11/6/24 11:45 AM

LAB NO. 24kcc083-c3

Mail Report To:
Name: Aquatics Ecosystems Management
Attn: Mike Perkaus
Address: 1801 Holste Rd
Post Office: Northbrook, IL 60062 State: Zip code:
Phone: Area Code: Number: 847-414-7663

Collection Date: 11-6-24 **Time:** 9:45
Collected by: Matt Rudy
Sample Address: per map
MLK #3
LAT _____ LONG _____

Facility or File No.:
PIN No.:
Sampling Point: ☐ Beach ☐ Final Effluent ☑ Other: LT #3 MLK
Residual Chlorine: Free ____ ppm Total ____ ppm

Remarks:
Recent Rain: 0.50 Inches in Past 24 Hrs.
Wind: Direction NW Velocity: 9
Temp: Air 50 Water 57
Algae:
Wave Height: ☐ (S) ☐ (WC) ☐ (R) ☐ (C)

Indicate Type of Microbiological Test to be Performed: ☐ Total Coli ☒ Fecal Coli ☒ Fecal Strep
Indicate Type of Chemical Test to be Performed: ☐ Dye Test ☐ Detergent ☐ Other

Microbiological Results: (All Analyses Are Performed Same Day Received)

	E.coli	Fecal Coliforms	Fecal Streptococci
Volume, mL:		3	
No. of Colonies:		20	
Membrane Filter Count/100 mL:		670	

MICROBIOLOGICAL REPORT:
☐ **SATISFACTORY** This Analysis Does Not Show Bacterial Levels Indicative of Pollution.
☐ **UNSATISFACTORY** This Analysis Shows the Presence of Bacteria Indicative of Pollution.
☐ **OTHER** _____

CHEMICAL REPORT:
Fluorescein Dye Test: ☐ Detected ☐ Not Detected **Date Tested:** _____
Test Method Used: Spectrophotometric Scan @ 494 nm

Detergent: **Concentration:** _____ mg/L **Date Tested:** _____
Reported Units: Milligrams of Alkyl Benzene Sulfonate per Liter
Test Method Used: "Detergent Detection" Method Reported by Jesse M. Cohen
Minimum Detection Limit: 0.2 mg/L

☐ **Other:** (See Attached Report)

Report Prepared by: _____ Laboratory Review by: _____

Date Reported: 11/7/24 Sanitarian Review by: _____

Notification for Unsatisfactory Results: Person Notified: _____ Date: _____ By: _____

Batch# BYK0126 Analysis start time 11/6/24 1455 TCS GREEN SHEET 010517

Analysis ended: 11/7/24 1435 TCS

NON-POTABLE WATER

Email Address/Fax # mike@h2oeco.com

LakeCounty

Sample Must Reach Laboratory within 24 Hr. after Collection.

Lake County Environmental Laboratory
IEPA Certification # 100194
IDPH Registry # 17541

MICROBIOLOGICAL AND CHEMICAL ANALYSES REPORT FORM

Date and Time in Laboratory: 11/6/24 11:45 AM (R) LAB NO. 24K0083-04

Mail Report To: Name: Aquatics Ecosystems Management Attn: Mike Perkaus	**Collection Date:** 11-6-24 **Time:** 10:55
Address: 1801 Holste Rd	**Collected by:** Matt Rudy
Post Office: Northbrook, IL 60062 State: Zip code:	**Sample Address:** per map Brookhill #4
Phone: Area Code: 847-414-7663 Number:	LAT LONG

Facility or File No.:

PIN No.:

Sampling Point: ☐ Beach ☐ Final Effluent ☑ Other: LT #4 Brookhill

Residual Chlorine: Free ppm Total ppm

Remarks:

Recent Rain: 0.50 Inches in Past 24 Hrs.

Wind: Direction NW Velocity: 9

Temp: Air 51 Water 56

Algae:

Wave Height: ☐ (S) ☐ (WC) ☐ (R) ☐ (C)

Indicate Type of Microbiological Test to be Performed: ☐ Total Coli ☒ Fecal Coli ☒ Fecal Strep

Indicate Type of Chemical Test to be Performed: ☐ Dye Test ☐ Detergent ☐ Other

Microbiological Results: (All Analyses Are Performed Same Day Received)

	E.coli	Fecal Coliforms	Fecal Streptococci
Volume, mL:		3	
No. of Colonies:		17	
Membrane Filter Count/100 mL:		570 est	

MICROBIOLOGICAL REPORT:

☐ **SATISFACTORY** This Analysis Does Not Show Bacterial Levels Indicative of Pollution.

☐ **UNSATISFACTORY** This Analysis Shows the Presence of Bacteria Indicative of Pollution.

☐ **OTHER**

CHEMICAL REPORT:

Fluorescein Dye Test: ☐ Detected ☐ Not Detected **Date Tested:**
Test Method Used: Spectrophotometric Scan @ 494 nm

Detergent: **Concentration:** mg/L **Date Tested:**
Reported Units: Milligrams of Alkyl Benzene Sulfonate per Liter
Test Method Used: "Detergent Detection" Method Reported by Jesse M. Cohen
Minimum Detection Limit: 0.2 mg/L

☐ **Other:** (See Attached Report)

Report Prepared by: [signature] Laboratory Review by: [signature]

Date Reported: 11/7/24 Sanitarian Review by:

Notification for Unsatisfactory Results: Person Notified: Date: By:

Batch# BYK0126 Analysis start time 11/6/24 1455 TCS GREEN SHEET 010517

Analysis ended: 11/7/24 1435 TCS

NON-POTABLE WATER

Email Address/Fax # mike@h2oeco.com

LakeCounty

Sample Must Reach Laboratory within 24 Hr. after Collection.

Lake County Environmental Laboratory
IEPA Certification # 100194
IDPH Registry # 17541

MICROBIOLOGICAL AND CHEMICAL ANALYSES REPORT FORM

Date and Time in Laboratory: 11/6/24 11:45 ATP

LAB NO. 24KCL83-05

Mail Report To: Name: Aquatics Ecosystems Management Attn: Mike Perkaus Address: 1801 Holste Rd Post Office: Northbrook, IL 60062 State: Zip code: Phone: Area Code: 847-414-7663 Number:	**Collection Date:** 11-6-24 **Time:** 10:30 **Collected by:** Mutt Rudy **Sample Address:** per Map Valley #5 LAT _____ LONG _____
Facility or File No.: **PIN No.:** **Sampling Point:** ☐ Beach ☐ Final Effluent ☒ Other: LT #5 Valley **Residual Chlorine:** Free ____ ppm Total ____ ppm	Remarks: Recent Rain: 0.50 Inches in Past 24 Hrs. Wind: Direction NW Velocity: 9 Temp: Air 51 Water 57 Algae: Wave Height: ☐ (S) ☐ (WC) ☐ (R) ☐ (C)

Indicate Type of Microbiological Test to be Performed: ☐ Total Coli ☒ Fecal Coli ☒ Fecal Strep

Indicate Type of Chemical Test to be Performed: ☐ Dye Test ☐ Detergent ☐ Other

Microbiological Results: (All Analyses Are Performed Same Day Received)

	E.coli	Fecal Coliforms	Fecal Streptococci
Volume, mL:		3	
No. of Colonies:		21	
Membrane Filter Count/100 mL:		700	

MICROBIOLOGICAL REPORT:

☐ **SATISFACTORY** This Analysis Does Not Show Bacterial Levels Indicative of Pollution.

☐ **UNSATISFACTORY** This Analysis Shows the Presence of Bacteria Indicative of Pollution.

☐ **OTHER** _____

CHEMICAL REPORT:

Fluorescein Dye Test: ☐ **Detected** ☐ **Not Detected** **Date Tested:** _____
Test Method Used: Spectrophotometric Scan @ 494 nm

Detergent: **Concentration:** _____ **mg/L** **Date Tested:** _____
Reported Units: Milligrams of Alkyl Benzene Sulfonate per Liter
Test Method Used: "Detergent Detection" Method Reported by Jesse M. Cohen
Minimum Detection Limit: 0.2 mg/L

☐ **Other:** **(See Attached Report)**

Report Prepared by: _____ Laboratory Review by: _____

Date Reported: 11/7/24 Sanitarian Review by: _____

Notification for Unsatisfactory Results: Person Notified: _____ Date: _____ By: _____

PJ TG

Batch# BYK0126 Analysis start time 11/6/24 1455TG GREEN SHEET 010517

Analysis ended: 11/7/24 1435TG

NON-POTABLE WATER

Email Address/Fax # mike@h2oeco.com

LakeCounty

Sample Must Reach Laboratory within 24 Hr. after Collection.

Lake County Environmental Laboratory
IEPA Certification # 100194
IDPH Registry # 17541

MICROBIOLOGICAL AND CHEMICAL ANALYSES REPORT FORM

Date and Time in Laboratory: 11/6/24 11:45 AM

LAB NO. 24CC83-06

Mail Report To:
Name: Aquatics Ecosystems Management
Attn: Mike Perkaus
Address: 1801 Holste Rd
Post Office: Northbrook, IL 60062 State: Zip code:
Phone: Area Code: 847-414-7663 Number:

Collection Date: 11-6-24 **Time:** 10:15
Collected by: Matt Rudy
Sample Address: per map river #6
LAT LONG

Facility or File No.:
PIN No.:
Sampling Point: ☐ Beach ☐ Final Effluent ☒ Other: LT #6 river
Residual Chlorine: Free ppm Total ppm

Remarks:
Recent Rain: 0.50 Inches in Past 24 Hrs.
Wind: Direction NW Velocity: 9
Temp: Air 51 Water 59
Algae:
Wave Height: ☐ (S) ☐ (WC) ☐ (R) ☐ (C)

Indicate Type of Microbiological Test to be Performed: ☐ Total Coli ☒ Fecal Coli ☒ Fecal Strep
Indicate Type of Chemical Test to be Performed: ☐ Dye Test ☐ Detergent ☐ Other

Microbiological Results: (All Analyses Are Performed Same Day Received)

	E.coli	Fecal Coliforms	Fecal Streptococci
Volume, mL:		3	
No. of Colonies:		102	
Membrane Filter Count/100 mL:		3400 est	

MICROBIOLOGICAL REPORT:
☐ **SATISFACTORY** This Analysis Does Not Show Bacterial Levels Indicative of Pollution.
☐ **UNSATISFACTORY** This Analysis Shows the Presence of Bacteria Indicative of Pollution.
☐ **OTHER**

CHEMICAL REPORT:
Fluorescein Dye Test: ☐ Detected ☐ Not Detected **Date Tested:**
Test Method Used: Spectrophotometric Scan @ 494 nm

Detergent: **Concentration:** mg/L **Date Tested:**
Reported Units: Milligrams of Alkyl Benzene Sulfonate per Liter
Test Method Used: "Detergent Detection" Method Reported by Jesse M. Cohen
Minimum Detection Limit: 0.2 mg/L

☐ **Other:** (See Attached Report)

Report Prepared by: [signature] Laboratory Review by: [signature]
Date Reported: 11/7/24 Sanitarian Review by:

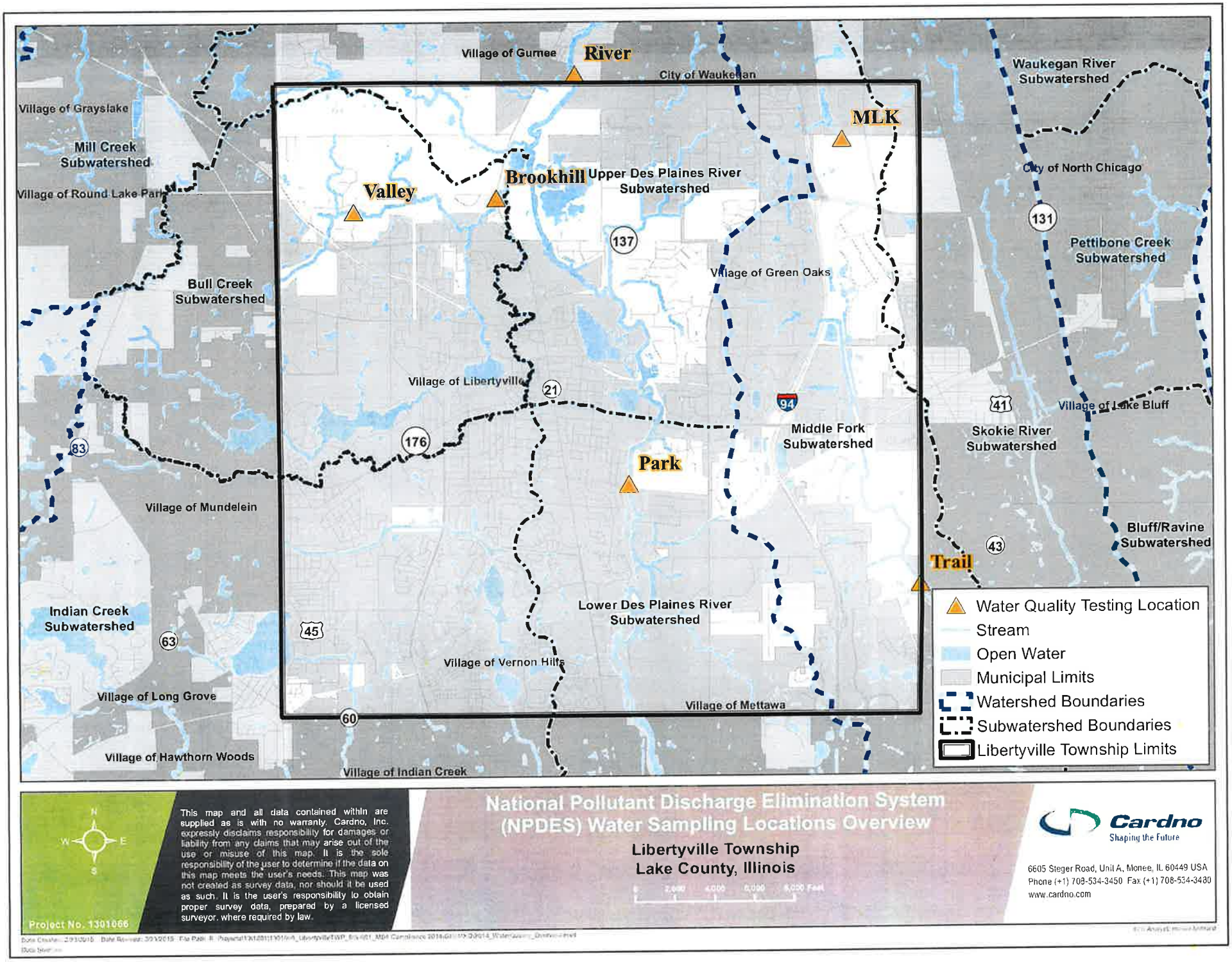
Notification for Unsatisfactory Results: Person Notified: Date: By:

Batch# BYK0126 Analysis start time 11/6/24 1455 TG GREEN SHEET 010517

Analysis ended: 11/7/24 1435 TG

NON-POTABLE WATER

PV TG


Village of Gurnee
River
City of Waukegan
Waukegan River Subwatershed
Village of Grayslake
Mill Creek Subwatershed
MLK
Valley
Brookhill
Upper Des Plaines River Subwatershed
City of North Chicago
Village of Round Lake Park
137
131
Pettibone Creek Subwatershed
Village of Green Oaks
Bull Creek Subwatershed
Village of Libertyville
21
94
41
Village of Lake Bluff
Middle Fork Subwatershed
Skokie River Subwatershed
176
83
Park
Village of Mundelein
Bluff/Ravine Subwatershed
43
Trail
Indian Creek Subwatershed
Lower Des Plaines River Subwatershed
45
63
Village of Vernon Hills
Village of Long Grove
Village of Mettawa
60
Village of Hawthorn Woods
Village of Indian Creek
Water Quality Testing Location
Stream
Open Water
Municipal Limits
Watershed Boundaries
Subwatershed Boundaries
Libertyville Township Limits
N
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Project No. 1301066
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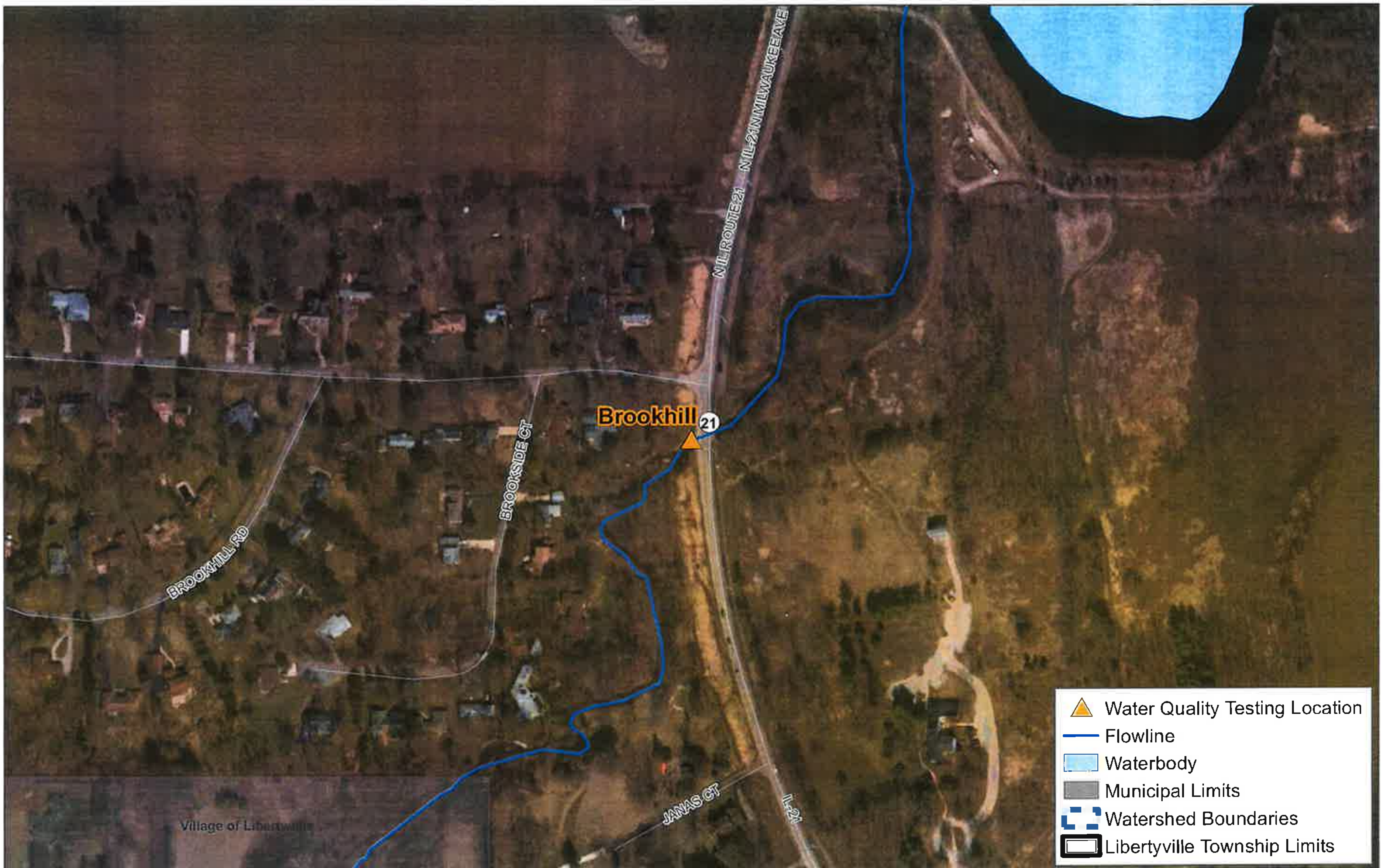
National Pollutant Discharge Elimination System (NPDES) Water Sampling Locations Overview
Libertyville Township
Lake County, Illinois
Cardno
Shaping the Future
6605 Steger Road, Unit A, Monee, IL 60449 USA
Phone (+1) 708-534-3450 Fax (+1) 708-534-3480
www.cardno.com



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Page: 1 of 6
Project No. 1301066

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National Pollutant Discharge Elimination System (NPDES) Water Sampling Locations Overview

Libertyville Township
Lake County, Illinois

0 100 200 300 Feet

Cardno
Shaping the Future

6605 Steger Road, Unit A, Monee, IL 60449 USA
Phone (+1) 708-534-3450 Fax (+1) 708-534-3480
www.cardno.com

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Page: 2 of 6
Project No. 1301086

National Pollutant Discharge Elimination System (NPDES) Water Sampling Locations Overview

Libertyville Township
Lake County, Illinois

0 100 200 300 Feet

Cardno
Shaping the Future

6605 Steger Road, Unit A, Monee, IL 60449 USA
Phone (+1) 708-534-3450 Fax (+1) 708-534-3480
www.cardno.com

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Page: 3 of 6
Project No. 1301066

National Pollutant Discharge Elimination System (NPDES) Water Sampling Locations Overview

Libertyville Township
Lake County, Illinois

Cardno
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6605 Steger Road, Unit A, Monee, IL 60449 USA
Phone (+1) 708-534-3450 Fax (+1) 708-534-3480
www.cardno.com

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Project No. 1301066

National Pollutant Discharge Elimination System (NPDES) Water Sampling Locations Overview

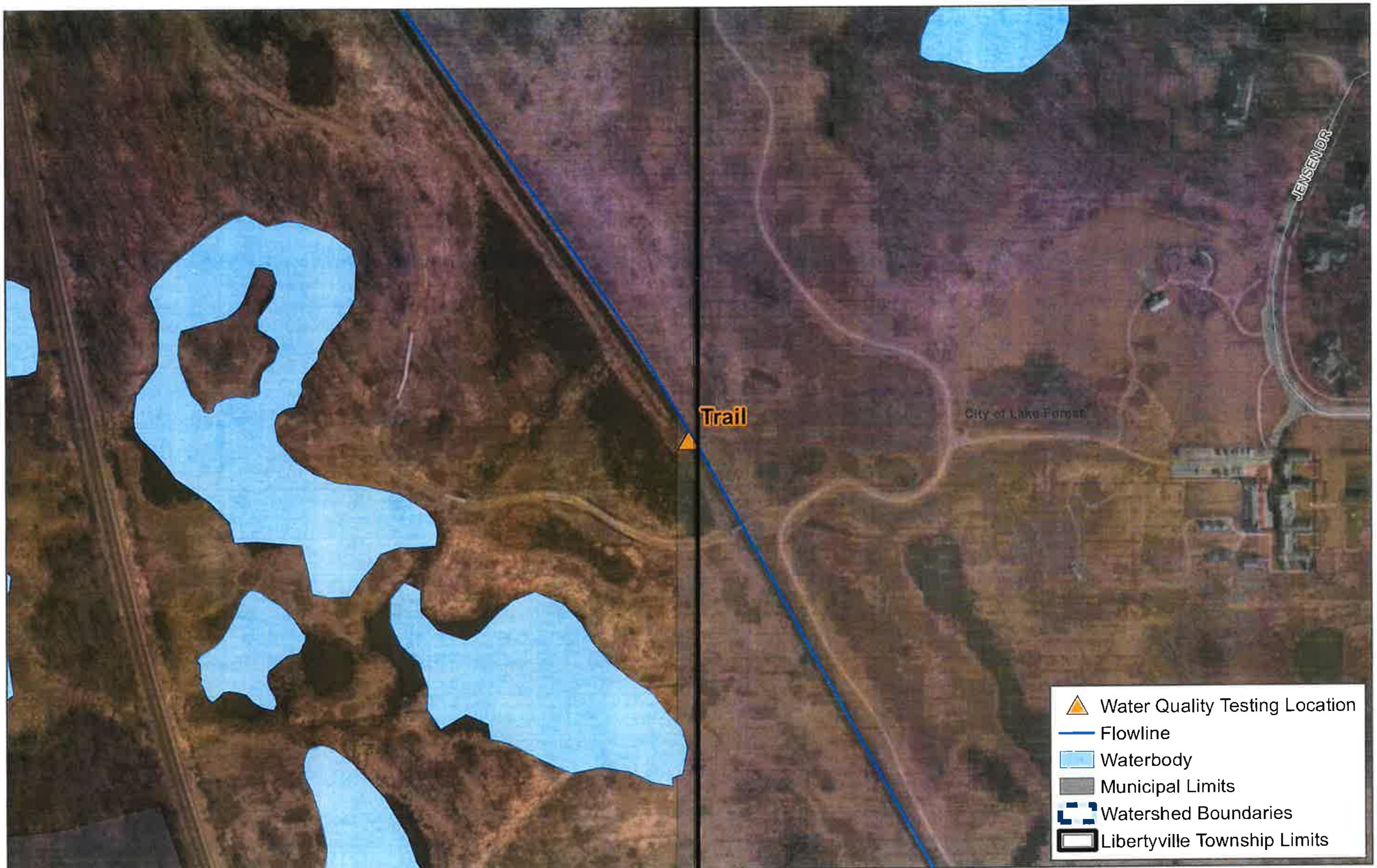
Libertyville Township
Lake County, Illinois

0 100 200 300 Feet

Cardno
Shaping the Future

6605 Steger Road, Unit A, Monee, IL 60449 USA
Phone (+1) 708-534-3450 Fax (+1) 708-534-3480
www.cardno.com

Source: ... and the GIS User Community



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Project No. 1301066

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National Pollutant Discharge Elimination System (NPDES) Water Sampling Locations Overview

Libertyville Township
Lake County, Illinois

0 100 200 300 Feet

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