



February 7, 2024

Illinois Environmental Protection Agency  
Division of Water Pollution Control  
Attention: Compliance Assurance Section, Mail Code #19  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

Re: NPDES Permit No. IL0025089  
Aqua Illinois Manteno STW  
Special Condition 21 – NARP

Please forgive the lateness of this document it was completed before 12/25/23; however, not sent on time. In response to Special Condition 21 of the Manteno STW NPDES Permit (No. IL0025089), Aqua Illinois respectfully submits its Nutrient Assessment and Reduction Plan, which includes results of our water quality monitoring program, characterization of the effluent-receiving watershed and our strategy for plan implementation, including estimated schedule and costs.

Please contact us at your convenience if you have any questions, require any clarifications or if the agency would like an opportunity to discuss the submission.

*Alan E. stark*  
Alan Stark  
Environmental Compliance Manager

## **NUTRIENT ASSESSMENT REDUCTION PLAN**

**December 2023**

**AQUA ILLINOIS - MANTENO**



**PREPARED BY: NORTHWATER CONSULTING & DONOHUE AND ASSOCIATES**

**PREPARED FOR: AQUA ILLINOIS**

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## LIST OF ACROYNMS

CFS	Cubic Feet Per Second
CWA	Clean Water Act
DAF	Design Average Flow
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
FOIA	Freedom of Information Act
HUC	Hydrologic Unit Code
INLRS	Illinois Nutrient Loss Reduction Strategy
MGD	Million Gallons per Day
NARP	Nutrient Assessment Reduction Plan
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NPS	Nonpoint Source
NWS	National Weather Service
NH <sub>3</sub>	Ammonia
NO <sub>3</sub> <sup>-</sup>	Nitrate
NPDES	National Pollution Discharge Elimination System
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
USGS	United States Geological Survey
WWTP	Wastewater Treatment Plant



*Aqua Illinois Manteno Treatment Plant*

## 1. INTRODUCTION & BACKGROUND

In 2018, the Illinois EPA instituted nutrient reduction permit requirements applicable to Wastewater Treatment Plants (WWTPs) with effluent discharges greater than 1-million gallons per day (MGD). The nutrient reduction approach for WWTPs supports a pathway to establish site-specific permit limits for phosphorus at each facility in lieu of instituting a statewide limit. The Nutrient Assessment Reduction Plan (NARP) requirement resulted from negotiations with environmental organizations, Illinois EPA, and the Illinois Association of Wastewater Agencies.

A NARP Special Permit Condition is now included in a National Pollution Discharge Elimination System (NPDES) permit if a receiving stream segment or downstream segment is on the Illinois Clean Water Act (CWA) 303(d) list as impaired with phosphorus-related causes. A NARP is also required if there is a “risk of eutrophication” as defined by meeting any of the three conditions outlined in Table 1.

**Table 1 - Illinois EPA Risk of Eutrophication Criteria**

Risk of Eutrophication if any of these Conditions Met:		
pH	Median Sestonic Chlorophyll $\alpha$	On any Two Days During Illinois EPA Monitoring Week, Daily Max
> 9	> 26 $\mu\text{g/L}$	pH > 8.35 and DO saturation > 110%

Whether the NARP special permit condition is triggered by a CWA 303(d) impairment listing, or eutrophication risk criteria, the designation is often based on limited data. For example, the risk of eutrophication justification for some sites is based on only two non-consecutive weeks of continuous Dissolved Oxygen (DO) and pH data collection performed by the Illinois EPA. In some cases, the data is over 10 years old.

The Illinois EPA allows the NPDES permittee to undertake additional data collection and assessment, which can confirm NARP triggering conditions, or determine that the watershed does not have a phosphorus-related impairment or risk of eutrophication. If sufficient evidence indicates no impairment or risk of eutrophication, it is possible that phosphorus regulation and mitigation measures may not be necessary. The following actions have been proposed to comply with the NARP permit condition:

- Examine if sufficient data exists to fully characterize impairment or risk of eutrophication in the receiving watershed.
  - If data is insufficient, create a water quality monitoring plan and collect data.
- If existing or new data indicates a full NARP is required:
  - Undertake watershed characterization.
  - Model watershed and instream processes.
  - Establish defensible site-specific water quality criteria.
  - Define scenarios and strategies to achieve water quality targets.
  - Implement NARP recommended actions and engage stakeholders.

This report details the monitoring program implemented to support a NARP Strategy and Work Plan. Section 2 provides an overview of water quality triggers. Section 3 describes the monitoring program,

methods, and results with interpretation at the end of the section. Section 4 presents a Strategy and Work Plan following a watershed characterization.

## 1.1 TREATMENT PLANT BACKGROUND

Aqua Illinois owns and operates the Manteno WWTP with a design average flow (DAF) of 1.15 MGD located in the Village of Manteno in Kankakee County (NPDES Permit No. IL0025089). The facility is subject to a NARP special permit condition with a deadline of December 31, 2023. The plant serves a population of over 9,000 with 3,800 residential, commercial, and industrial connections. Treatment consists of screening, grit removal, sedimentation, activated sludge, secondary clarification, anaerobic digestion, aerobic digestion/sludge holding tanks, belt filtration, tertiary filtration, chlorination, excess flow treatment, aerobic digestion and land application. The WWTP discharges to South Branch Rock Creek, a small stream that is characterized with seven-day one in ten-year low flow (7Q10) of 0.5 cubic feet per second (CFS). The stream is tributary to Rock Creek which then joins the Kankakee River. Aqua also owns and operates the Village of Peotone WWTP (DAF 0.85 MGD), which discharges to Black Walnut Creek, a tributary to South Branch Rock Creek upstream of the Manteno WWTP (Figure 1). Although it is not subject to NARP requirements as the DAF is under 1.0 MGD, it is a source of nutrients in the watershed upstream of the Manteno WWTP, and differentiating the influences of all nutrient sources in the watershed was considered important for Manteno's NARP implementation.

## 2. NARP TRIGGERS & ACTIONS

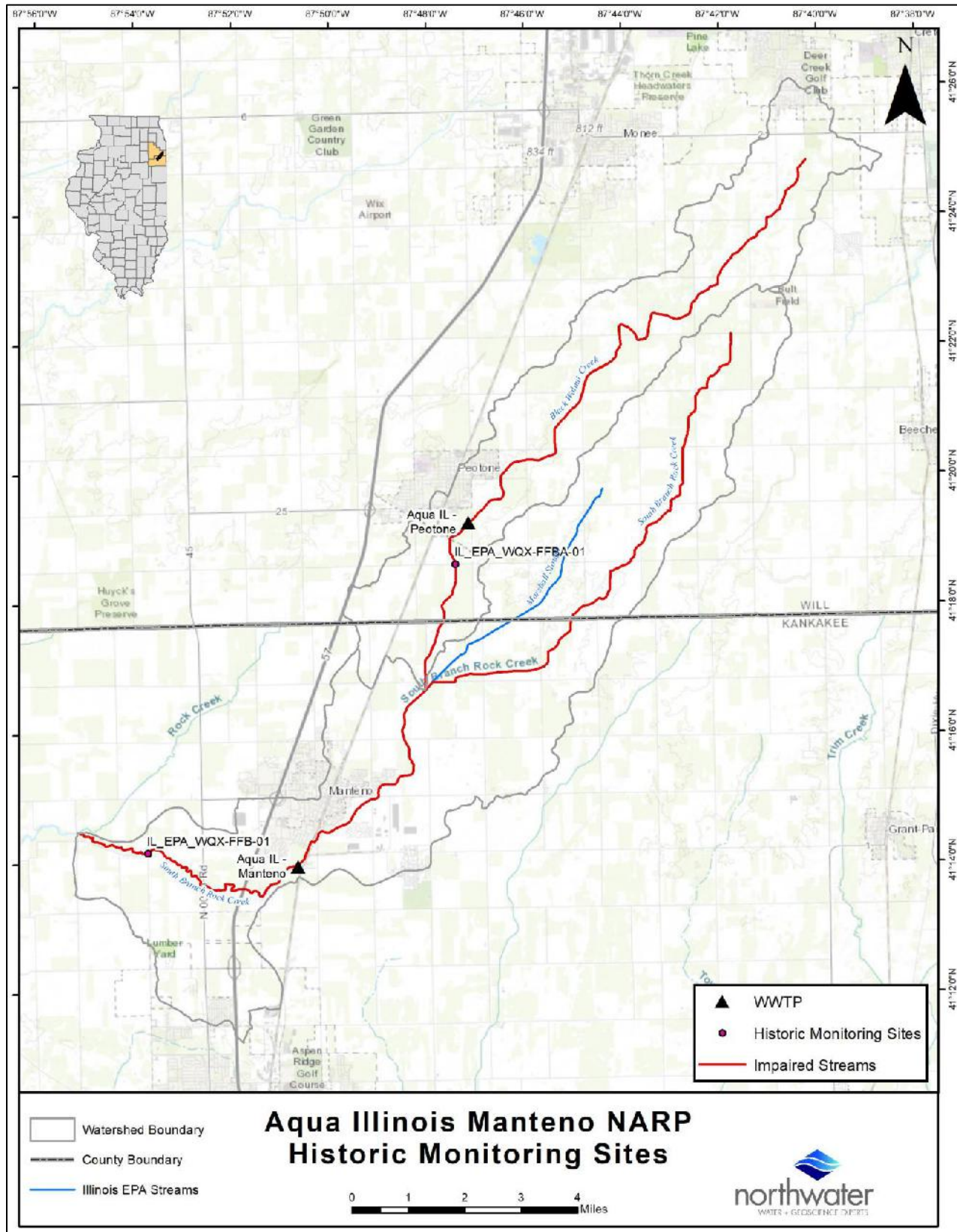
According to the NPDES permit, the Manteno WWTP NARP special condition was triggered by historical data indicating a risk of eutrophication in Illinois EPA segment FFB-01 on South Branch Rock Creek downstream of the plant's outfall. This segment is 19.8 miles long and extends upstream and downstream of the outfall. This segment was also on the 303(d) list of impaired waters with non-attainment for aquatic life use with non-standards-based cause of phosphorus from 2010-2016 and with a cause of pH from 2012-2016. Supporting data for these triggers was limited and considered inadequate to fully understand the risk of eutrophication, or conclusive that Manteno effluent contributed to the threshold exceedances (Table 2). The upstream watershed area of the plant outfall is 51.4 mi<sup>2</sup> while the sampling site that experienced risk of eutrophication is 3.4 miles downstream with a watershed area of 59.3 mi<sup>2</sup>. The watershed is primarily agricultural land use, with an additional WWTP upstream in Peotone, IL.

**Table 2 - Illinois EPA Risk of Eutrophication Designation Data**

Site	Description	Continuous Monitoring Duration	Days Exceeding DO & pH Threshold	Days Exceeding 9.0 pH Standard	Sestonic Chlorophyll α Samples	Sestonic Chlorophyll α Exceedances
FFB-01	South Branch Rock Creek	2 weeks in 2010 2 weeks in 2015	6 days in 2010 4 days in 2015	2 days in 2010	3 in 2010 1 in 2015	0

Data mining was undertaken using publicly available sources to compile any other informative and relevant nutrient, DO, pH or chlorophyll data. Several sites were identified in the study area, however, there were no more than 5 measurements per parameter since 2010, with the exception of phosphorus which had additional measurements in 2020. With only limited data available, a water quality monitoring plan was

created (Appendix A) and executed to further evaluate the risk of eutrophication and guide the NARP process.



**Figure 1 - Historic Monitoring Site Locations and Impaired Stream Segments**

### 3. WATER QUALITY MONITORING PROGRAM & RESULTS

Based on the monitoring plan, the program was carried out with three main objectives:

1. Confirm or contest the appropriateness of the NARP requirement in the Manteno NPDES permit.
2. Improve understanding of nutrient dynamics to inform next steps if a NARP needs to be advanced to establish site-specific phosphorus limits.
3. Provide data to guide equitable implementation of nutrient reduction measures among contributors, if such reductions are necessary.

Aqua Illinois retained Donohue and Associates and Northwater Consulting to develop the monitoring plan and support implementation of the monitoring program. The Strategy and Work Plan presented in Sections 4.2 and 4.3 are guided by the monitoring results and are the foundation of next steps in the NARP process.

#### 3.1 MONITORING STATIONS & INFRASTRUCTURE

Figure 2 and Figure 3 illustrate the stations and details of the 2023 monitoring. Section 3.2 details methods and parameters. Aqua's Manteno WWTP discharges to South Branch Rock Creek, which downstream is joined by North Branch Rock Creek to become Rock Creek, which then enters the Kankakee River. Upstream, Black Walnut Creek is tributary to South Branch Rock Creek, the receiving stream for effluent from Aqua's Peotone WWTP. A modified upstream/downstream monitoring configuration (Figure 2 and Figure 3) was designed to capture stream conditions (1) before and after the Manteno outfall, (2) before and after the Peotone outfall, and (3) on South Branch Rock Creek above any WWTP influence. Another downstream site was monitored on Rock Creek just above the confluence with the Kankakee to represent the entire Rock Creek watershed. Monitoring began in May 2023 with grab sampling and deployment of continuous monitoring equipment and concluded at the end of October 2023.



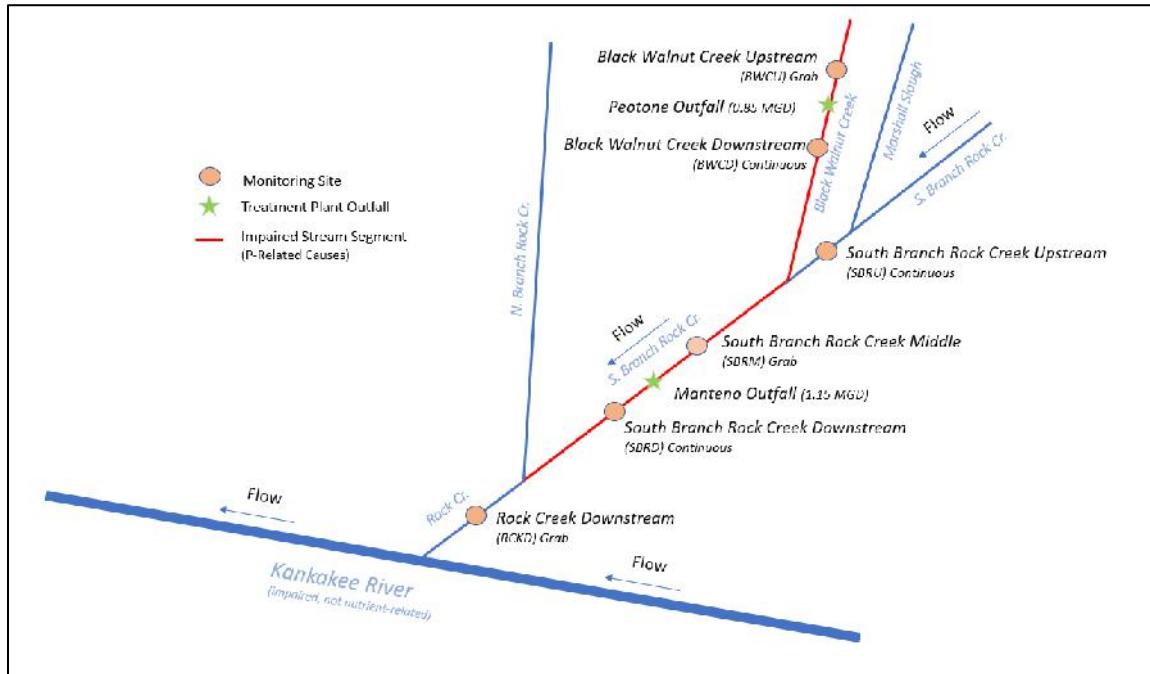


Figure 2 - Monitoring Program Schematic (not to scale)

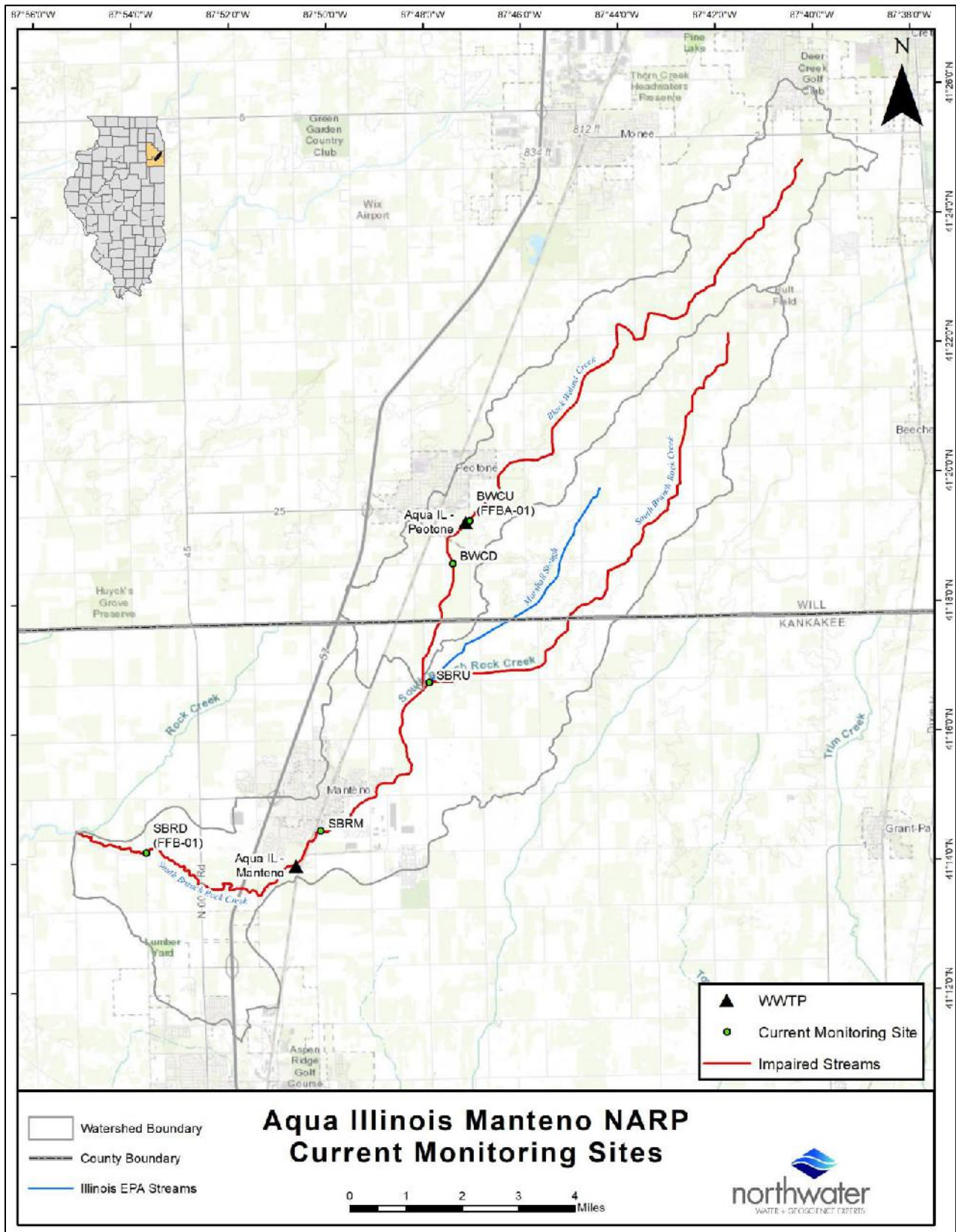


Figure 3 - NARP Monitoring Locations

**Table 3 - Monitoring Stations**

Station ID	Name	Alternate Station IDs	Lat/Long (decimal degrees)	Approximate distance from outfall (mi)	Watershed area (mi <sup>2</sup> )	Type of Sampling
BWCU	Black Walnut Creek Upstream	-	41.321304, -87.785058	0.1 mi (Upstream from Peotone)	15.7	Biweekly Grab
BWCD	Black Walnut Creek Downstream	FFBA-01	41.31034, -87.790788	0.95 mi (Downstream from Peotone)	17.2	Continuous / Biweekly Grab
SBRU	South Branch Rock Creek Upstream	-	41.27964, -87.799155	4.5 mi (Upstream from Manteno)	16.9	Continuous / Biweekly Grab
SBRM	South Branch Rock Creek Middle	-	41.24168, -87.836472	0.7 mi (Upstream from Manteno)	49.1	Biweekly Grab
SBRD	South Branch Rock Creek Downstream	FFB-01	41.22502, -87.857841	3.4 mi (Downstream from Manteno)	59.3	Continuous / Biweekly Grab
RCKD	Rock Creek Downstream	FF-01	41.22122, -87.9734	8.7	120.7	Biweekly Grab

### 3.2 METHODS

Sampling parameters were selected to be directly responsive to the NARP criteria, with a combination of continuous monitoring, spot checks with handheld meters and grab samples submitted for lab analysis. Table 4 summarizes all parameters and other details including methods and sampling frequency. Continuous data collection stations included temporarily deployed infrastructure to facilitate use of water quality sondes. Sondes were placed in 4" perforated PVC pipes that extended from the bank as close as practical to the channel thalweg or attached vertically to a bridge pier. The sondes were positioned so that they were in flowing water and not influenced by stagnant or non-flowing backwater conditions.

#### **Continuous Monitoring (3 Stations: BWCD, SBRU, SBRD)**

- YSI Inc. EXO2 multiparameter continuous monitoring sondes with anti-fouling wiper, internal logging, and battery deployed at three of the six stations (BWCD, SBRU, SBRD).
  - Bi-weekly site visits to download data, calibrate and maintain the sensors and infrastructure. All instrument calibrations and maintenance followed manufacturer's recommended practices and calibration logs were saved.
- The sondes were equipped with pH, DO, temperature, turbidity, conductivity, and chlorophyll  $\alpha$  optical fluorescence sensors. The sondes also included pressure transducers to record water height/stage.
- Data collection frequency was 15-minutes to enable the capture of daily maxima and minima of parameters such as pH and DO, which is relevant to Illinois EPA eutrophication risk criteria.

- Chlorophyll  $\alpha$  optical fluorescence data was collected to better understand its occurrence and variability through the monitoring period as it is a eutrophication risk criterion (26  $\mu\text{g/L}$  is the NARP threshold). The sensor data is considered a qualitative measurement and not reliable to make conclusive determinations of NARP triggers.



*Example of infrastructure at South Branch Rock Creek Downstream (SBRD)*

#### **Grab/Spot Sample Sites (BWCU, SBRM, RCKD) and Spot Checks (Continuous sites)**

- Monitoring was performed by Northwater Consulting staff using calibrated handheld water quality meters (YSI ProQuatro and YSI ProDSS), and grab samples were collected.
- Grab sample only sites were monitored biweekly for DO, pH, conductivity, temperature, turbidity, chlorophyll, and nutrient chemistry.
  - Black Walnut Creek (BWCU) is small with a 15.7  $\text{mi}^2$  watershed. With limited resources available, spot and grab sampling were considered adequate for securing baseline data on the upstream influences at this site.
  - South Branch Rock Creek Middle (SBRM) was monitored with spot and grab sampling only. This was considered adequate to capture the change in stream water quality between the upstream and downstream sites with continuous monitoring.
  - Rock Creek Downstream (RCKD) was monitored with grab sampling to have a baseline dataset available if needed, but this site is not currently a critical part of this NARP study.

- Flow was measured bi-weekly at all sites. The United States Geological Survey (USGS) midsection method was applied to measure flows using a Hach FH-950 electromagnetic velocity meter, tape measure, and a top-set wading rod.

**Laboratory Analysis**

- Nutrient grab samples were collected using laboratory-provided containers on the bi-weekly schedule at all stations for the monitoring period. Chain of custody documentation was recorded.
- Parameters included Total Phosphorus (TP), Orthophosphate, Total Nitrogen (TN), Ammonia (NH<sub>3</sub>) and Nitrate (NO<sub>3</sub><sup>-</sup>), and chlorophyll α (Table 4)
- Nitrogen analysis was included to support an improved understanding of in-stream chemistry processes and future modeling, if necessary.
- Laboratory analysis for nutrients was performed by an accredited contract laboratory (Pace Analytics, Peoria, IL and Hazelwood, MO)



*Measuring Flow at Site SBRD*

**WWTP Effluent**

Effluent data is collected as part of the Illinois EPA-required Discharge Monitoring Report (DMR). Parameters relevant to the NARP study include daily discharge and TP which are monitored and reported monthly.

- The average effluent flow for Manteno during the monitoring period was 1.37 MGD, or 2.12 cfs.
- The average TP concentration in Manteno effluent was 2.1 mg/L.
- The average effluent flow for Peotone during the monitoring period was 0.61 MGD or 0.95 cfs.
- The average TP concentration in Peotone effluent was 1.8 mg/L.



*Calibrating multiparameter sondes during a sampling trip.*

Table 4 - Water Quality Monitoring Parameters and Methods

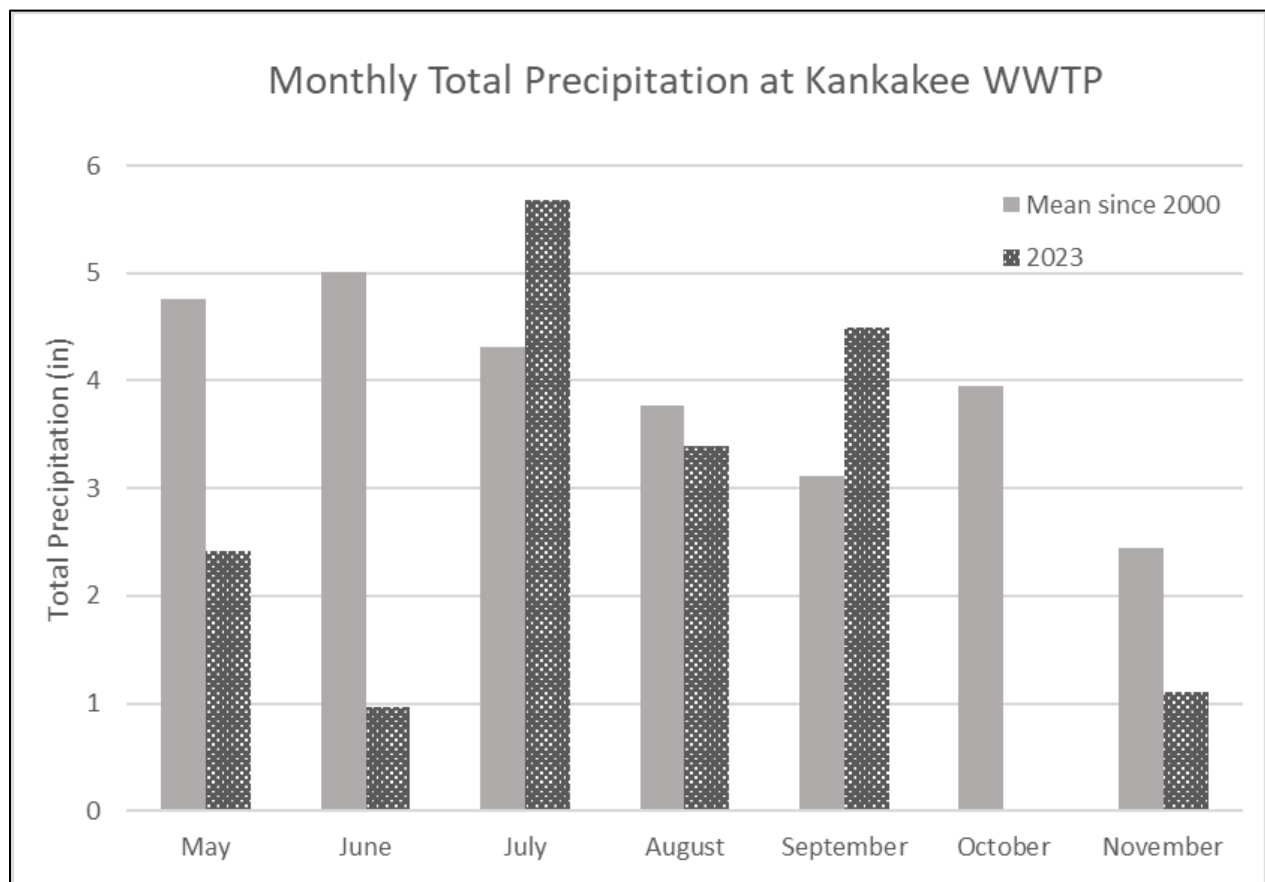
Parameter	Collection Type	Frequency	Method	Method Identifier	Sonde Calibration Method
Dissolved Oxygen	Continuous Probe	Continuous	Optical	InSitu: EPA Approved Method YSI: ASTM D888-09	100% Air Saturation
	Handheld Meter	Bi-weekly	Optical	ASTM D888-09	-
pH	Continuous Probe	Continuous	Potentiometric	EPA 150.2	2 Point 7 & 10 pH
	Handheld Meter	Bi-weekly	Potentiometric	EPA 150.2	-
Water Temperature	Continuous Probe	Continuous	Thermistor	EPA 170.1	Factory Calibration
	Handheld Meter	Bi-weekly	Thermistor	EPA 170.1	-
Chlorophyll- $\alpha$	Continuous Probe	Continuous	In-situ Optical Fluorescence	Instrument Manufacturer Optical Method	2 Point Rhodamine
	Grab	Bi-weekly	Lab Spectrophotometric	EPA 445.0	-
Total Phosphorus	Grab	Bi-weekly	Colorimetry	EPA 365.1 / EPA 365.3	-
Orthophosphate	Grab	Bi-weekly	Colorimetry	EPA 365.1 / EPA 365.3	-
Ammonia	Grab	Bi-weekly	Colorimetry	EPA 350.1 Rev 2	-
Nitrate	Grab	Bi-weekly	Colorimetry	EPA 300.0 Rev 2.1	-
Total Nitrogen	Calculated	-	-	-	-
Conductivity	Continuous Probe	Continuous	Resistor Network	EPA 120.1	1 Point 1,413 $\mu$ S/cm
	Handheld Probe	Bi-weekly	Resistor Network	EPA 120.1	-
Turbidity	Continuous Probe	Continuous	Optical	ASTM D7315-07a	3 point NTU

### 3.3 MONITORING RESULTS

This section presents results of the monitoring program and is organized based on the measured parameters relevant to the NARP. All grab sampling data and contract laboratory reports can be found in Appendix B.

#### STREAMFLOW & PRECIPITATION

Table 5 and Figure 5 present a summary of the flow data measured during the monitoring period. Some data were influenced by precipitation and runoff events however, flows were typically low at all the sites from May through October. The period experienced drought conditions, as illustrated by precipitation data from the National Weather Service (NWS) station at the nearby Kankakee WWTP (Figure 4). The early portion of the monitoring was a statistically significant dry period and not representative of average conditions. The hydrology and river flows were more significantly driven by WWTPs during this period than is typical. Later in the monitoring, higher than average rainfall was recorded, however, river baseflows remained low due to the earlier season dry conditions. These low flows likely had an impact on water quality in the streams.



**Figure 4 - Monthly Total Precipitation at Kankakee WWTP (October 2023 data not available due to equipment malfunction - the total was above average despite several days of missing data, source: NWS)**

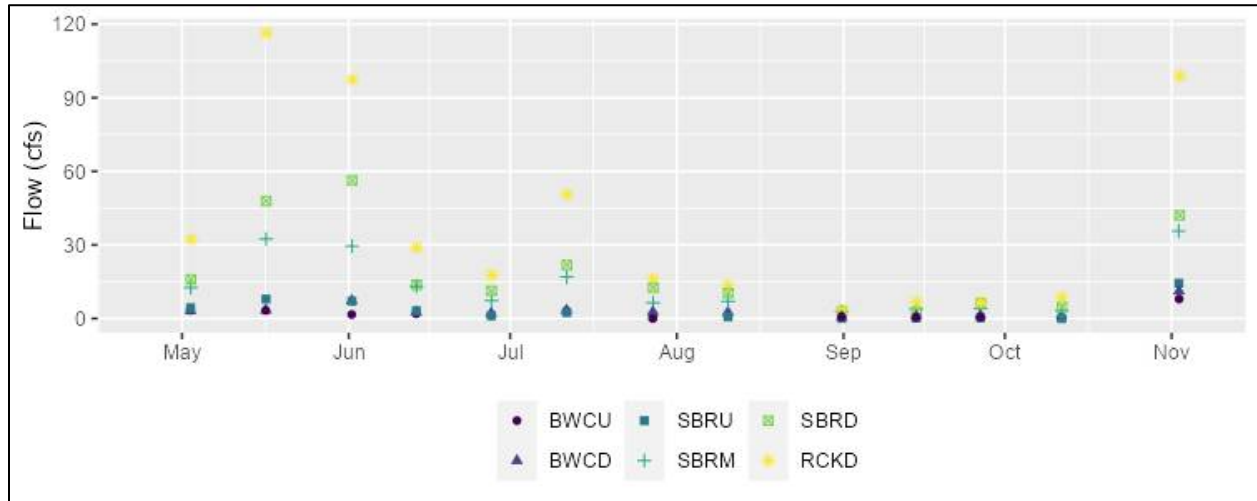


Figure 5 - Measured Flows - 2023 Monitoring Period

### **Black Walnut Creek (BWCU, BWCD)**

- Black Walnut Creek upstream of the Peotone WWTP (BWCU) is a drainage ditch that captures a 15.7 mi<sup>2</sup> agricultural watershed. The median flow based on 13 measurements was 1.3 cfs. Very low flows occurred late in the monitoring season, including a minimum of less than 0.1 cfs on 27 July 2023. The highest flow measured was 8.0 cfs on 2 November 2023 following a precipitation event. Drainage tile outlets were observed near this site and were contributing flow on several occasions.
- Black Walnut Creek Downstream of the Peotone WWTP (BWCD) captures a 17.2 mi<sup>2</sup> watershed and flows varied similarly to the upstream site, with the lowest of 0.7 cfs occurring late in the monitoring period on 31 August 2023. The maximum measured was 11.2 cfs on 2 November 2023 following a precipitation event. The Peotone WWTP located upstream of this site contributes a notable portion of baseflow to Black Walnut Creek during dry periods. Tile drainage inflows to the creek were observed during the monitoring season.

### **South Branch Rock Creek Upstream of Manteno (SBRU, SBRM)**

- South Branch Rock Creek Upstream (SBRU) is an agricultural drainage ditch with a watershed area of 16.9 mi<sup>2</sup> before its confluence with Black Walnut Creek. The station had one instance of zero discharge on 11 October 2023. While there was no flow at the time of the measurement, there was water in the ditch from bank to bank. It is possible a beaver dam or log jam downstream was backing up the water.
- South Branch Rock Creek Middle (SBRM) is 0.7 mi upstream from the Manteno WWTP with a watershed area of 49.1 mi<sup>2</sup>. This station is downstream of the confluence of Black Walnut Creek and upper South Branch Rock Creek. Measured flows ranged from 2.8 to 35.6 cfs, with a median of 7.3 cfs. Normal flow conditions were influenced by runoff, tile drainage, and groundwater gained between SBRM and the confluence of Black Walnut Creek and South Branch Rock Creek.



South Branch Rock Creek Downstream (SBRD)

- The station is 3.4 miles downstream of the Manteno WWTP. It captures the entire 59.3 mi<sup>2</sup> South Branch Rock Creek watershed and effluent from Aqua's Manteno and Peotone WWTPs. Measured flows ranged from 2.9 to 56.3 cfs, with a median of 12.6 cfs.

**Table 5 - Summary of Flow Data**

Station	# Measurements	Range (cfs)	Median	Approximate WWTP % of Flow at Median
Black Walnut Creek Upstream (BWCU)	13	0.01-7.97	1.3	Upstream No WWTP influence
Black Walnut Creek Downstream (BWCD)	13	0.73-1.2	2.7	30-40% Peotone
South Branch Rock Creek Upstream (SBRU)	13	0.0-14.4	1.2	Upstream No WWTP influence
South Branch Rock Creek Middle (SBRM)	13	2.8-35.7	7.3	10-15% Peotone Upstream of Manteno
South Branch Rock Creek Downstream (SBRD)	13	2.9-56.3	12.6	7-10% Peotone 15-20% Manteno
Rock Creek Downstream (RCKD)	13	3.1-116.4	17.7	NA

**SESTONIC CHLOROPHYLL A**

Chlorophyll  $\alpha$  results are shown in Figure 6 and were low throughout the monitoring period at all sites (n=13). They are typically far below the median 26  $\mu\text{g/L}$  risk of eutrophication threshold.

- There was one elevated result on South Branch Rock Creek Downstream of Manteno (SBRD) on 2 May 2023 with a concentration of 54  $\mu\text{g/L}$ , and one result of 31  $\mu\text{g/L}$  on Black Walnut Creek Downstream of Peotone (BWCD) on 11 July 2023.
- Continuous chlorophyll fluorescence results are not considered quantitative concentration measurements; however, sensor data did corroborate that there were elevated levels in the stream at the time of the elevated results at SBRD and BWCD. Outside of elevated periods, the sensor-recorded levels typically remained very low with occasional short fluctuations.
- Overall, chlorophyll laboratory results are low with medians well below risk of eutrophication thresholds. This is expected in small streams with perennial baseflow conditions.

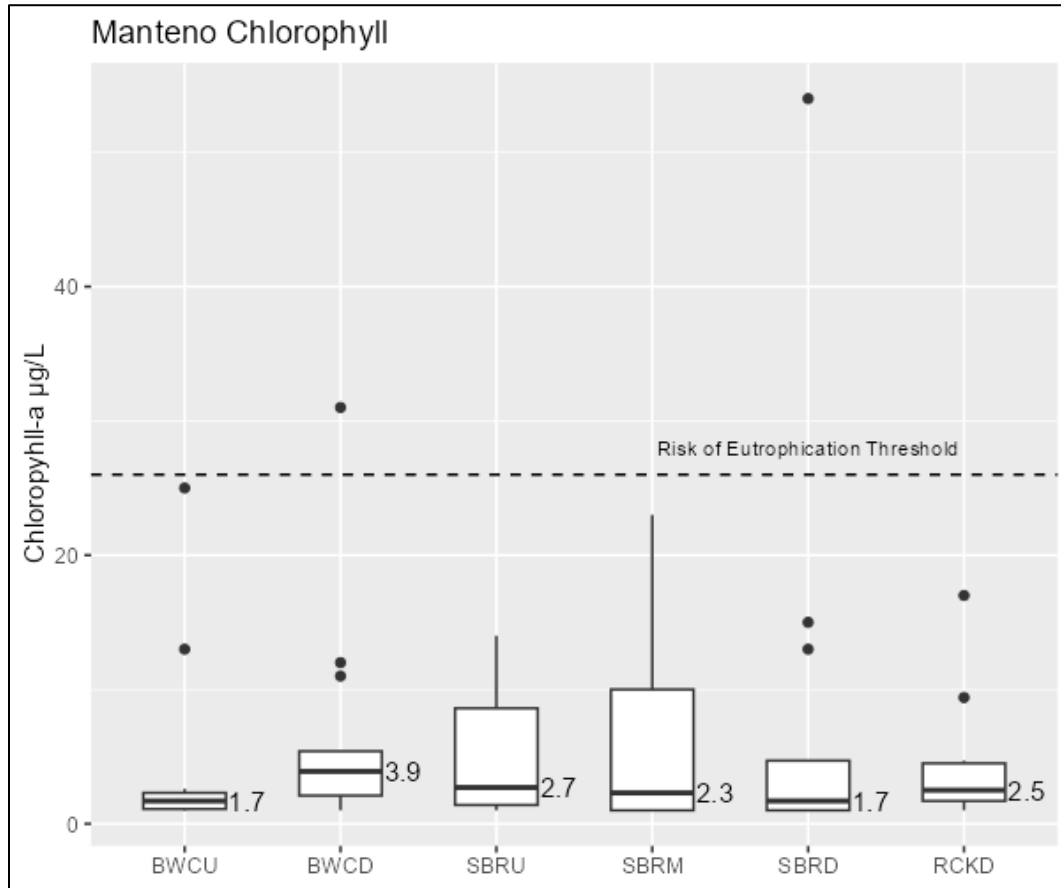


Figure 6 - Chlorophyll  $\alpha$  Results (presented as box plots with sample medians annotated)

#### BLACK WALNUT CREEK UPSTREAM (BWCU) – DO, pH, PHOSPHORUS

##### BWCU Key Takeaways:

- This station is upstream and outside of influence from the Peotone WWTP and was not continuously monitored.
- Eutrophication risk conditions were not met based on the DO + pH criteria.
- Eutrophication risk conditions were not met based on the pH > 9 criteria.
- Eutrophication risk conditions were not met based on the median sestonic chlorophyll  $\alpha$  criteria.
- The data corroborates the aquatic life use impairment on this segment with cause of phosphorus, as low DO was observed.
  - This supports that the aquatic life use impairment exists upstream of the WWTP outfall, and nonpoint sources (NPS) are a contributor of nutrient loads.

Black Walnut Creek upstream of the Peotone WWTP was monitored bi-weekly. DO saturation, pH, flow and phosphorus results (n=13) are illustrated in Figure 7. Based on the DO + pH risk of eutrophication criteria, there were no exceedances.

While there were no occurrences of eutrophication risk exceedances, two measurements exceeded the low DO water quality standard of 5.0 mg/L at any time from February - July (IL Admin Code Title 35 Part

302, Subpart B, Section 302.206). While there is no 303(d) DO impairment listing for Black Walnut Creek, the low DO occurrence does support the prior non-standard-based impairment caused by TP. The site was not equipped with continuous monitoring equipment, so the frequency and duration of the low DO conditions are not known.

As expected in a small stream with consistent baseflow, sestonic chlorophyll  $\alpha$  levels are low relative to the median 26  $\mu\text{g/L}$  threshold (Figure 6), with a median of 1.7  $\mu\text{g/L}$  and a maximum of 25  $\mu\text{g/L}$  from 13 samples.

There is phosphorus available in the stream (Figure 7) from NPS, though TP was frequently below the laboratory quantification limit of 0.1 mg/L, with maximum of 0.15 mg/L (n=12). Algae and macrophytes were observed in the stream during the entire monitoring period indicating that phosphorus is available, but quickly taken up by plants. The low observed DO at this site indicates phosphorus related impairment conditions upstream of the WWTP outfall.



*Black Walnut Creek Upstream (BWCU), looking downstream. Pictured 2 November 2023.*

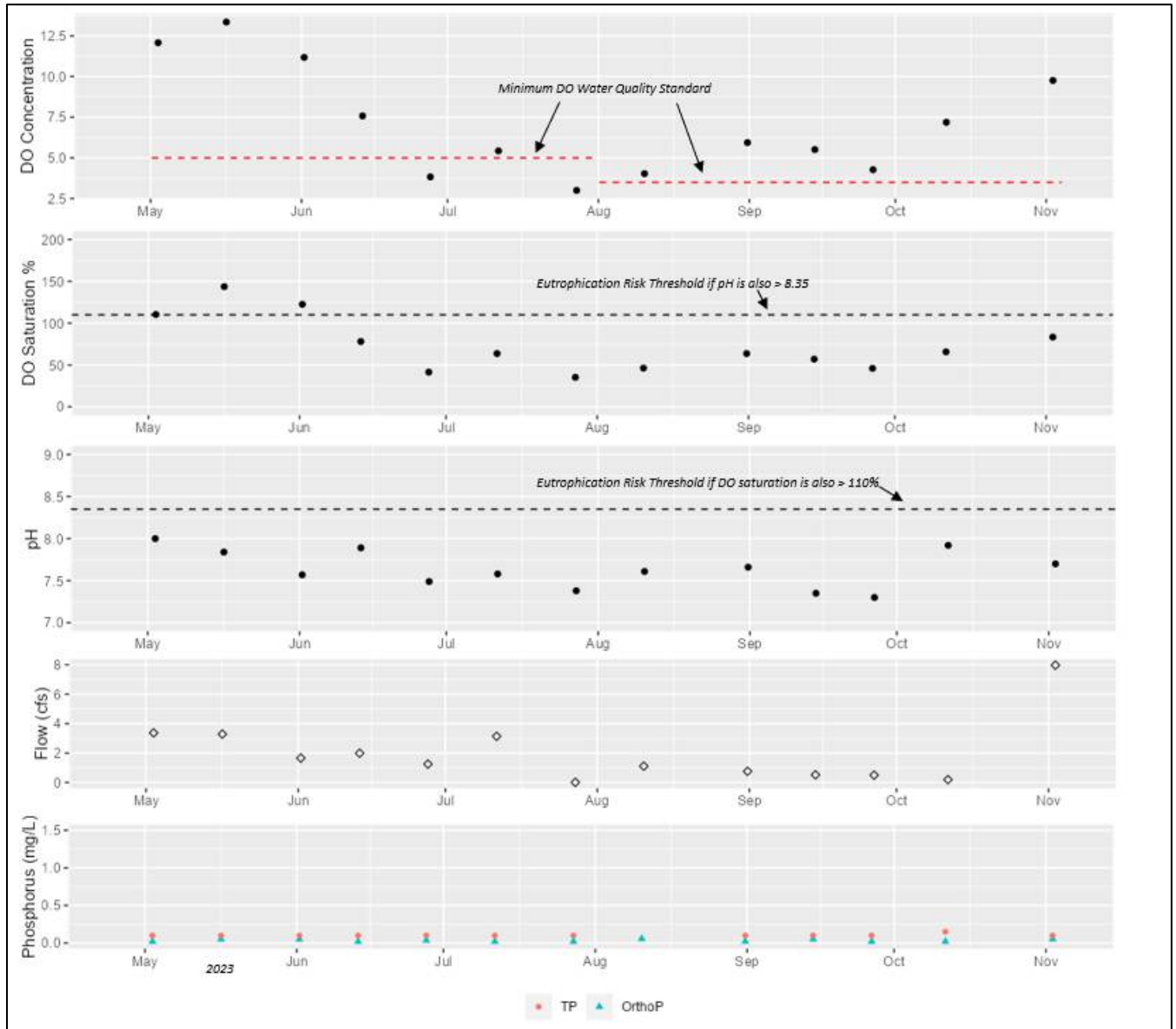


Figure 7 – Black Walnut Creek Upstream of Peotone (BWCU) - DO Concentration, DO Saturation, pH, Flow, and TP

BLACK WALNUT CREEK DOWNSTREAM OF PEOTONE WWTP (BWCD) – DO, pH, PHOSPHORUS

BWCD Key Takeaways:

- This station is downstream of the Peotone WWTP outfall but upstream of the Manteno WWTP.
- Eutrophication risk conditions were met based on the DO + pH criteria.
  - The criteria was exceeded on 23% of the days monitored.
  - Almost all the exceedances occurred in early to mid-summer.
- Eutrophication risk conditions were not met based on the pH > 9 criteria.
- Eutrophication risk conditions were not met based on the median sestonic chlorophyll  $\alpha$  criteria.

- The data corroborates the aquatic life use impairment with a cause of phosphorus as low DO was frequently observed with continuous monitoring.
  - Low DO was observed 133 days of 185 monitored.

Black Walnut Creek downstream of the Peotone WWTP was monitored with in-situ sensors. Additionally, grab samples were collected and spot checks were performed during instrument calibration visits, approximately every two weeks. Though Peotone does not have a NARP special condition, its receiving stream was monitored to ensure that all point and NPS nutrients in the watershed upstream of the Manteno WWTP were measured. This data provides important context for NARP implementation. There were 185 monitoring days with continuous DO and pH data. Forty-two days, or 23%, exceeded the NARP trigger of daily maximum 110% DO saturation and 8.35 pH (Table 6). The median chlorophyll  $\alpha$  concentration was 3.9  $\mu\text{g/L}$  and maximum was 31  $\mu\text{g/L}$  (n=13).

**Table 6 – Black Walnut Creek Downstream of Peotone WWTP (BWCD) - Summary of Continuous Monitoring Results**

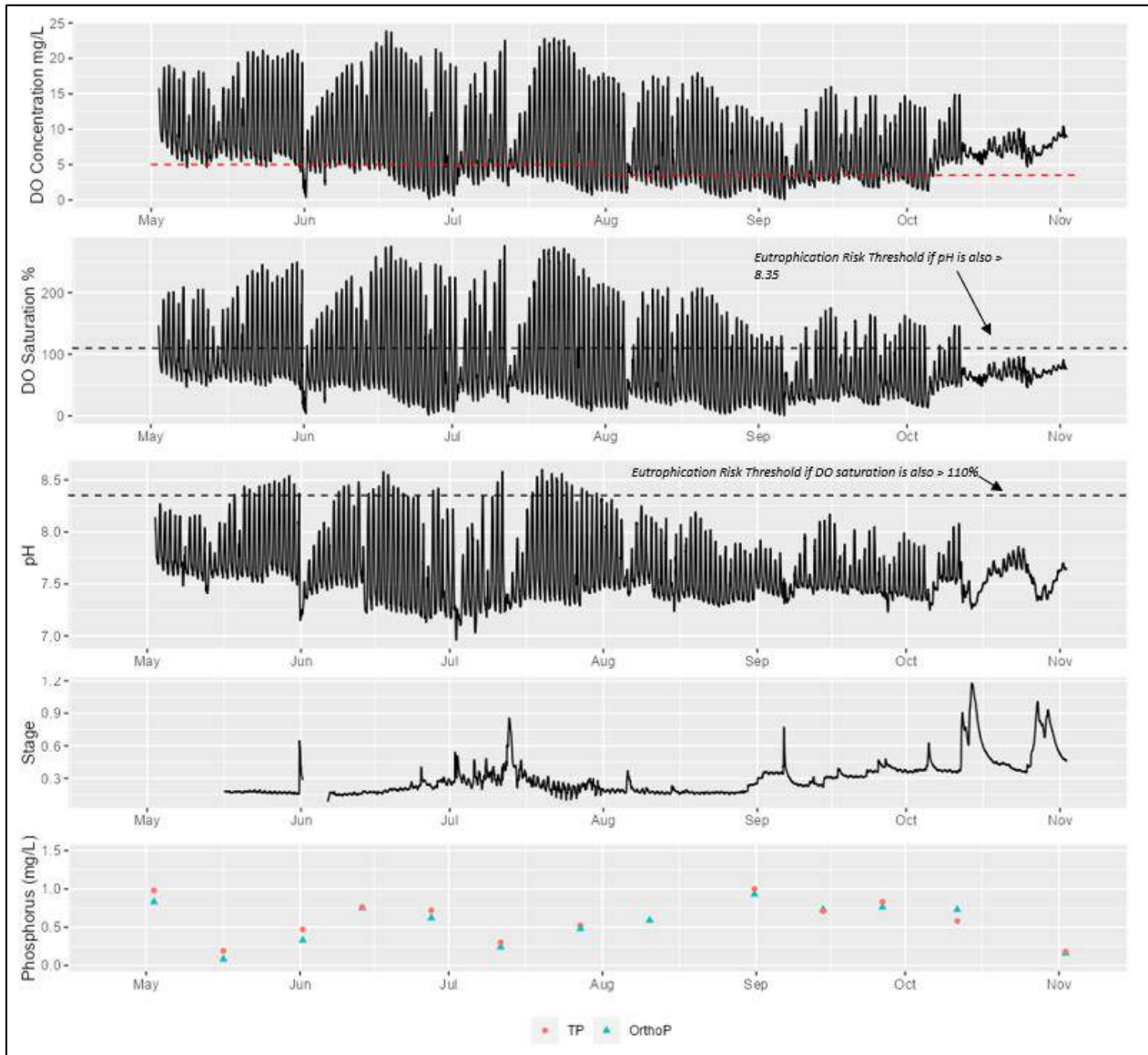
Days with Continuous Monitoring	Median Daily Maximum	# of Days (%) Exceeding the Risk of Eutrophication Criteria (8.35 pH + 110% DO)	# Days (%) Exceeding the Minimum DO Water Quality Standard (5.0 Mar-July; 3.5 Aug-Feb)
185	169% (DO Saturation) 8.0 (pH)	42 (23%)	133 (72%)

During the 2023 monitoring period, the diel ranges of DO and pH are elevated in the spring months through mid-summer. Rain events have a clear, short-term effect, moderating the diel range of each. The large daily swings gradually return over a few days (Figure 8), typically reaching a maximum range then decreasing over time. While TP data collection from storm events was limited, it appears that high flows add NPS phosphorus causing increased DO and pH for several days, followed by the range and minima decreasing as phosphorus is depleted. An example of this phenomenon can be seen in the time series starting with the high stage on July 12 and continuing through the next significant runoff event on August 5 (Figure 8). The maximum daily DO saturation is over 200% for several periods. This is likely influenced by the lack of shade in the stream and periphyton and macrophytes photosynthesizing. In October 2023, several significant precipitation events moderated the diel DO and pH for a longer period that was typical in the dataset.



*Black Walnut Creek Downstream (BWCD), Looking Upstream. Pictured 1 June 2023.*

The mean TP concentration at BWCD was 0.6 mg/L with a maximum of 1.0 mg/L (n=12) occurring on 31 August 2023. Mean orthophosphate was 0.56 mg/L as phosphorus, with a maximum of 0.93 mg/L (n=13) also on 31 August. The phosphorus results do not appear to correlate with patterns in DO and pH, nor flow.



**Figure 8 - Black Walnut Creek Downstream of Peotone (BWCD) - DO Concentration, DO Saturation, pH, Stage, and TP**

**SOUTH BRANCH ROCK CREEK UPSTREAM (SBRU) – DO, pH, PHOSPHORUS**

**SBRU Key Takeaways:**

- This station captures the watershed of South Branch Rock Creek before the confluence with Black Walnut Creek and is not influenced by any WWTP effluent.
- Low DO was observed on 110 of 185 monitoring days.
- Eutrophication risk conditions were not met based on the DO + pH criteria.

- Eutrophication risk conditions were not met based on the pH > 9 criteria.
- Eutrophication risk conditions were not met based on the median sestonic chlorophyll  $\alpha$  criteria.
- Observed macrophytes, risk of eutrophication occurrences and low DO provide evidence that this site is frequently enriched with nutrients, even though measured TP concentrations are consistently low. Unfortunately, phosphorus sampling did not capture any significant stormwater runoff events, where TP concentrations are expected to be higher due to NPS pollution.

South Branch Rock Creek upstream of its confluence with Black Walnut Creek was monitored with sensors. This allowed for characterization of the diel range of DO and pH (Figure 9). Additionally, grab samples were collected, and spot checks were performed during instrument calibration visits, approximately every two weeks. There were 185 monitoring days with both DO and pH measurements, none of which exceeded the eutrophication risk criteria of daily maximum 110% DO saturation and 8.35 pH (Table 7). The data was also compared to the DO and pH water quality standards (Illinois Admin Code Title 35, Part 302, Subpart B, Sections 302.204 & 302.206), as a 2016 non-standards-based aquatic life impairment due to phosphorus is noted for South Branch Rock Creek. None of these measurements exceeded the maximum 9.0 pH water quality standard, however, 52 of 91 days (57%) exceeded the minimum DO concentration limit of 5.0 mg/L at any time during March - July, and 58 of 94 days (62%) exceeded the minimum DO concentration limit of 3.5 mg/L at any time during August - February (Figure 9). This data indicates that nutrient issues occur in the stream even without the influence of WWTP effluent.

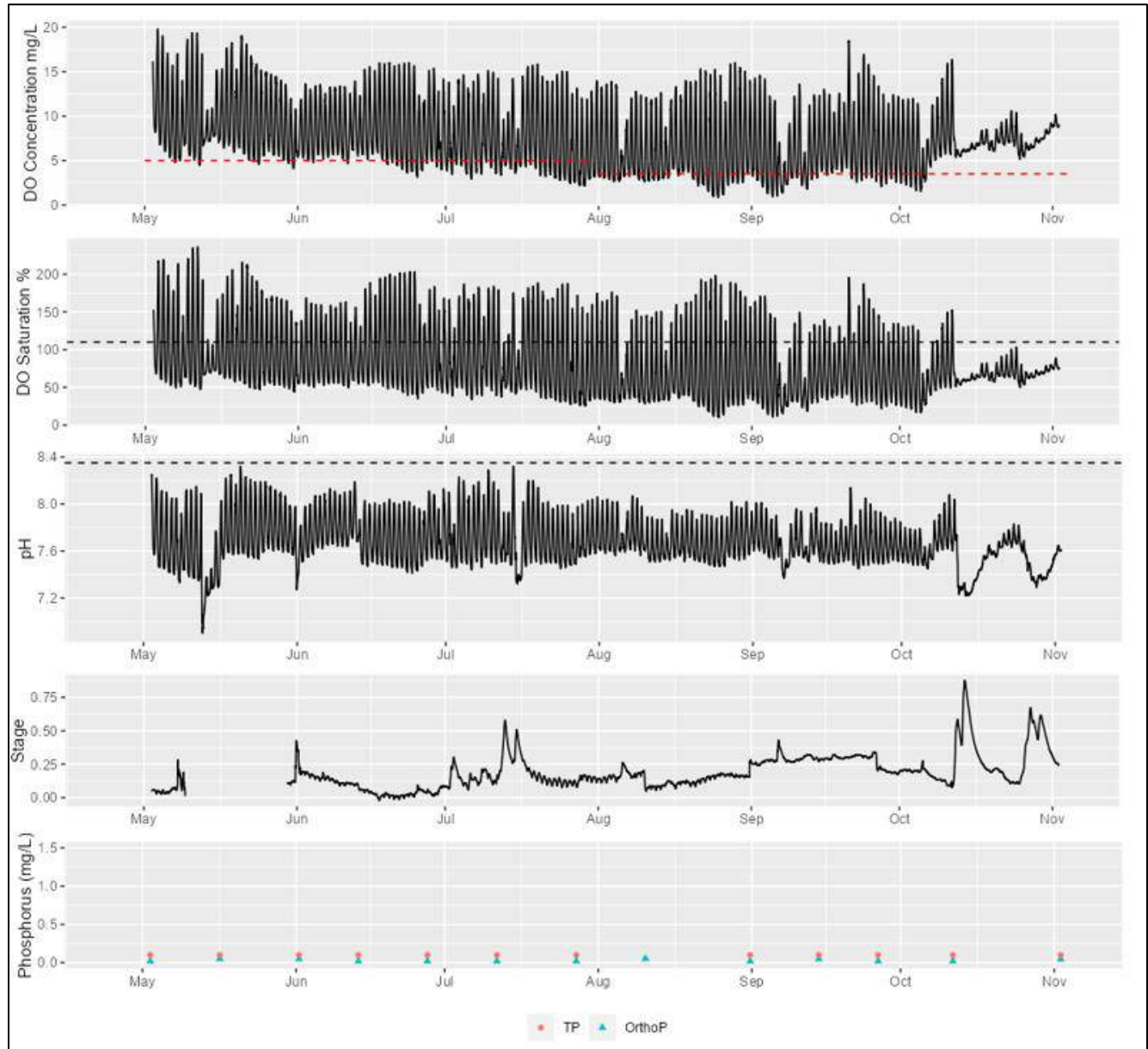
Chlorophyll was generally low and below the 26  $\mu\text{g/L}$  criteria. The median chlorophyll  $\alpha$  concentration was 2.7  $\mu\text{g/L}$  and maximum was 14  $\mu\text{g/L}$  (n=13), indicating that sestonic chlorophyll is not generally a eutrophic risk criterion of concern at this site.

**Table 7 – South Branch Rock Creek Upstream (SBRU) - Summary of Continuous Monitoring Results**

Days with Continuous Monitoring	Median Daily Maximum	# of Days (%) Exceeding the Risk of Eutrophication Criteria (8.35 pH + 110% DO)	# Days (%) Exceeding the Minimum DO Water Quality Standard (5.0 Mar-July; 3.5 Aug-Feb)
185	158% (DO Saturation) 8.0 (pH)	0 (0%)	110 (59%)

Most DO standard exceedances occurred during summer to early fall. This mirrors the pattern present in the site downstream of the Peotone WWTP on Black Walnut Creek (BWCD). Storm runoff results in a short-term positive effect on DO and pH that buffer or attenuate the diel ranges. The larger diel ranges gradually recover, typically over several days.

Phosphorus concentrations were typically low at this station, with 10 of 12 samples below the quantification limit of 0.1 mg/L. Aquatic macrophytes were observed throughout the monitoring season, indicating that the stream experiences nutrient enrichment upstream of any WWTP influences. The frequency of daily low DO concentrations supports this observation, and the highly channelized ditch with complete lack of canopy cover exacerbates water quality issues for this station. Unfortunately, the monitoring program did not capture water quality conditions during the stage rise associated with precipitation events, which is believed to carry much of the NPS nutrient load.



**Figure 9 - South Branch Rock Creek Upstream of Confluence with Black Walnut Creek (SBRU) - DO Concentration, DO Saturation, pH, Stage, and TP**

#### SOUTH BRANCH ROCK CREEK MIDDLE (SBRM) – UPSTREAM OF MANTENO WWTP AND DOWNSTREAM OF PEOTONE WWTP

##### SBRM Key Takeaways:

- South Branch Rock Creek Middle (SBRM) is upstream of the Manteno WWTP but downstream of the confluence with Black Walnut Creek. It is influenced by a 49.1 mi<sup>2</sup> largely agricultural watershed and by effluent from the Peotone WWTP.
- Eutrophication risk conditions were not met based on the DO + pH criteria.
- Eutrophication risk conditions were not met based on the pH > 9 criteria.



- Eutrophication risk conditions were not met based on the median sestonic chlorophyll  $\alpha$  criteria.
- There is phosphorus available in the stream from both point and NPS.

South Branch Rock Creek Middle (SBRM) is upstream of the Manteno WWTP but downstream of the confluence with Black Walnut Creek, which receives effluent from the Peotone WWTP. The site was monitored with grab sampling on a bi-weekly schedule to capture changes in water quality conditions that occur between Manteno and the upstream sites. As expected in a small stream with consistent baseflow, sestonic chlorophyll  $\alpha$  levels are low relative to the median 26  $\mu\text{g/L}$  threshold (Figure 6), with a median of 1.7  $\mu\text{g/L}$  and a maximum of 25  $\mu\text{g/L}$  from 13 samples.

DO saturation, pH, flow, and phosphorus results (n=13) are illustrated in Figure 10. Based on the DO + pH risk of eutrophication criteria, there were no exceedances, nor were there exceedances of the DO water quality standard. There is phosphorus available in the stream, with a median of 0.12 mg/L and maximum was 0.18 mg/L (n=12). Algae and macrophytes were observed across the entire monitoring period, and several occurrences of high DO saturation were documented, with one nearing 200%.



*South Branch Rock Creek Middle, 31 August 2023.*

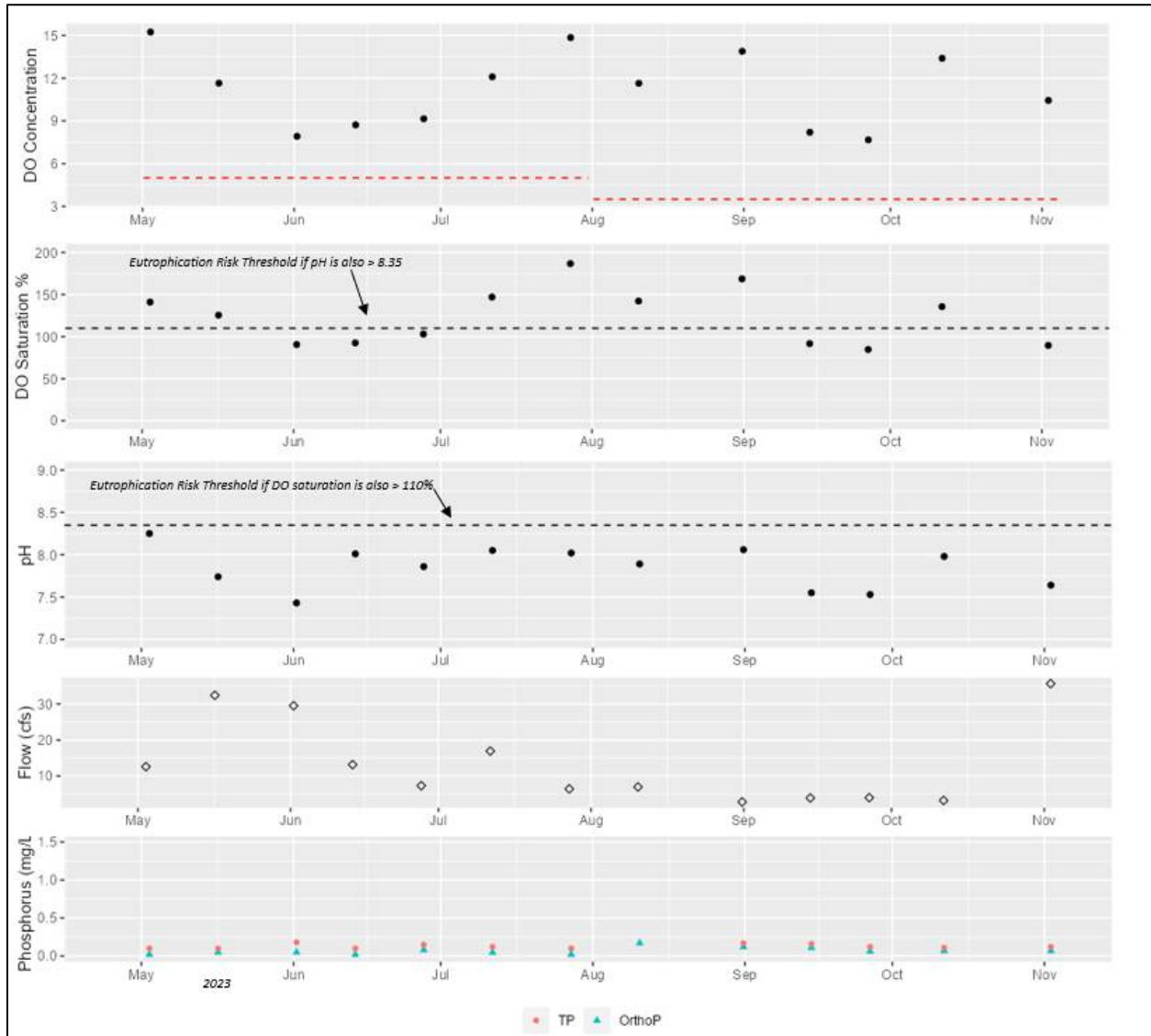


Figure 10 - South Branch Rock Creek Middle (SBRM) Upstream of Manteno WWTP and Downstream of Peotone WWTP - DO, pH, Flow, and TP

SOUTH BRANCH ROCK CREEK DOWNSTREAM OF MANTENO WWTP (SBRD) – DO, pH, PHOSPHORUS

SBRD Key Takeaways:

- This station is downstream of the Manteno WWTP.
- Eutrophication risk conditions were met based on the DO + pH criteria.
  - The criteria were exceeded on 60% of the 175 days monitored.
- Eutrophication risk conditions were met based on the pH > 9 criteria.
  - 5 days or 3%
- Eutrophication risk conditions were not met based on the median sestonic chlorophyll α criteria.

- Data indicates that the effects of nutrient enrichment observed upstream occur at this site as well.

South Branch Rock Creek downstream of the Manteno WWTP was monitored with in-situ sensors. Additionally, grab samples were collected and spot checks were performed during instrument calibration visits, approximately every two weeks. An equipment malfunction led to a gap in stage data early in the monitoring period and fouling of the sensors after a rain event led to a gap in water quality data collection early in July. These periods were excluded from the dataset.



South Branch Rock Creek Downstream (SBRD) Looking Upstream. Pictured 26 September 2023.

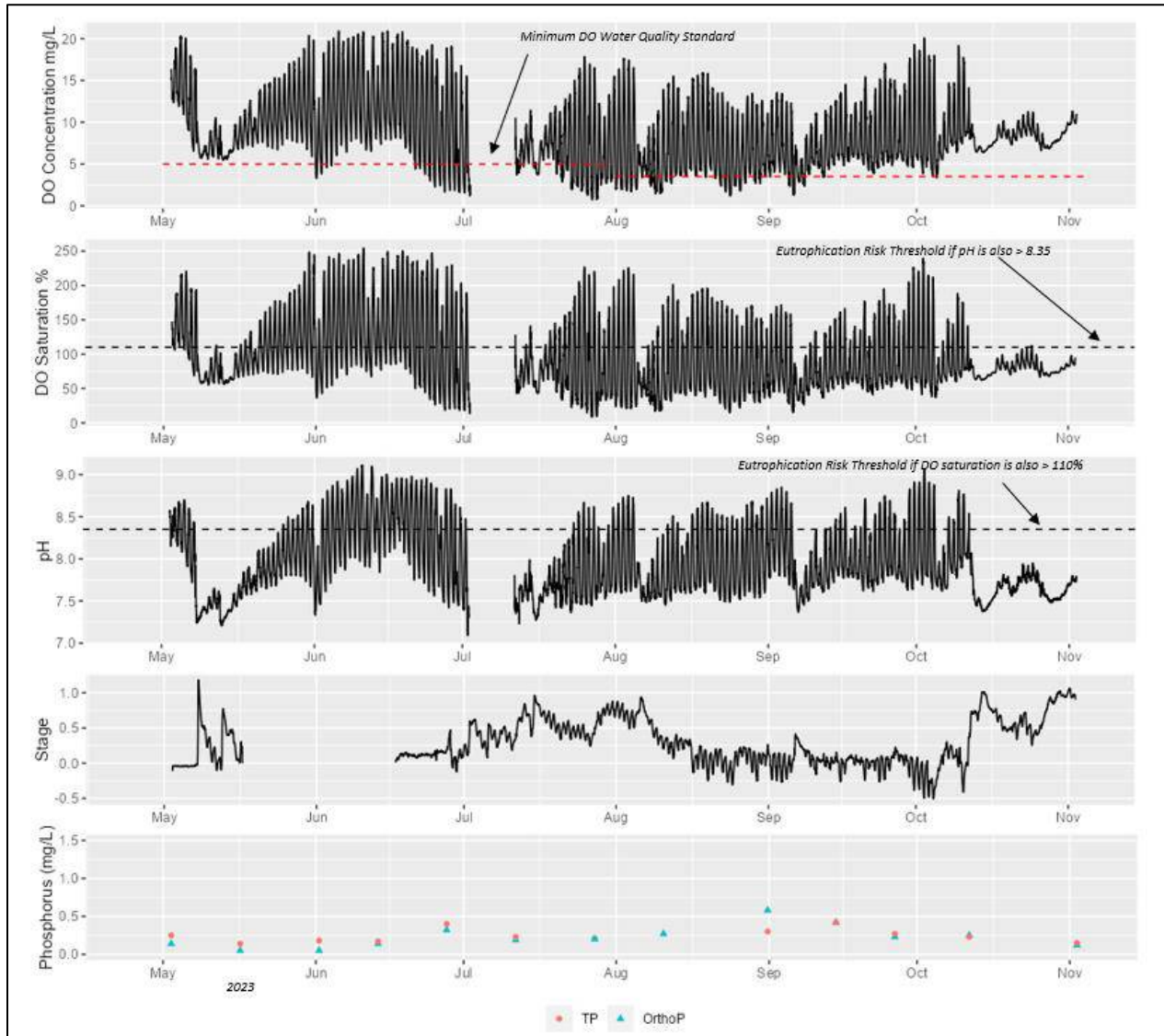
There were 175 monitoring days with continuous DO and pH data. Total of 105 days, or 60%, exceeded the NARP trigger of daily maximum 110% DO saturation and 8.35 pH (Table 8). The median chlorophyll  $\alpha$  concentration was 1.7  $\mu\text{g/L}$  and maximum was an outlier of 54  $\mu\text{g/L}$  (n=13), indicating that the chlorophyll risk of eutrophication criteria is not of concern at this site.

**Table 8 - South Branch Rock Creek Downstream (SBRD) - Summary of Continuous Monitoring Results**

Days with Continuous Monitoring	Median Daily Maximum	# of Days (%) Exceeding the Risk of Eutrophication Criteria (8.35 pH + 110% DO)	# Days (%) Exceeding the Minimum DO Water Quality Standard (5.0 Mar-July; 3.5 Aug-Feb)
175	164% (DO Saturation) 8.5 (pH)	105 (60%)	62 (35%)

The diel ranges of DO and pH are elevated throughout the monitoring period (Figure 11). Downstream South Branch Rock Creek is a wide, shallow stream with very little canopy cover, much like the upstream sites. Macrophytes and periphyton were observed during the entire monitoring period. Precipitation or runoff events have a clear, short-term effect on DO and pH, moderating the diel range of each from their typical large swings, which gradually return over a few days, typically reaching a maximum range, and then decrease over time.

Median TP concentration at SBRD was 0.23 mg/L with a maximum of 0.42 mg/L (n=12). Median orthophosphate was 0.2 mg/L as phosphorus, with a maximum of 0.58 mg/L (n=13). While data collection during storm events was limited, the data shows that high flow events contribute NPS phosphorus, resulting in increased DO and pH before decreasing as the nutrients are depleted. This pattern was observed several times over the monitoring period. In October 2023, several successive precipitation events moderated the diel DO and pH for a longer period that was typical in the dataset.



**Figure 11 – South Branch Rock Creek Downstream (SBRD), Downstream of Manteno WWTP – DO Concentration, DO Saturation, pH, Stage, and TP**

**ROCK CREEK DOWNSTREAM (RCKD)**

Rock Creek downstream was monitored with grab and spot sampling to provide baseline data for the entire Rock Creek watershed before its confluence with the Kankakee River. This data was collected for reference purposes. Due to the size of the watershed at this location, it is not directly relevant to understanding the impacts of the Manteno WWTP.

The DO + pH risk of eutrophication criteria was exceeded on 3 of 12 days monitored (Figure 12). Median phosphorus concentration was 0.16 mg/L with a maximum of 0.28 mg/L.

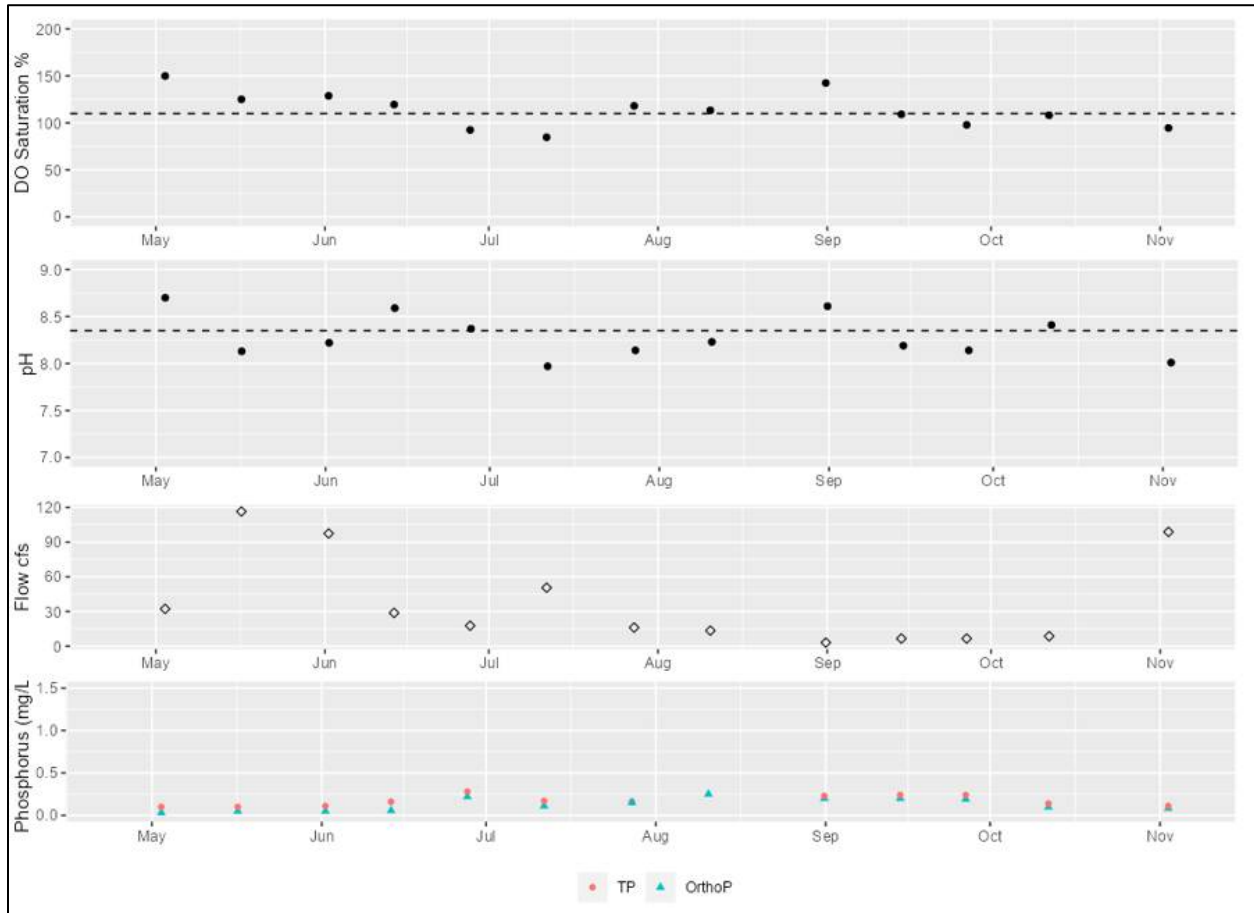


Figure 12 - Rock Creek above the Confluence with the Kankakee River (RCKD) - DO Saturation, pH, Flow, and TP

### 3.4 INTREPRETATION & ANALYSIS

The monitoring results identified eutrophication risk or a water quality impairment at sites both upstream and downstream of the Manteno and Peotone outfalls. The issues do not appear to follow a pattern or correlation clearly associated with phosphorus concentrations. However, high flow events, which typically carry high TP loads, appear in some cases to increase the daily DO maximum for several days and subsequently depress the daily minimum, often below the standard. This pattern is just one that illustrates the complexity of watershed and stream processes that affect water quality and contribute



South Branch Rock Creek Upstream, 19 April 2023.

to impairments and risk of eutrophication. The data demonstrates that NPS and treated wastewater effluent both contribute phosphorus. Though storm event nutrient data was limited, a majority of the overall TP loading and availability occurs during and immediately following these periods, making NPS a significant contributor to stream conditions. In addition, the streams in the study area have been highly modified through channelization and removal of littoral vegetation, exacerbating impacts of both NPS and

point source nutrients and further enabling algal and macrophyte growth. The early portion of the monitoring period experienced significantly below average rainfall, which negatively impacted streamflow's through the remainder of monitoring. The precipitation deficit resulted in WWTP effluent comprising a larger proportion of streamflow than average and was not representative of normal conditions.

Considering these observations and measured data showing that nutrients are impacting the watershed even upstream of the WWTP outfalls, it is clear that treated effluent is not the sole driver of the impairments and risk of eutrophication on South Branch Rock Creek. Based on the monitoring, site SBRD / IL-FFB-01 downstream of Manteno had the highest incidence of risk of eutrophication exceedances and Aqua has focused its NARP on this segment and associated watershed.

## 4. NARP STRATEGY & WORK PLAN

Based on an understanding of the watershed dynamics and the results of the monitoring program, the NARP Strategy and Work Plan is presented focusing on the South Branch Rock Creek Segment IL\_FFB and the associated 38,497-acre catchment comprised of two HUC12 subwatersheds within the Rock Creek HUC10 watershed and part of the Kankakee River Basin. The watershed is comprised of 80% agricultural land and 11% urban/developed lands and includes the Manteno and Peotone WWTPs. These subwatersheds are presented in Figure 1 and further characterized in Section 4.1.

### 4.1 WATERSHED CHARACTERIZATION

A concise watershed characterization is presented and includes relevant information related to hydrology, land cover, climate, and demographics. Current and historical water quality impairments are summarized and estimates of phosphorus loading from NPS are presented from a map-based, planning-scale pollutant load model created for this NARP, using formulas and methods derived from the United States EPA Spreadsheet Tool for Estimating Pollutant Loads (STEPL). This section also details applicable linkages with other relevant plans, efforts, and initiatives.

#### HYDROLOGIC UNIT CODES

Black Walnut Creek and South Branch Rock Creek HUC12 subwatersheds are in north-eastern Illinois located in Will and Kankakee Counties and are within the Rock Creek watershed of the Kankakee River Basin (Table 9). The 10-digit HUC watershed is 77,620 acres and contains four smaller HUC12 subwatersheds though only two are relevant, totaling 38,497 acres (Table 9).

**Table 9 – Black Walnut/South Branch Rock Creek HUC 12 Subwatersheds**

HUC Name	HUC12 ID	Area (acres)
Black Walnut Creek	071200011501	13,191
South Branch Rock Creek	071200011502	25,306
<b>Total:</b>		<b>38,497</b>

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**STREAMS & LAKES**

According to the National Hydrography Dataset (NHD) there are 52 miles of streams and rivers, including artificial drainageways (Table 10). South Branch Rock Creek is the longest named stream at 19.8 miles followed by Black Walnut Creek (13.9 miles). Water quality impairments are included in a proceeding section of this watershed characterization.

**Table 10 – Relevant Stream Segments and Illinois EPA Assessment ID**

Stream Name	Illinois EPA Assessment ID	Length (Miles)
South Branch Rock Creek	IL_FFBB	19.8
Black Walnut Creek	IL_FFBA	13.9
Unnamed Tributary/Drainage Way	N/A	13.5
Marshall Slough	IL_FFBB	4.8
<b>Total:</b>	-	<b>51.9</b>

The NHD also identifies 96 acres of lakes, ponds and reservoirs. The largest lake is Lake Manteno at 38 acres.

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**CLIMATE NORMALS**

Based on climate normals published by the Illinois State Climatologist for a weather station in Kankakee, for the period of 1991 – 2020 (UofI, 2023), Manteno experiences an average of 41.66 inches of precipitation per year (3.47 inches/month). June is typically the wettest month, with an average of 5.21 inches. Average temperature is 51 degrees Fahrenheit, and July is the warmest month.

The region experienced 17% less precipitation than average in 2023. The monitoring data supporting this NARP is from a climatic and hydrological period that is not representative of average conditions.

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**LAND COVER**

Table 11 presents the land cover of the subwatersheds. The two predominant categories are (i) 80% agriculture comprising 30,662 acres of cultivated crops, and (ii) 11% developed/urban areas or 4,362 acres according to the National Land Cover Database (NLCD) (Dewitz, J., 2021). South Branch Rock Creek (HUC12 071200011502) has the greatest proportion of agriculture/cultivated crops (80%), with Black Walnut Creek (HUC12 071200011501) at 78%.

**Table 11 – Black Walnut/ South Branch Rock Creek Subwatersheds Land Cover**

Land Cover	Area (acres)	% of Watershed Area
Cultivated Crops	30,662	80%
Developed	4,362	11%
Grasslands/Hay/Pasture	1,446	3.8%
Forest	847	2.2%

Land Cover	Area (acres)	% of Watershed Area
Developed Open Space	791	2.1%
Barren Land	181	0.5%
Wetlands	113	0.3%
Open Water	95	0.2%
<b>Total:</b>	<b>38,497</b>	<b>100%</b>

## DEMOGRAPHICS & ECONOMY

The most significant urban area located within the subwatersheds is Manteno, with a 2022 population of 9,168, a decline of 0.4% from 2010 according to the US Census Bureau. A portion of the City of Peotone is also in the watershed, with a 2010 population of 4,142.

Median household income (2018 – 2022) is \$90,370 compared to \$78,433 for Illinois and the national average of \$75,149.

## WATER QUALITY IMPAIRMENTS

Black Walnut Creek, stream segment IL\_FFBA, is on the 2020/2022 303(d) list as impaired for Aquatic Life with causes of TP, chlorine, and stream habitat and flow modifications, and has been listed since at least 2010. On South Branch Rock Creek, IL\_FFBA, historic impairments include pH and TP, with the most recent listing in 2016 (Table 12).

**Table 12 - Current and Historic Impaired Waters**

Stream	HUC 12 Watershed	Illinois Assessment Unit	303(d) Impairments	Causes Related to P & Years on List
South Branch Rock Creek (Manteno WWTP Receiving Segment)	071200011502	IL_FFBA	Aquatic Life	pH, Total Phosphorus 2010 (TP only), 2012, 2014, 2016
Black Walnut Creek (Peotone WWTP Receiving segment)	071200011502	IL_FFBA	Aquatic Life	Total Phosphorus, Chlorine 2010, 2012, 2014, 2016, 2018, 2020/2022
Marshall Slough	071200011502	IL_FFBB	None	NA

## RELATIONSHIP TO OTHER PLANS & WATERSHED EFFORTS

Two existing studies or plans are relevant to the Manteno NARP: (i) the 2009 Kankakee River Total Maximum Daily Load (TMDL) and (ii) the Illinois Nutrient Loss Reduction Strategy (INLRS). The TMDL addressed fecal coliform for several stream segments in the Kankakee River watershed. The receiving stream for the Manteno and Peotone WWTPs, South Branch Rock Creek and Black Walnut Creek, respectively, were not a focus of the TMDL. However, the TMDL does provide insight into the characteristics of the broader watershed and implementation strategies that can be adopted by the



agricultural community and agencies to reduce NPS nutrients. As described in section 4, Manteno plant upgrades will also have a direct positive impact on nutrient reduction targets listed in the INLRS. A specific watershed plan that includes the South Branch Rock Creek watershed has not been produced to date.

#### KANKAKEE RIVER TMDL

A TMDL, is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards and are a requirement of Section 303(d) of the CWA. In 2009 a TMDL focused on *E. coli* impairments was finalized for the Kankakee River watershed by Illinois EPA and Indiana EPA. The entire Rock Creek watershed is covered in the report. While the Rock Creek watershed does not have an *E. coli* impairment, management for this contaminant is similar to management for nutrients such as phosphorus. Of particular relevance are sections 4.6 that discusses sources, and sections 9 and 9.1 that discuss implementation of best management practices. Solutions or recommended practices focus primarily on addressing agricultural NPS pollution, which is directly applicable to managing nutrient runoff.

#### POINT & NONPOINT SOURCE LOADING

Point source pollution is defined by the United States EPA as “any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack” (Hill, 1997). The NPDES, a provision of the Clean Water Act, prohibits point source discharge of pollutants into waters of the U.S. unless a permit is issued by the United States EPA or a state or tribal government. Individual permits are specific to individual facilities (e.g., water or wastewater treatment facilities), and general permits are for a group of facilities in a geographical area. Permits describe the allowed discharge of pollutant concentrations (mg/L) and loads (lbs/day). The Manteno WWTP does not have an effluent phosphorus limit in its permit.

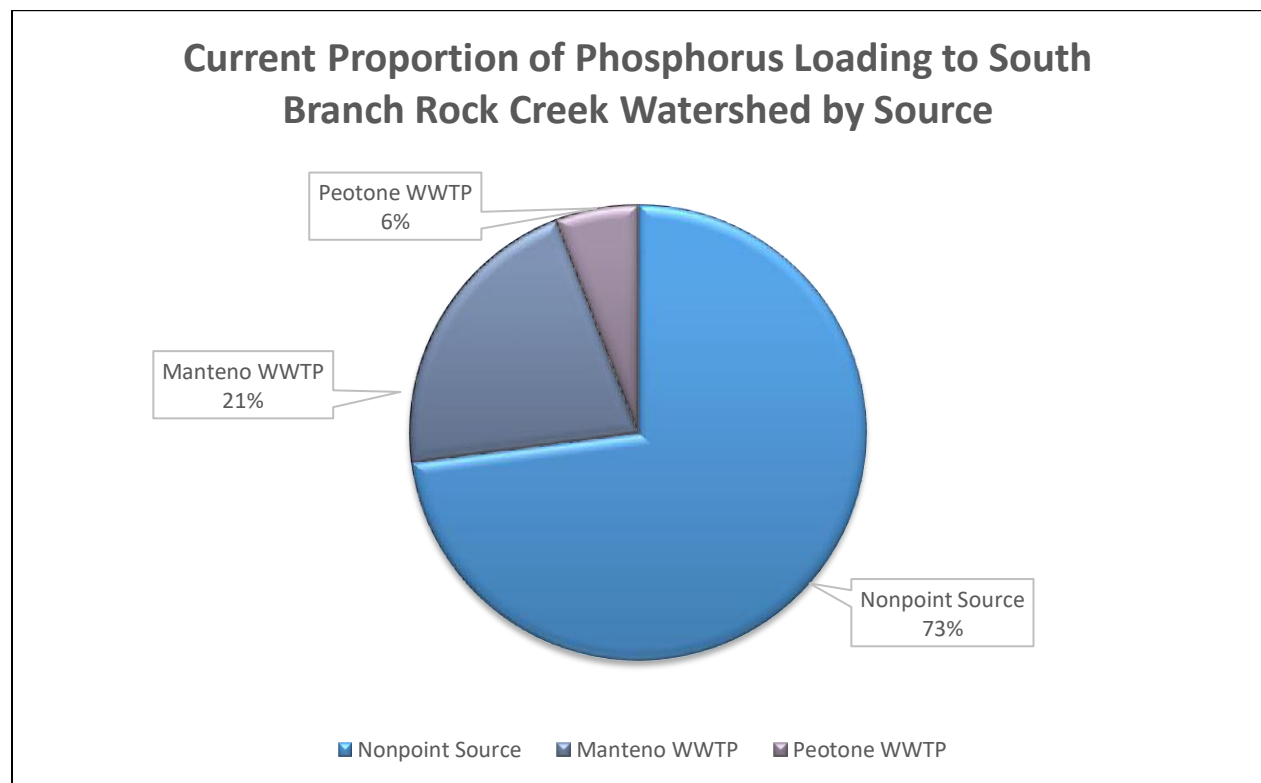
Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. The term "nonpoint source" is defined to mean any source of water pollution that does not meet the legal definition of "point source." Unlike pollution from point sources like industrial and sewage treatment plants, NPS pollution comes from many diffuse sources and is caused by rainfall or snowmelt moving over and through the ground. The runoff picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters (USEPA, 2018).

Point source loading of phosphorus from the Manteno WWTP is provided in Table 13. Based on United States EPA-required discharge monitoring report data, average annual loading from 2017 through 2022 is 11,179 lbs. Average effluent TP concentration during the same period was 1.8 mg/L.

**Table 13 - Annual Phosphorus Load - Manteno WWTP (Data Source: Illinois EPA and USEPA ECHO)**

WWTP	2017	2018	2019	2020	2021	2022	Average Annual
Manteno	10,483	8,089	15,808	11,083	9,668	11,943	<b>11,179 lbs</b>
Peotone	6,644	3,650	1,809	1,466	3,086	1,818	<b>3,078 lbs</b>

A planning-level pollution load model based on STEPL was developed for the two relevant HUC12 subwatersheds in the Rock Creek HUC10. The model results were compared to a nearby watershed with similar land cover, soil and precipitation characteristics to ensure loading estimates were in an acceptable range. The model indicates the average annual NPS phosphorus load for the watershed is 38,414 lbs/yr. Total average annual phosphorus loading from all sources is estimated at 52,627 lbs/yr with the Manteno WWTP accounting for 21% and Peotone WWTP accounting for 6%. Nonpoint sources are responsible for 73% of the average annual phosphorus loads in the watershed and are a larger contributor than both the Manteno and Peotone WWTPs combined (Figure 13). Though Peotone does not have a NARP special condition, its contribution is important to understand in the context of overall water quality in the watershed.



**Figure 13 - Proportion of Annual Phosphorus Load to South Branch Rock Creek Watershed by Source**

#### 4.2 NARP STRATEGY

Aqua's NARP strategy for the Manteno WWTP focuses on the IL\_FFB segment of South Branch Rock Creek and its watershed described in Section 4.1. The watershed of this segment is 38,497 acres and exhibited DO + pH eutrophication risk criteria in 2010, and 2015 which triggered the NARP special permit condition. The extensive monitoring program undertaken in 2023 demonstrated DO + pH risk of eutrophication criteria and low DO throughout, even at locations upstream and outside the influence of WWTP effluent.

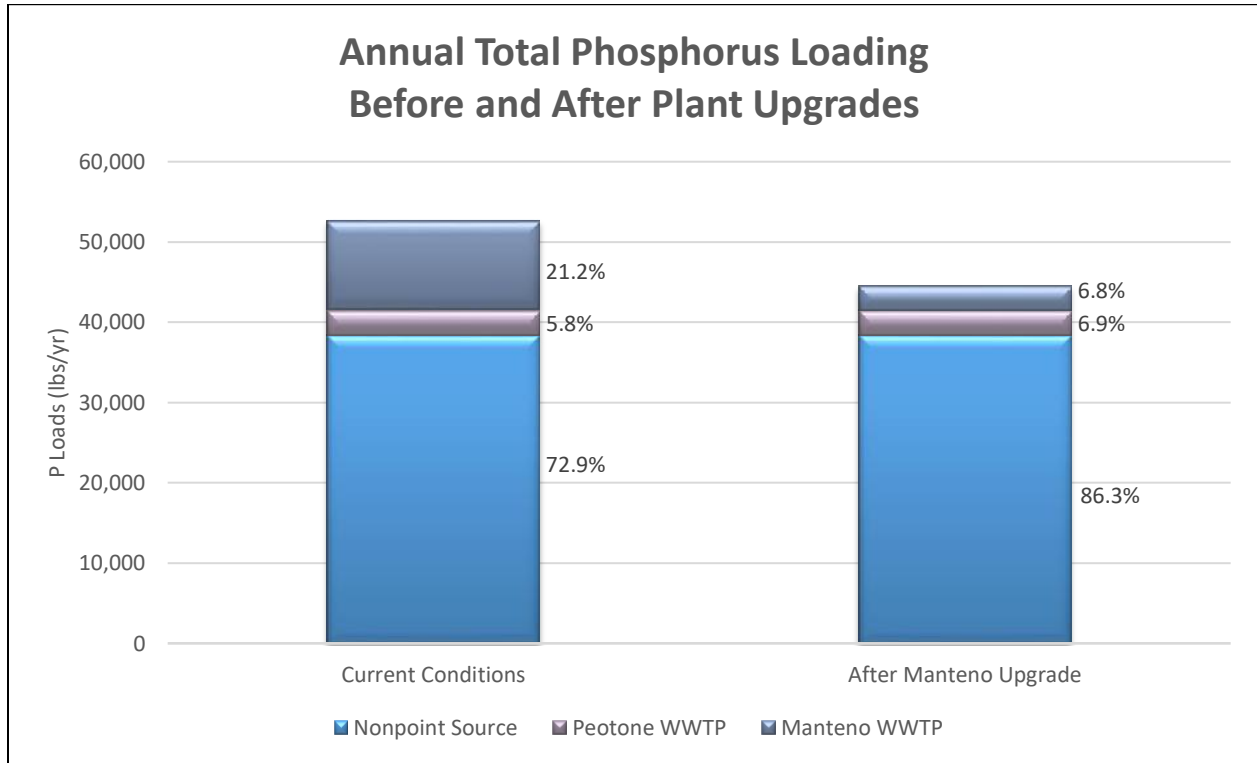
Based on an analysis of land cover, planning level loading estimates and monitoring, NPS pollution is a major contributor to water quality issues. The Manteno WWTP contributes approximately 21% of the

average annual phosphorus loading to the South Branch Rock Creek watershed, with NPS estimated to contribute over 3X more than the Manteno WWTP. Nonpoint sources are a larger contributor to the water quality issues such as low DO and eutrophication risk conditions (Figure 13). The availability of phosphorus in the stream systems is systemic due to the agricultural and urban land uses that dominate the watershed. Based on the conditions observed during the monitoring program, the streams are highly channelized with poor riparian and canopy cover conditions and the areas adjacent to the stream are highly agricultural.

Aqua recognizes the Manteno WWTP's contribution of phosphorus to the watershed, and how this input is part of a complex and dynamic process that may affect DO in the stream and risk of eutrophication. Aqua, however, does not have jurisdiction over land management decisions made outside of boundaries where a majority of the nutrients originate.

In this context, the Manteno's NARP is focused on improving water quality in the watershed in three ways:

1. **WWTP Plant Operation and Upgrades** – Manteno is currently operating above its design flow of 1.15 MGD, and plant upgrades are underway to increase the capacity to 2 MGD, though flows are not expected to immediately increase above current conditions after project completion. Increasing the design flow capacity of the plant will allow for improvements in the treatment process that translate to effluent water quality. In addition, plant upgrades will implement chemical phosphorus removal.
  - a. Manteno's contribution of phosphorus will be reduced by approximately 73% with these upgrades to meet a 0.5 mg/L limit. Annual Loading will be reduced to approximately 3,018 lbs/yr from 11,179 lbs/yr.
  - b. This will result in Manteno's portion of annual watershed phosphorus loading being reduced from **21% to under 7%**. Figure 14 illustrates the proportion of phosphorus loading after plant upgrades.
  - c. The plant upgrades and associated phosphorus load reductions will have a positive effect on water quality and eutrophication risk conditions.
2. **Collaborate** – Aqua will collaborate and support any future watershed planning efforts that address NPS loading. Aqua has been a consistent and active voting member of the Kankakee River Basin Partnership, which has completed projects that address NPS pollution, including purchases of sensitive lands, bank stabilization and sedimentation studies. Aqua stresses public education in watershed protection efforts and seeks opportunities for messaging to the public regarding water quality in the basin.
  - a. Evaluate developing an internal means to track involvement and investments in a measurable way to report on progress and improvements.
3. **Local Watershed Group** – Aqua will continue to participate in the Kankakee River Partnership, however no local group exists for the smaller Rock Creek watershed. Aqua would strongly consider participating in a localized watershed group for this area if one were to be established, recognizing this would need to involve the agricultural community, the Kankakee County Soil and Water Conservation District (SWCD) and several other local groups and agencies. Aqua will encourage and support watershed management activities such as future grant funding through the Illinois EPA Section 319 program as well as other local collaborative efforts to reduce NPS pollution.



**Figure 14 - Phosphorus Loads from Point and NPS and Percent of Total Load Before and After Plant Upgrades**

Appendix C provides the treatment plant upgrade plans. The plans include implementation of a chemical phosphorus removal to meet a phosphorus limit of 0.5 mg/L. It is estimated that by 2025 the new system will achieve a 73% reduction in phosphorus loading. Aqua is committed to removing nutrients from the discharge to the watershed. Plant upgrades will also include capacity expansion that will achieve a more effective treatment process, and improvements to headworks, replacing sand filters with disk filters, and installation of new final clarifiers. These upgrades and corresponding point source reductions will have a positive effect on water quality and reduce risk of eutrophication conditions.

### 4.3 NARP WORKPLAN

The Work Plan includes a schedule and cost estimate for NARP activities moving forward. Aqua is committed to a series of key activities that will significantly reduce phosphorus loading to the South Branch Rock Creek, the subject of the risk of eutrophication designation that triggered the NARP, as well as contributing to source reductions needed to meet targets in the INLRS. Furthermore, Aqua will work with area stakeholders to further limit NPS loading through collaborative efforts outside of their jurisdiction. Actions include plant upgrades, watershed group involvement, and partnerships to help secure outside funding for NPS reductions.

### ACTIONS & SCHEDULE

An estimated schedule of activities is presented in Table 14. Significant plant upgrades are currently in progress, with several phases estimated to be completed by approximately 2030. Manteno will continue

to participate in the Kankakee River Basin Partnership watershed group and consider involvement in a new group specific to the Rock Creek watershed. Aqua will also continue seeking partnerships with others to secure outside grant funding for NPS reduction projects and will support production of a watershed plan if the existing group or a new watershed group pursues it.

**Table 14 - NARP Actions and Estimated Schedule**

NARP Action	Anticipated Start Date	Estimated End Date	Notes
Plant upgrades	In Progress	2030	Current upgrades are implementing a new filtration system and chemical phosphorus removal that will achieve compliance with a 0.5 mg/L effluent concentration limit and will achieve a 76% reduction in TP loading before the end of 2024. Additional upgrades that increase capacity to the 2.0 MGD level and optimize treatment processes will be completed by approximately 2030.
Watershed Group	Ongoing	Ongoing	Aqua will continue participation in the Kankakee River Basin Partnership stakeholder group or if one specific to Rock Creek is formed.
NPS Reduction Grants	TBD	TBD	Aqua will look for opportunities to partner with other entities to implement NPS reductions in the South Branch Rock Creek Watershed

#### BUDGET & COST ESTIMATES

The Manteno WWTP capital improvements and plant upgrades are estimated at **\$9,012,000** with the in-progress Phase I project costing an estimated \$6,109,000. Participation in a watershed group is estimated at **\$3,000** per year. The cost of other NPS reduction measures is currently unknown.

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## APPENDIX A: MONITORING PLAN



# AQUA Illinois

## Manteno Wastewater Treatment Plant

Nutrient Assessment Reduction Plan  
Draft: Data Mining & Monitoring Plan



April 2023

Prepared for: Aqua Illinois

Prepared by: Northwater Consulting & Donohue and Associates



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# 1 Introduction

## 1.1 NARP Process & Requirements

In 2018, the Illinois EPA (IEPA) instituted a new process for permitting of municipal (WWTP) discharges that would allow for consideration of site-specific conditions for defining permit limits for phosphorus. This Nutrient Assessment Reduction Plan (NARP) process resulted from negotiations with environmental organizations, IEPA, and the Illinois Association of Wastewater Agencies. A NARP Special Permit Condition is required if a receiving stream segment or downstream segment is on the Illinois Clean Water Act 303(d) list as impaired with phosphorus-related causes. A NARP is also required if there is a “risk of eutrophication” as defined by meeting any of the conditions outlined in Table 1.

*Table 1. IEPA Risk of Eutrophication Criteria*

Risk of eutrophication if any of these conditions met		
pH	Median sestonic chlorophyll <i>a</i>	On any two days during IEPA monitoring, daily max
>9	>26 u/l	pH>8.35 and Dissolved Oxygen (DO) sat >110%

AQUA Illinois (AQUA) owns and operates a wastewater treatment plant that serves the Village of Manteno, Illinois. This 1.15 MGD facility discharges to the South Branch Rock Creek in the Kankakee watershed. The Manteno Plant currently only has a monitoring requirement for TP and has a special permit condition to develop a phosphorus discharge optimization plan. AQUA will be performing capital improvements at the Manteno plant with construction of Phase I planned for a 2023 commencement. Phase I includes new headworks building and a new disk filter system that will provide for mechanical screening of influent and tertiary filtration, respectively. While these improvements are not for the primary purpose of phosphorus removal, by reducing the amount of rags that get into the process treatment train, more stable operation of the secondary treatment system will be achieved. In addition, the new disk filter system will reduce the total suspended solids (TSS) in the effluent and will assist in enhancing phosphorus removal due to better TSS management.

The NARP special condition in Manteno’s National Pollution Discharge Elimination System (NPDES) permit has a deadline of December 31, 2023. In the NARP process, the permittee has an opportunity to evaluate and assess phosphorus-related impairments and eutrophication risk with data collection and analysis to inform the process. In some cases, data may support the case that further NARP requirements are not necessary.

Northwater Consulting was retained by Donohue and Associates to perform data mining and analysis to guide a monitoring plan to inform next steps and satisfy NARP requirements.

Typical steps include:

- Examine if sufficient water quality data exists to justify a NARP.
  - If insufficient, create a water quality monitoring plan and collect data.
- Analyze monitoring data to assess if NARP triggers are being met and if further steps are needed.
- Complete a strategy and workplan and advance the NARP, if required:
  - Conduct watershed characterization.
  - Engage stakeholders and develop a watershed group.
  - Model watershed and instream processes.
  - Establish defensible site-specific water quality criteria.
  - Define scenarios and strategies to achieve water quality targets.
  - Implement the recommendations of the NARP.

## 1.2 Data for NARP Determination

For a determination to be satisfactory to the IEPA there must be sufficient dissolved oxygen (DO), pH and sestonic chlorophyll *a* data available between May 1 and October 31 to assess if eutrophication risk criteria are met, or the receiving stream/downstream segment are appropriately categorized as impaired with phosphorus-related causes. Based on analysis of existing datasets for the outfall and associated stream segments, monitoring is recommended to evaluate impairments, eutrophication risks and better understand nutrient sources. Data will inform subsequent NARP stages if necessary, such as modeling, establishing site-level water quality standards, and estimating nutrient input reductions needed to achieve standards. Monitoring will validate the initial IEPA determination and guide additional components, if required.

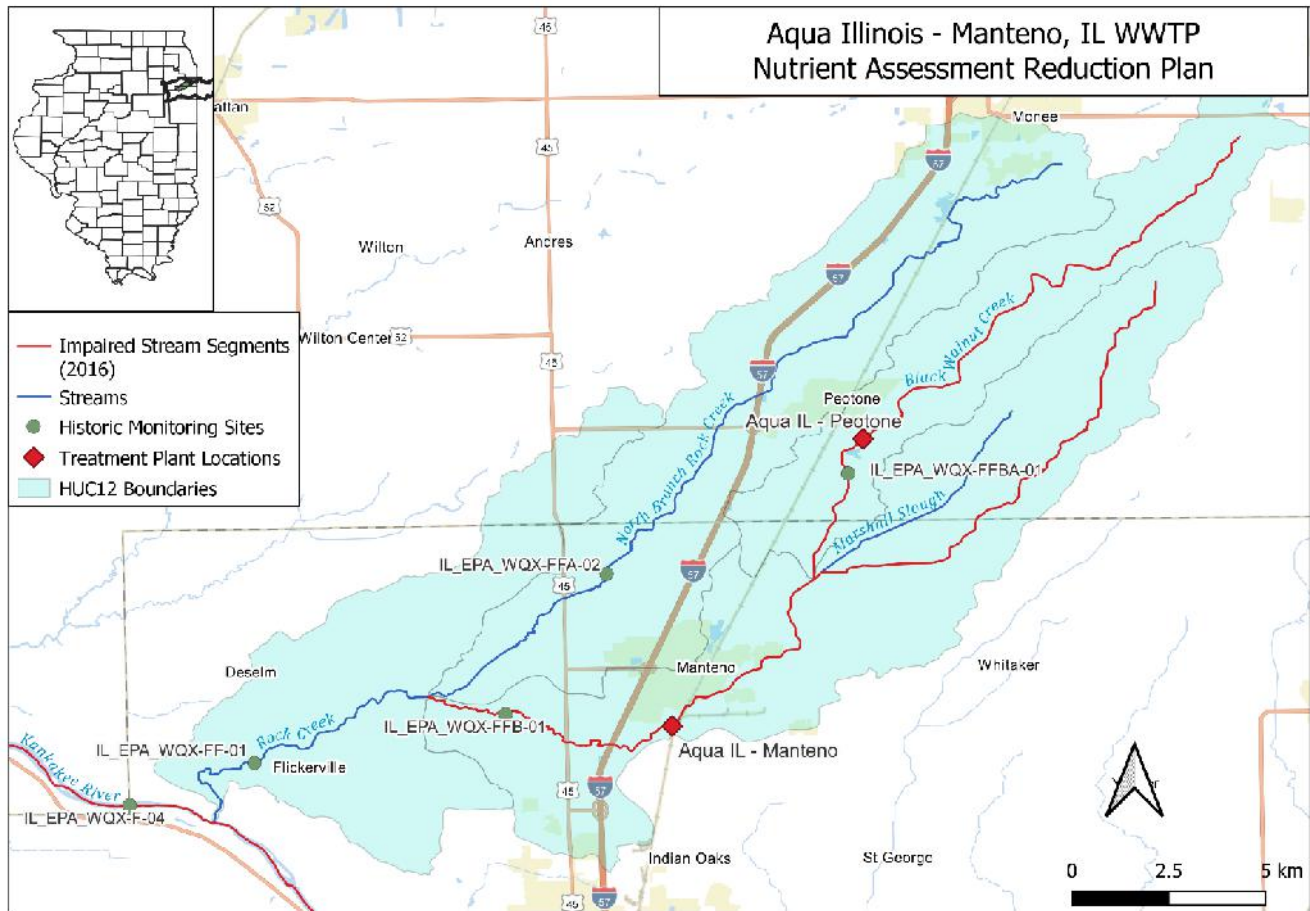


Figure 1. Project Area and Rock Creek Watershed

## 2 Results

### 2.1 Location & Background

Manteno is in Kankakee County in northeast Illinois. The village has a population of 9,212 according to the 2020 census. AQUA owns and operates the village WWTP which has approximately 3,800 sewer connections. The plant has a design average flow of 1.15 million gallons per day (MGD) and a design maximum flow of 3.5 MGD. The plant discharges to South Branch Rock Creek, a channelized drainage ditch with a watershed of 50 square miles (mi<sup>2</sup>) upstream from the plant discharge. Upstream of the Manteno outfall, South Branch Rock Creek is fed by the Marshall Slough and Black Walnut Creek tributaries (Figure 1). Downstream of Manteno, North Branch Rock Creek becomes Rock Creek downstream of the South Branch Rock Creek confluence. Rock Creek then flows to the Kankakee River. The Rock Creek Watershed is 121 mi<sup>2</sup> (77,400 acres) and is dominated by agricultural land use, with few developed areas, including Manteno and the Village of Peotone. Peotone has a 0.85 MGD WWTP discharging to Black Walnut Creek, also owned and operated by AQUA.

### 2.2 Impairments & Risk of Eutrophication

South Branch Rock Creek was cross referenced with the 2010, 2012, 2014, 2016, 2018 and 2020/2022 IEPA Clean Water Act Section 303(d) list<sup>1</sup> of impaired waters. Details of phosphorus-related impairments are summarized for the treatment plant's watershed in Table 2. South Branch Rock Creek was on each of the 2010, 2012, 2014 and 2016 lists as impaired for aquatic life caused by total phosphorus, and additionally the cause of pH was noted on the 2012, 2014 and 2016 lists. The upstream tributary, Marshall Slough meets all designated uses and upstream tributary Black Walnut Creek has been listed as impaired since at least 2010 with causes of total phosphorus and chlorine. Downstream, Rock Creek meets all its designated uses and is not listed.

The NARP special permit condition was triggered<sup>2</sup> by the South Branch Rock Creek impairment. IEPA monitoring documented a risk of eutrophication in this segment indicated by 10 of 33 days with pH greater than 8.35 and DO saturation greater than 110%. There were also two days with pH greater than 9.0. A Freedom of Information Act Request resulted in the identification of three additional IEPA monitoring sites on the Kankakee River downstream of the Rock Creek confluence with eutrophication risk criteria including high pH and DO (Figure 2). One site upstream of the Rock Creek confluence with the Kankakee (IL F-12) did not show risk of eutrophication. However, between the confluence with Rock Creek and site IL F-12 is the Kankakee WWTP, which has a permitted daily average flow of 25 MGD and is also subject to the NARP requirements. The Kankakee watershed above Rock Creek is over 2.9 million acres with numerous point and nonpoint sources. Based on the small relative size of the Manteno plant, the large influence of the Kankakee WWTP, the size of the watershed upstream from Rock Creek, and the low confidence in effectively characterizing nutrient sources in a drainage system this large, it makes most sense if the Manteno effort focuses on the Rock Creek watershed and does not include the Kankakee.

<sup>1</sup> <https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx>

<sup>2</sup> <https://external.epa.illinois.gov/WebSiteApi/api/PublicNotices/GetDocument/8973>

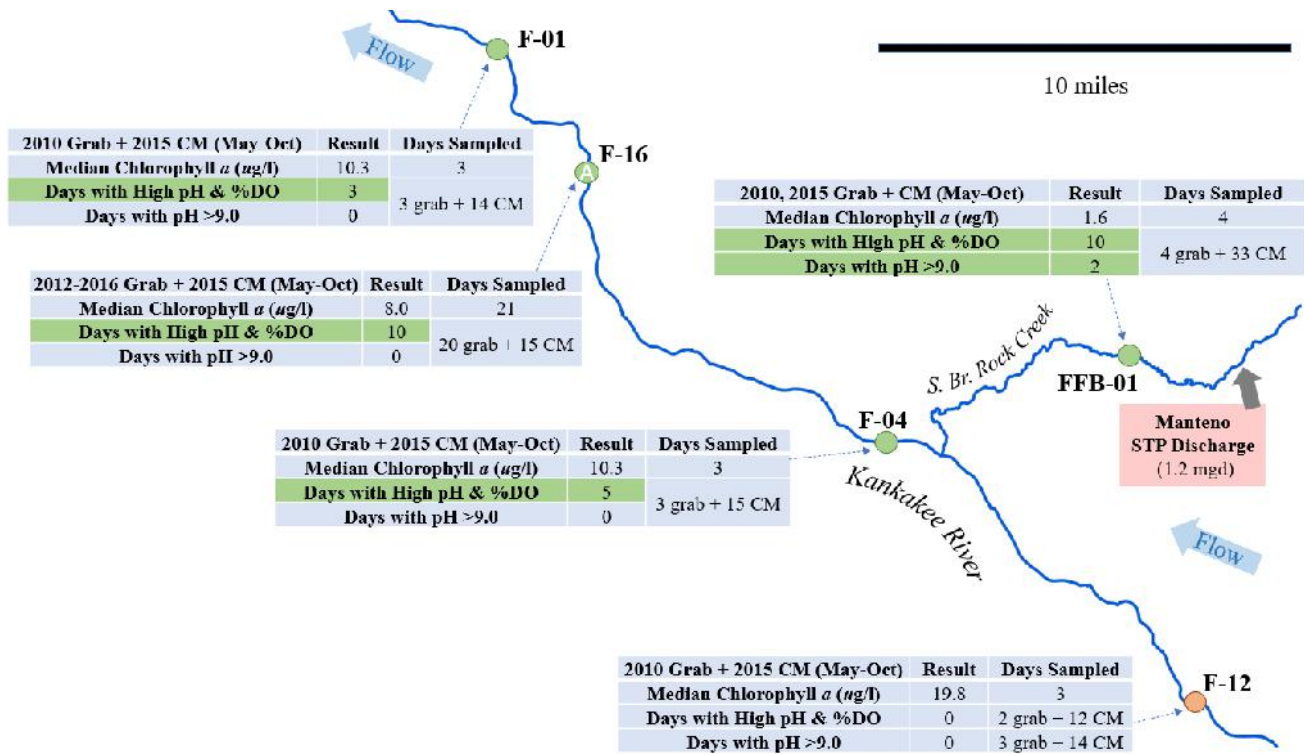


Figure 2. IEPA "Risk of Eutrophication Map" received through open records request. Not depicted on this map is Kankakee WWTP (25MGD), downstream of site F-12.

Table 2. Receiving Stream and Tributary Segment Summary

Manteno Receiving Stream Segment				
Receiving Stream	HUC12 Watershed	Illinois Assessment Unit	303(d) Impairments	Causes Related to P & Years on List
South Branch Rock Creek (Receiving Segment)	071200011502	IL_FFB	Aquatic Life	pH, Total Phosphorus 2010 (TP only), 2012, 2014, 2016
Rock Creek (Downstream of Receiving Segment)	071200011805	IL_FF	None	NA
Upstream Tributary	HUC12 Watershed	Illinois Assessment Unit	303(d) Impairments	Causes Related to P & Years on List
Black Walnut Creek	071200011502	IL_FFBA	Aquatic Life	Total Phosphorus, Chlorine 2010, 2012, 2014, 2016, 2018, 2020/2022
Marshall Slough	071200011502	IL_FFBB	None	NA
Receiving Major Watershed	POTW Design Average Flow		POTW Design Maximum Flow	
Kankakee River	1.15 MGD		3.5 MGD	

### 2.3 Water Quality Data Summary

Mining was completed for existing water quality data collected since January 1, 2010 from the USEPA Water Quality Portal<sup>3</sup>. AQUA also provided effluent monitoring data. These data were examined to better understand eutrophication risk using DO, pH, chlorophyll *a* and water temperature. A summary for the receiving stream and stations on relevant nearby segments is presented in Table 3. Figure 1 shows site locations.

*Table 3. Receiving Stream and Tributary Water Quality Summary*

Stream	Segment ID	Analyte	Mean	Units	N	Begin Date	End Date
Rock Creek	IL_EPA FF-01	Chlorophyll a	NA	ug/l	7	6/1/2010	10/27/2020
Rock Creek	IL_EPA FF-01	Dissolved oxygen (DO)	8.20	mg/l	4	6/1/2010	10/13/2015
Rock Creek	IL_EPA FF-01	Dissolved oxygen saturation	90.15	%	4	6/1/2010	10/13/2015
Rock Creek	IL_EPA FF-01	pH	7.98	None	4	6/1/2010	10/13/2015
Rock Creek	IL_EPA FF-01	Phosphorus	0.20	mg/l	18	6/1/2010	10/27/2020
Rock Creek	IL_EPA FF-01	Temperature, water	19.42	deg C	4	6/1/2010	10/13/2015
North Branch Rock Creek	IL_EPA FFA-02	Chlorophyll a	5.34	ug/l	1	6/2/2010	6/2/2010
North Branch Rock Creek	IL_EPA FFA-02	Dissolved oxygen (DO)	6.46	mg/l	1	6/2/2010	6/2/2010
North Branch Rock Creek	IL_EPA FFA-02	Dissolved oxygen saturation	70.00	%	1	6/2/2010	6/2/2010
North Branch Rock Creek	IL_EPA FFA-02	pH	7.36	None	1	6/2/2010	6/2/2010
North Branch Rock Creek	IL_EPA FFA-02	Phosphorus	0.15	mg/l	4	6/2/2010	8/31/2010
North Branch Rock Creek	IL_EPA FFA-02	Temperature, water	18.09	deg C	1	6/2/2010	6/2/2010
South Branch Rock Creek	IL_EPA FFB-01	Chlorophyll a	1.83	ug/l	7	6/2/2010	10/19/2020
South Branch Rock Creek	IL_EPA FFB-01	Dissolved oxygen (DO)	9.78	mg/l	4	6/2/2010	10/15/2015
South Branch Rock Creek	IL_EPA FFB-01	Dissolved oxygen saturation	109.33	%	4	6/2/2010	10/15/2015
South Branch Rock Creek	IL_EPA FFB-01	pH	7.97	None	4	6/2/2010	10/15/2015
South Branch Rock Creek	IL_EPA FFB-01	Phosphorus	0.30	mg/l	19	6/2/2010	10/19/2020
South Branch Rock Creek	IL_EPA FFB-01	Temperature, water	19.41	deg C	4	6/2/2010	10/15/2015
Black Walnut Creek	IL_EPA FFBA-01	Chlorophyll a	3.79	ug/l	6	6/2/2010	10/19/2020
Black Walnut Creek	IL_EPA FFBA-01	Dissolved oxygen (DO)	5.84	mg/l	3	6/2/2010	9/15/2010

<sup>3</sup> [www.waterqualitydata.us](http://www.waterqualitydata.us)

Stream	Segment ID	Analyte	Mean	Units	N	Begin Date	End Date
Black Walnut Creek	IL_EPA FFBA-01	Dissolved oxygen saturation	64.67	%	3	6/2/2010	9/15/2010
Black Walnut Creek	IL_EPA FFBA-01	pH	7.41	None	3	6/2/2010	9/15/2010
Black Walnut Creek	IL_EPA FFBA-01	Phosphorus	0.57	mg/l	15	6/2/2010	10/19/2020
Black Walnut Creek	IL_EPA FFBA-01	Temperature, water	19.13	deg C	3	6/2/2010	9/15/2010

Limited publicly available data was found for the receiving stream. As indicated above, an Illinois Freedom of Information Act request to IEPA revealed additional continuous monitoring data from 2010 and 2015 indicating South Branch Rock Creek segment FFBA-01 met the risk of eutrophication threshold based on DO saturation + pH from 6 of 17 days monitored in 2010 and 4 of 16 days monitored in 2015. The risk of eutrophication threshold was not met by three grab samples taken in 2010 or one in 2016. While this was sufficient to trigger the NARP special condition, there is not adequate data to fully understand the risk of eutrophication, nor make a defensible determination of the source of nutrients triggering the impairment.

### 3 Monitoring Plan Overview

Considering the effort and investment necessary for NARP development, and the lack of data available to make well-supported stream impairment and “risk of eutrophication” determinations, stream monitoring is recommended. Water quality data will guide additional NARP components if required.

Proposed in-stream water quality monitoring expands upon past collection efforts. To augment existing records, data collection is prioritized to locations previously monitored, where possible. To maintain cost effectiveness, a combination of grab sampling and continuous monitoring is proposed. The goal is to collect adequate data during the critical period of May 1 through October 31 when NARP-triggering conditions are most likely to occur and to strengthen understanding of the role of the plant’s effluent regarding eutrophication risk. Monitoring will support evaluation of water quality impacts in receiving streams, including the NARP-triggering segment of South Branch Rock Creek, as well as contributions from major tributaries upstream of the plant (Black Walnut Creek and South Branch Rock Creek). AQUA also owns and operates a wastewater treatment plant at Peotone, Illinois that discharges to Black Walnut Creek. It is not subject to NARP requirements, as it is a NPDES-minor discharger with under 1 MGD design average flow serving fewer than 10,000 people. However, monitoring is recommended upstream and downstream of the plant as part of the Manteno process. Though Peotone is not subject to NARP requirements, this will help to identify its impact on the risk of eutrophication and will allow for a more precise identification of nutrient impacts from nonpoint sources in the watershed.

As indicated in section 2.2, monitoring on the Kankakee River is not recommended at this stage, as Manteno’s effluent contribution is minor relative to the size of the watershed and the magnitude of point



source dischargers upstream of the Rock Creek confluence. Thus, focusing on the Rock Creek watershed is recommended.

Monitoring elements include:

1. Three grab sample-only sites:
  - a. S. Branch Rock Creek: upstream of Manteno outfall.
  - b. Rock Creek downstream of outfall.
  - c. Black Walnut Creek: upstream of Peotone outfall.
2. Three continuous sensor sites:
  - a. S. Branch Rock Creek: downstream of Manteno outfall.
  - b. S. Branch Rock Creek: upstream of confluence with Black Walnut Creek.
  - c. Black Walnut Creek: downstream of Peotone outfall.
3. Continuous sensor site parameters:
  - a. Hydrological: stream stage.
  - b. Water quality: pH, sestonic chlorophyll *a*, water temp, DO, conductivity.
4. At all sites:
  - a. Grab samples and storm monitoring.
  - b. Weekly at grab-only sites; bi-weekly at sites with continuous monitoring:
    - i. Stream discharge/flow.
    - ii. In-situ (handheld meter) analysis of pH, conductivity, oxidation/reduction potential, temperature, DO saturation, and turbidity.
    - iii. Grab samples for laboratory analysis of orthophosphate, total phosphorus, and chlorophyll *a*, total nitrogen, nitrate, ammonia.

The parameters recommended are key for NARP determination and will assist with future stages. While there are myriad sampling methodologies and parameters that are eutrophication indicators, such as periphyton (attached algae chlorophyll) and nitrogen, this sampling scheme is designed to adhere closely to IEPA guidance and be cost-effective.

## 4 Stream Monitoring

### 4.1 General Schedule

Data collection shall occur from May 1 through October 31, 2023. This captures the critical period when water quality issues are most likely to occur.

### 4.2 Stations

Six monitoring stations are suggested to assess receiving stream water quality before and after the addition of treated effluent at the AQUA Manteno and Peotone plants. These stations will also support assessment of potential tributary impacts and characterize the segment that exceeded the IEPA eutrophication risk criteria (Figure 3, Figure 4).

The stations are located at bridge crossings or pre-established access points. The upstream sites are close enough to the outfall to capture as much of the watershed upstream as possible without the influence of effluent. The downstream sites are located at a distance to allow for sufficient mixing of effluent and streamflow and to evaluate the immediate impacts of nutrients. Data collected using this approach can then be used to develop a predictive water quality model (if required).

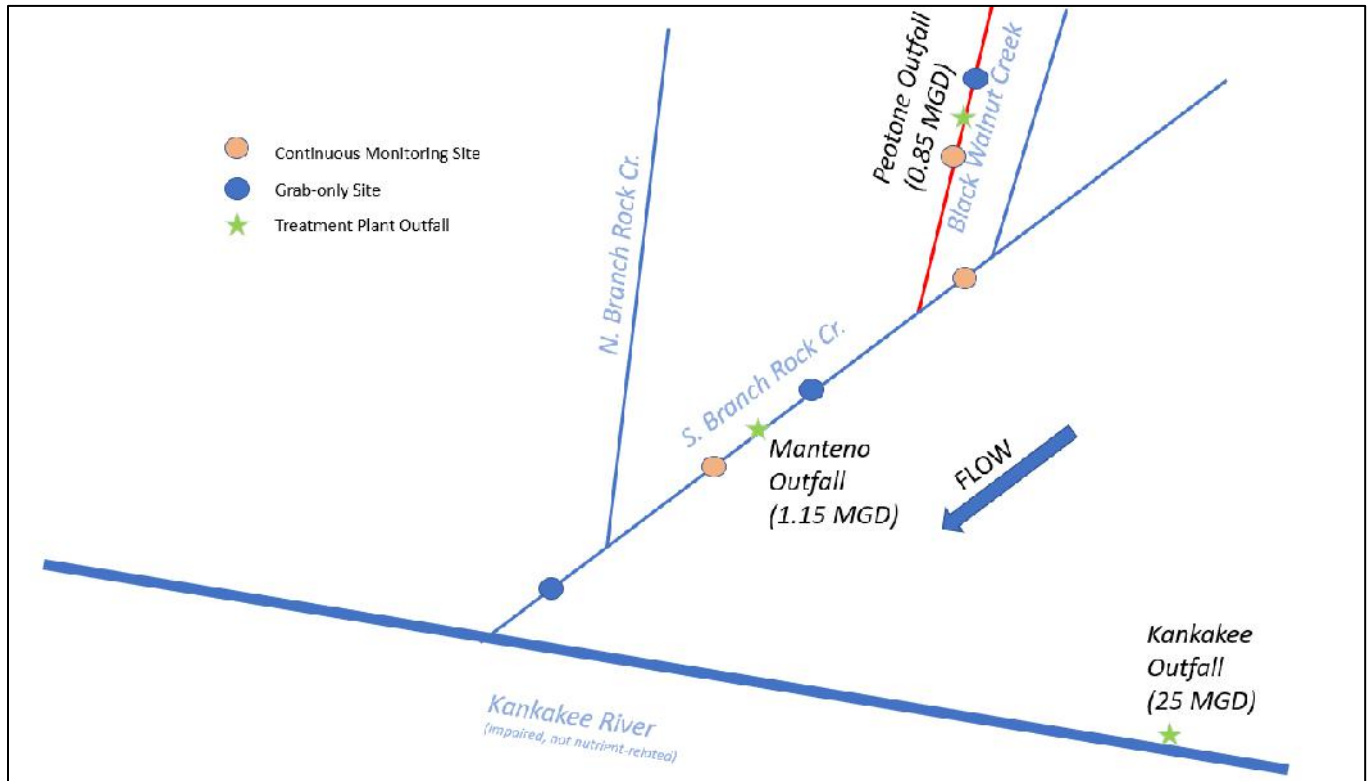


Figure 3. Line Diagram of Monitoring Streams and Proposed Monitoring Locations

Table 4 – Proposed Water Quality Monitoring Stations

Station ID	Name	Lat/Long	Station ID and organization which previously collected data at this site	Approximate distance from outfall	Type of Sampling
SBRD	South Branch Rock Creek Downstream	41.22502, -87.857841	IL EPA FFB-01	3.0 mi	Continuous, Biweekly Grab and Storm
SBRM	South Branch Rock Creek Middle	41.24168, -87.836472	NA	0.7 mi	Grab Only, Weekly Grab and Storm
BWCD	Black Walnut Creek Downstream	41.31034, -87.790788	IL EPA FFBA-01	0.95 mi	Continuous, Biweekly Grab and Storm
BWCU	Black Walnut Creek Upstream	41.321304, -87.785058	NA	0.1 mi	Grab Only, Weekly Grab and Storm
SBRU	South Branch Rock Creek Upstream	41.27964, -87.799155	NA	4.5 mi	Continuous, Biweekly Grab and Storm
RCKD	Rock Creek Downstream	41.22122, -87.9734	IL EPA FF-01	7.7	Grab Only, Weekly and Storm

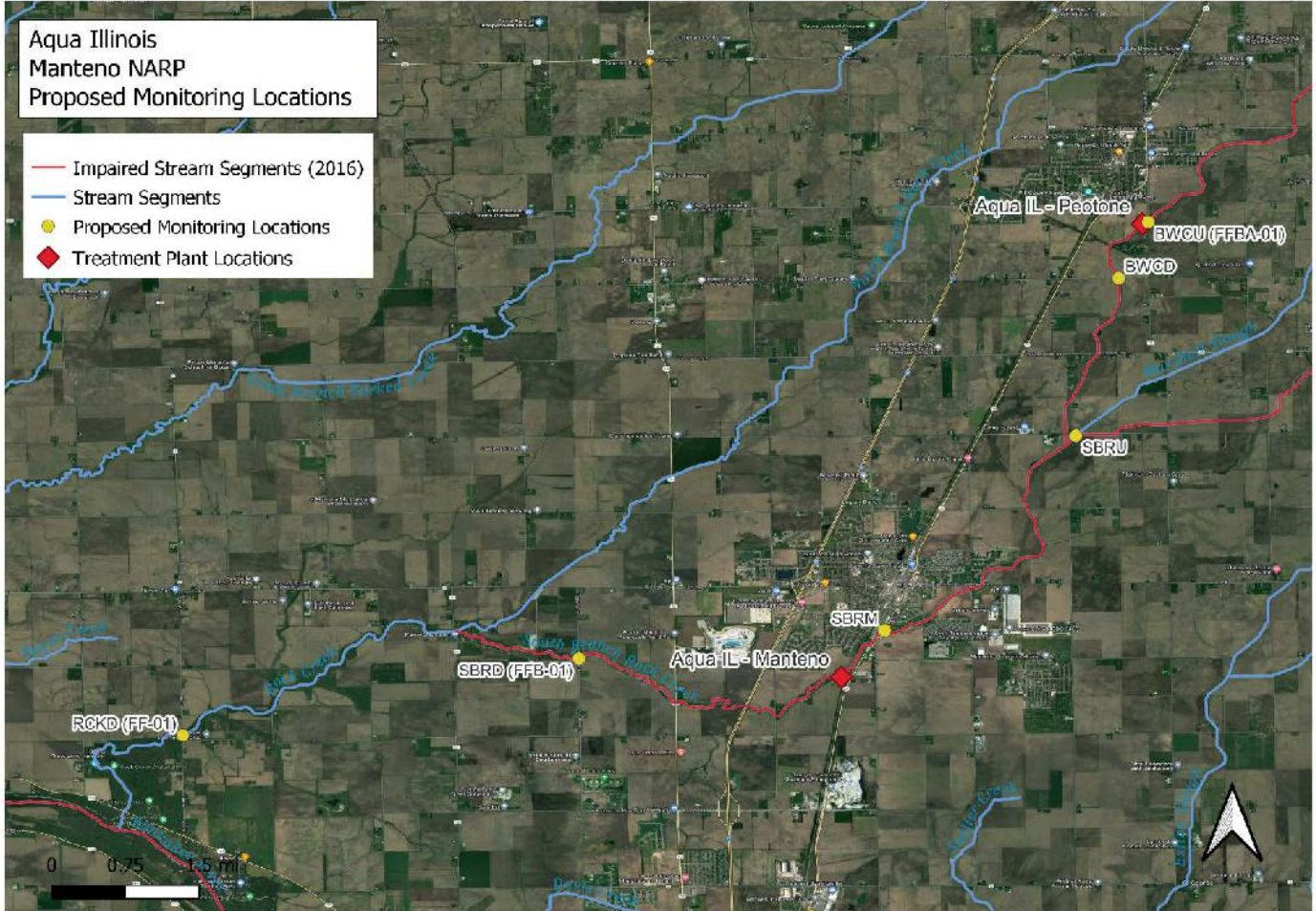


Figure 4. Proposed Monitoring Sites

### 4.3 Sampling & Analyses

Sampling will use industry standards and manufacturer protocols for calibration, maintenance, and data collection, and will be documented.

#### 4.3.1 Hydrology Data

Stream stage and discharge data will be collected at each site (Table 5). If a sufficient range of flows is captured, a rating curve can support estimates of stream loading which will inform watershed characterization and further NARP development, if necessary.

*Table 5. Hydrology Parameters*

Parameter	Collection Type	Frequency	Instrument/Method
Stream Stage	Continuous Probe	Continuous	Vented Pressure Transducer,
	Staff Gauge	Discreet	Graduated Staff Gauge
Discharge	Manual	Bi-weekly, with additional storm samples	Digital Electromagnetic Flow Meter + wading staff or ADCP

#### 4.3.2 Water Quality Data

Multiparameter sondes with integrated sensor wipers to reduce biofouling will be installed at each continuous monitoring site and will collect data on a 15-minute interval (Table 6). Sondes will be left in place for multi-week deployments and serviced and/or calibrated bi-weekly using manufacturer protocols unless conditions allow for a longer period between service, though no less frequently than every 30 days. Grab samples and in-situ water quality measurements will be collected to augment sonde data, support quality assurance and provide additional parameters useful for the NARP assessment. At sites with sondes, data collection will coincide with instrument calibration.

Grab samples will be collected on a bi-weekly frequency at continuous monitoring sites and grab sample only sites. 40 CFR Part 136 procedures will be followed and will include using laboratory-provided bottles, adherence to recommended sample preservation, holding times, and conditions for samples. Field data sheets and chains of custody will be used to document data collection. Grab samples will be analyzed in-house by AQUA or outsourced to an accredited environmental laboratory.

A typical stream sampling event will include:

- Calibration of all sensors.
- Measure of streamflow.
- Recording of stream stage.
- Collection of grab samples.
- Recording of data from handheld meter.

Table 6. Water Quality Parameters

Parameter	Collection Type	Frequency	Method	Method Identifier
Dissolved Oxygen	Continuous Probe	Continuous	Optical	ASTM D888-09
	Handheld Meter	Bi-weekly, Storm	Optical	ASTM D888-09
pH	Continuous Probe	Continuous	Potentiometric	EPA 150.2
	Handheld Meter	Bi-weekly, Storm	Potentiometric	EPA 150.2
Water Temperature	Continuous Probe	Continuous	Thermistor	EPA 170.1
	Handheld Meter	Bi-weekly, Storm	Thermistor	EPA 170.1
Chlorophyll-a	Continuous Probe	Continuous	In-situ Optical Fluorescence	Instrument Manufacturer Optical Method
	Grab	Bi-weekly, Storm	Lab Spectrophotometric	EPA 445.0
Total Phosphorus	Grab	Bi-weekly, Storm	Colorimetry	EPA 365.1 / EPA 365.3
Orthophosphate	Grab	Bi-weekly, Storm	Colorimetry	EPA 365.1 / EPA 365.3
Total Nitrogen	Grab	Bi-weekly, Storm	Colorimetry	USGS-NWQL: I-4650-03
Nitrate	Grab	Bi-weekly, Storm	Colorimetry	EPA 352.1
Ammonia	Grab	Bi-weekly, Storm	Colorimetry	EPA 350.2
Conductivity	Continuous Probe	Continuous	Resistor Network	EPA 120.1
	Handheld Probe	Bi-weekly, Storm	Resistor Network	EPA 120.1

## 5 Data Management & Quality Control

Data will be downloaded from each logger at each site visit and will be maintained in a relational database or spreadsheet with appropriate permissions, backups, and controls. Continuous data will be corrected for drift using a statistical software package designed for that purpose, such as the R package *driftR*<sup>4</sup>. This drift correction is a standard procedure based on instrument calibration and if necessary, stream grab sample data. The IEPA has indicated that a Quality Assurance Project Plan (QAPP) is not necessary for NARP monitoring, however a full quality assurance and quality control procedure document will be created and implemented in lieu of a QAPP and will include detailed sampling and analysis protocols and procedures.

<sup>4</sup> <https://rdocumentation.org/packages/driftR/versions/1.1.0>

## APPENDIX B: WATER QUALITY DATA

Appendix B Data Table 1 - Black Walnut Creek Upstream Grab Samples

DateTime	Site	Conductivity	DO	Flow	ORP	pH	Stage	Turbidity	DO Sat	Temp	ChlA	NH3-N	NO3/NO2-N	NO3-N	OrthoP	TKN	TN	TP	NO2-N
		µS/cm	mg/L	%	cfs	mV	SU	ft	C	RFU	µg/L	mg/L	mg/L	mg/L	mg/L as P	mg/L	mg/L	mg/L	mg/L
5/2/23 12:48	BWCU	737	12.08	3.37	82.3	8	0.98		110.4	11.2	1.8	0.1	1.7	1.6	0.02	1	1.7	0.1	
5/16/23 13:12	BWCU	737	13.35	3.29	138.1	7.84	0.96	2.61	143.7	18.5	2.3	0.1	2.3	2	0.05	1	2.3	0.1	
6/1/23 13:05	BWCU	680	11.18	1.66	176.7	7.57		2.91	122.6	19.4	2.6	0.1	1.8	2.1	0.05	1	1.8	0.1	
6/13/23 13:03	BWCU	812	7.58	1.99	104.8	7.89	1	19.3	78.1	16.7	1.7	0.1		0.42	0.02	1	1	0.1	0.2
6/27/23 11:20	BWCU	728	3.83	1.25	20.5	7.49	1.16	2.58	41.5	19.1	1	0.1		0.1	0.035	1	1	0.1	0.2
7/11/23 11:15	BWCU	640	5.43	3.14	70	7.58		5.42	63.7	21.7	1	0.1		2	0.02	1	2	0.1	0.15
7/27/23 12:40	BWCU	779	3	0.01	83.2	7.38	1.27	6.46	35.2	23	1.7	0.1		0.14	0.02	1	1	0.1	0.15
8/10/23 11:20	BWCU	978	4.03	1.11	89.2	7.61	1.2	15	46.3	20.7	1.1	0.1		0.5	0.057	1	1		0.5
8/31/23 14:51	BWCU	628	5.94	0.76	142.4	7.66	1.15	3.76	63.7	17.7	1.5	0.1		0.07	0.022	1	1	0.1	0.2
9/26/23 10:20	BWCU	596	4.27	0.5	69.3	7.3		1	46	17.7	13	0.1	0.52	0.54	0.02		0.52	0.1	
9/14/23 11:15	BWCU	758	5.51	0.52	125	7.35	1.18	0.7	57	14.8	25	0.1		0.5	0.05	1	1	0.1	0.5
10/11/23 11:40	BWCU	1132	7.19	0.19	-39.1	7.92		2	65.7	10	1.4	0.1	1.5	1.5	0.02	1.3	2.8	0.15	
11/2/23 9:25	BWCU	679	9.76	7.97	98.9	7.7	1.5	4.75	83.4	7.5	1	0.1	4.7	5.2	0.053	1	4.7	0.1	

Appendix B Data Table 2 - Black Walnut Creek Downstream Grab Samples

Date/Time	Site	Conductivity	DO	DO Sat	Flow	ORP	pH	Stage	Temp	Turbidity	ChlA	NH3-N	NO3/NO2-N	NO3-N	OrthoP	TKN	TN	TP	NO2-N
		µS/cm	mg/L	%	cfs	mV	SU	ft	C	RFU	µg/L	mg/L	mg/L	mg/L	mg/L as P	mg/L	mg/L	mg/L	mg/L
5/2/23 14:05	BWCD	908	13.04	121.6	3.21	69.6	8.12		12.1	4.32	4.4	0.84	2.9	2.9	0.83	1.6	4.6	0.98	
5/16/23 13:50	BWCD	922	14.36	171.9	3.44	148	8.08		20.1	2.48	11	0.1	2.6	2.5	0.082	1	2.6	0.19	
6/1/23 13:25	BWCD	780	7.86	88.8	7.32	137	7.36		20.9	23.2	3.9	0.31	6	6.5	0.33	1	7	0.47	
6/13/23 13:21	BWCD	1134	12.05	125.6	2.7	64.4	8.13		17.5	2.52	1	0.1	4.4	4.4	0.75	1	4.4	0.76	
6/27/23 11:45	BWCD	1055	11.63	127.4	2.2	48	7.92		19.7	1.3	2.1	1		0.52	0.62	1.4	2	0.72	0.2
7/11/23 11:40	BWCD	848	16.37	192	3.34	82.3	8.36		23.6	0.52	31	0.1		3.5	0.24	1	4.5	0.3	0.2
7/27/23 12:50	BWCD	1104	17.12	216.8	2.7	91.4	8.25		27.1	1.38	5.4	0.1		4.6	0.48	1	4.6	0.52	0.2
8/10/23 11:45	BWCD	1181	11.1	128.8	2.61	90.4	7.81		21.5	0.99	2.5	0.1		3.4	0.59	1	3.4		0.5
8/31/23 15:15	BWCD	1025	10.81	123.7	0.73	141.1	7.86		21.3	2.66	4.7	0.1		8.5	0.93	1	8.5	1	0.2
9/26/23 10:45	BWCD	896	6.22	67.5	1.42	89.1	7.25		18.2	0.2	12	0.1	4.8	5.7	0.76		4.8	0.83	
9/14/23 11:40	BWCD	1037	13.97	150.1	1	127.1	7.76		18.9	0	3.2	0.1		5.2	0.73	1	5.2	0.71	0.5
10/11/23 12:05	BWCD	1542	13.91	137.6	1.25	56.3	7.91		13.4	0.41	1	0.1	6.4	6.4	0.73	1	6.4	0.58	
11/2/23 8:50	BWCD	739	9.53	82.2	11.2	90.4	7.7		8.1	4.92	1	0.1	5.1	5.6	0.16	1	6.1	0.18	



Appendix B Data Table 3 - South Branch Rock Creek Upstream Grab Sample Data

DateTime	Site	Conductivity		DO	DO Sat	Flow	ORP	pH	Stage	Temp	Turbidity	ChlA	NH3-N	NO3-/NO2-N	NO3-N	OrthoP	TKN	TN	TP	NO2-N
		µS/cm	mg/L	%	cfs	mV	SU	ft	C	RFU	µg/L	mg/L	mg/L	mg/L	mg/L as P	mg/L	mg/L	mg/L	mg/L	mg/L
5/2/23 14:05	SBRU	688	16.33	155.5	4.38	59.5	8.32	13.1	6.06	8.6	0.1	4.1	3.7	0.02	1	4.1	0.1			
5/16/23 14:30	SBRU	737	15.63	176.4	7.94	136	8.01	21.1	7.13	14	0.1	8.2	8.8	0.05	1	8.2	0.1			
6/1/23 14:00	SBRU	688	10.32	117.6	7.05	114	7.67	21.7	18.3	3.1	0.1	8.8	9.3	0.05	1	8.8	0.1			
6/13/23 13:57	SBRU	846	8.1	86	3.13	54.4	7.8	18.2	5.02	1.4	0.1		2	0.02	1	2	0.1	0.2		
6/27/23 12:15	SBRU	751	8.84	98.7	1.16	87	8.01	20.5	0.69	2.7	0.1		0.03	0.02	1	1	0.1	0.15		
7/11/23 12:35	SBRU	744	10.48	127.8	2.43	89.2	8.02	25.2	0.86	1.5	0.1		1.9	0.02	1	1.9	0.1	0.15		
7/27/23 13:17	SBRU	841	13.04	165.6	1.03	31.1	7.9	28.1	5.48	1	0.1		0.03	0.02	1	1	0.1	0.15		
8/10/23 12:15	SBRU	914	8.9	102.5	0.67	95.5	7.8	20.9	1.34	1.1	0.1		0.5	0.053	1	1		0.5		
8/31/23 15:38	SBRU	664	11.32	124.6	0.06	169.9	7.75	19.3	0.86	1.5	0.1		0.03	0.02	1	1	0.1	0.2		
9/26/23 11:15	SBRU	726	6.38	68.5	0.29	92.5	7.47	17.6	1.2	12	0.1		0.03	0.02		0.03	0.1			
9/14/23 12:00	SBRU	757	8.09	82.7	0.15	128.4	7.54	15.6	0	5.4	0.1		0.5	0.05	1	1	0.1	0.5		
10/11/23 13:25	SBRU	1101	13.48	126.4	0	164.4	7.87	11.5	6.5	8.7	0.1	0.2	0.02	0.02	1	1	0.1			
11/2/23 8:10	SBRU	671	9.59	92	14.39	104.6	7.71	7.7	6.76	1	0.1	5.6	6.7	0.044	1	5.6	0.1			

Appendix B Data Table 4 - South Branch Rock Creek Middle Grab Sample Data

DateTime	Site	Conductivity	DO	DO Sat	Flow	ORP	pH	Stage	Temp	Turbidity	ChlA	NH3-N	NO3/NO2-N	NO3-N	OrthoP	TKN	TN	TP	NO2-N
		µS/cm	mg/L	%	cfs	mV	SU	ft	C	RFU	µg/L	mg/L	mg/L	mg/L	mg/L as P	mg/L	mg/L	mg/L	mg/L
5/2/23 15:05	SBRM	786	15.24	141	12.59	64.4	8.25	0.32	11.7	2.33	10	0.1	2.6	2.6	0.02	1	2.6	0.1	
5/16/23 14:55	SBRM	721	11.65	125.5	32.41	136.9	7.74	0.9	19.1	8.78	2.3	0.1	6.2	6.5	0.05	1	6.2	0.1	
6/1/23 14:35	SBRM	554	7.92	90.5	29.51	113.7	7.43	1.09	22	17	2.7	0.1	9.6	9.9	0.05	1	9.6	0.18	
6/13/23 14:14	SBRM	761	8.72	92.5	13.15	94.6	8.01	0.67	17.9	3.39	1.4	0.1	1.8	1.9	0.02	1	1.8	0.1	
6/27/23 12:40	SBRM	825	9.15	103	7.3	109.1	7.86	1	21	2.07	17	0.1	0.75	0.54	0.081	1	1	0.15	
7/11/23 13:05	SBRM	720	12.1	147	16.93	97.1	8.05	1.25	24.2	0.4	1.5	0.1	3.2	3.2	0.046	1	3.2	0.12	
7/27/23 13:45	SBRM	866	14.85	186.7	6.42	36.6	8.02	0.75	27.5	2.47	1	2.1		0.57	0.021	1	1	0.1	0.2
8/10/23 12:40	SBRM	928	11.64	142.2	6.96	106.5	7.89	0.44	22.7	1.13	1	0.1		0.74	0.17	1	1		0.5
8/31/23 16:17	SBRM	652	13.89	168.6	2.8	129.4	8.06	0.43	24.2	0.81	23	0.1		0.28	0.12	33	34	0.17	0.2
9/26/23 11:35	SBRM	732	7.67	84.7	3.98	95.2	7.53	0.62	19.1	1.75	13	0.1	0.9	0.96	0.062		0.9	0.12	
9/14/23 12:30	SBRM	791	8.2	91.6	3.9	139.6	7.55	0.39	19.8	1.1	1	0.1		0.63	0.11	1	1	0.16	0.5
10/11/23 13:45	SBRM	1192	13.4	135.6	3.21	131.1	7.98	0.5	14.5	0.12	2.7	0.1	0.99	0.99	0.068	1	1	0.11	
11/2/23 7:35	SBRM	704	10.44	89.5	35.66	93.2	7.64	1.2	7.9	9.5	1	0.1		5.3	0.069	1	6.6	0.12	0.25

Appendix B Data Table 5 - South Branch Rock Creek Downstream Grab Sample Data

Date/Time	Site	Conductivity	DO	DO Sat	Flow	ORP	pH	Stage	Temp	Turbidity	ChlA	NH3-N	NO3-/NO2-N	NO3-N	OrthoP	TKN	TN	TP	NO2-N
		µS/cm	mg/L	%	cfs	mV	SU	ft	C	RFU	µg/L	mg/L	mg/L	mg/L	mg/L as P	mg/L	mg/L	mg/L	mg/L
5/2/23 15:46	SBRD	728	17.14	154.9	15.93	51.8	8.65	0.69	10.8	6.23	54	0.1	3.4	3.2	0.14	1	3.4	0.25	
5/16/23 15:30	SBRD	678	117.9	126.4	47.85	158.2	7.82	1.29	18.9	9.3	2.6	0.1	6.2	6.6	0.05	1	6.2	0.14	
6/1/23 15:20	SBRD	601	11.56	134.9	56.32	112	8.04	1.38	23	10.97	1.4	0.13	7.5	8.5	0.05	1.2	8.7	0.18	
6/13/23 15:02	SBRD	814	13.41	145.7	13.79	79.1	8.91	1.02	19.2	2.53	1	0.1		1.7	0.14	1	1.9	0.17	0.2
6/27/23 13:15	SBRD	714	12.76	151.6	11.3	68.8	8.84	1.12	23.9	1.96	3.1	0.1	0.32	0.25	0.32	1	1	0.4	
7/11/23 13:35	SBRD	734	9.44	117.9	21.81	95.1	8.06	1.36	26.4	4.05	1	0.1	2.6	2.5	0.19	1	2.6	0.23	
7/27/23 14:15	SBRD	830	17.12	232.6	12.55	69.9	8.64	1.5	30.4	2.91	15	0.1		1.1	0.2	1	1.1	0.21	0.2
8/10/23 13:25	SBRD	808	14.29	178.8	10.34	88.3	8.48	1.1	25.3	1.36	1.7	0.1		1.1	0.27	1	1.1		0.5
8/31/23 16:46	SBRD	711	11.2	139.2	3.11	113.4	8.71	0.79	25.5	10.91	4.7	0.1		1.1	0.58	1	1.1	0.3	0.2
9/26/23 12:30	SBRD	732	15.8	173.3	6.34	83.7	8.42	0.68	21.2	0.6	13	0.1	2.5	2.6	0.23		2.5	0.27	
9/14/23 13:25	SBRD	673	12.88	154.9	2.85	93.5	8.39	0.5	23.9	1.55	1	0.1		2.7	0.42	1	2.7	0.42	0.5
10/11/23 14:45	SBRD	1003	14.2	147	4.76	158.6	8.56	0.58	15.6	10.96	1.4	0.1	3	3	0.25	1	4	0.23	
11/2/23 11:40	SBRD	693	11.28	97.8	42.1	113.8	7.82	1.24	8.5	3.54	1	0.1	4.2	5.6	0.12	1	4.2	0.15	

Appendix B Data Table 6 - Rock Creek Downstream Grab Sample Data

Date/Time	Site	Conductivity	DO	DO Sat	Flow	ORP	pH	Stage	Temp	Turbidity	ChlA	NH3-N	NO3-/NO2-N	NO3-N	OrthoP	TKN	TN	TP	NO2-N
		µS/cm	mg/L	%	cfs	mV	SU	ft	C	RFU	µg/L	mg/L	mg/L	mg/L	mg/L as P	mg/L	mg/L	mg/L	mg/L
5/2/23 17:00	RCKD	659	26.42	149.9	32.23	46	8.7	1.43	11.2	0.12	4.3	0.1	3.7	3.6	0.032	1	3.7	0.1	
5/16/23 16:10	RCKD	636	11.38	125.1	116.4	139	8.13	2.05	19.1	6.76	1.8	0.1	7.7	8.2	0.05	1	7.7	0.1	
6/1/23 15:50	RCKD	606	10.75	128.8	97.4	92.7	8.22	1.82	24.1	5.48	2	0.1	4.6	5.8	0.05	1	4.6	0.11	
6/13/23 15:37	RCKD	760	10.9	119.5	28.8	47.8	8.59	1.28	19.1	3.5	2.7	0.1		2.6	0.056	1.1	3.7	0.16	0.2
6/27/23 13:55	RCKD	671	7.93	92.5	17.71	110	8.37	1.2	22.9	3.01	4.7	0.1	0.7	0.64	0.22	1	1	0.28	
7/11/23 14:05	RCKD	660	6.8	84.7	50.55	91.6	7.97	1.6	25.5	4.88	1	0.1	4	3.8	0.11	1	4	0.17	
7/27/23 14:50	RCKD	777	8.8	118.1	16.13	87	8.14	1.08	30.2	4.35	4.5	0.1		1.3	0.15	1	1.3	0.16	0.2
8/10/23 14:00	RCKD	752	9.29	113.4	13.5	110.6	8.23	1.08	24.1	3	1	0.1		1.2	0.25	1	1.2		0.5
8/31/23 17:23	RCKD	660	11.78	142.5	3.13	127.3	8.61	0.77	24	25.88	1.7	0.1		0.23	0.2	1	1	0.23	0.2
9/26/23 13:00	RCKD	683	8.67	97.9	6.63	75.9	8.14	1.6	20.4	1.05	17	0.1	1.9	2	0.19		1.9	0.24	
9/14/23 13:55	RCKD	514	9.97	109.1	6.66	115.6	8.19	0.86	19	2.01	9.4	0.1		1.3	0.2	1	1.3	0.24	0.5
10/11/23 15:15	RCKD	1047	11.13	108.1	8.64	203.5	8.41	1.86	12.7	2.6	2.5	0.1	2.4	2.4	0.097	1	3.5	0.14	
11/2/23 12:10	RCKD	664	11.19	94.6	98.8	107.7	8.01	2	7.5	4.86	1	0.1	4.5	5.6	0.083	1	4.5	0.11	



Pace Analytical Services, LLC

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May 30, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **5/3/23 11:55 am** and logged in under work order **GE00705**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise . We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GE00705

---

YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
YES	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



**ANALYTICAL RESULTS**

**Sample:** GE00705-01  
**Name:** SBRD  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 15:46  
**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	3.2	mg/L		05/03/23 14:30	1	0.50	05/03/23 14:32	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	3.4	mg/L		05/12/23 16:35	5	1.0	05/12/23 16:35	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	54	mg/m3		05/02/23 15:49	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 13:49	1	0.10	05/09/23 13:49	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	3.4	mg/L		05/12/23 16:35	5	0.10	05/12/23 16:35	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.14	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:06	ROJ	SM 4500P E 1999
Phosphorus - total as P	0.25	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:36	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/05/23 11:37	1	1.0	05/11/23 16:35	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

**Sample:** GE00705-02  
**Name:** RCKD  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 17:00

**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	3.6	mg/L		05/03/23 14:30	1	0.50	05/03/23 15:09	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	3.7	mg/L		05/12/23 16:36	5	1.0	05/12/23 16:36	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	4.3	mg/m3		05/02/23 17:00	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 13:50	1	0.10	05/09/23 13:50	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	3.7	mg/L		05/12/23 16:36	5	0.10	05/12/23 16:36	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.032	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:08	ROJ	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:38	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/05/23 11:37	1	1.0	05/11/23 16:37	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GE00705-03  
**Name:** SBRM  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 15:05

**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	2.6	mg/L		05/03/23 14:30	1	0.50	05/03/23 15:46	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	2.6	mg/L		05/12/23 16:37	5	1.0	05/12/23 16:37	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	10	mg/m3		05/02/23 15:05	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 13:51	1	0.10	05/09/23 13:51	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	2.6	mg/L		05/12/23 16:37	5	0.10	05/12/23 16:37	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:10	ROJ	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:38	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/05/23 11:37	1	1.0	05/11/23 16:38	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2





**ANALYTICAL RESULTS**

**Sample:** GE00705-04  
**Name:** UPDU  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 10:17

**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	0.76	mg/L		05/03/23 14:30	1	0.50	05/03/23 17:20	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.7	mg/L		05/12/23 13:45	1	1.0	05/12/23 13:45	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	11	mg/m3		05/02/23 10:17	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 13:52	1	0.10	05/09/23 13:52	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	0.65	mg/L		05/12/23 13:45	1	0.020	05/12/23 13:45	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.48	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:11	ROJ	SM 4500P E 1999
Phosphorus - total as P	0.58	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:39	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.1	mg/L		05/05/23 11:37	1	1.0	05/11/23 12:21	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GE00705-05  
**Name:** BD-1  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 14:10

**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	3.7	mg/L		05/03/23 14:30	1	0.50	05/03/23 17:57	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	3.9	mg/L		05/12/23 16:38	5	1.0	05/12/23 16:38	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	9.3	mg/m3		05/02/23 14:10	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 13:58	1	0.10	05/09/23 13:58	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	3.9	mg/L		05/12/23 16:38	5	0.10	05/12/23 16:38	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:12	ROJ	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:40	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/05/23 11:37	1	1.0	05/11/23 12:23	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



III  
II

**ANALYTICAL RESULTS**

**Sample:** GE00705-06  
**Name:** SBRU  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 14:05  
**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	3.7	mg/L		05/03/23 14:30	1	0.50	05/03/23 18:35	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	4.1	mg/L		05/12/23 16:39	5	1.0	05/12/23 16:39	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	8.6	mg/m3		05/02/23 14:05	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 13:59	1	0.10	05/09/23 13:59	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	4.1	mg/L		05/12/23 16:39	5	0.10	05/12/23 16:39	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:14	ROJ	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:45	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/05/23 11:37	1	1.0	05/11/23 12:24	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GE00705-07  
**Name:** SWCD  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 13:47  
**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	2.9	mg/L		05/03/23 14:30	1	0.50	05/03/23 19:12	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	4.6	mg/L		05/12/23 11:15	5	1.0	05/12/23 16:40	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	4.4	mg/m3		05/02/23 13:47	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	0.84	mg/L		05/09/23 14:00	1	0.10	05/09/23 14:00	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	2.9	mg/L		05/12/23 11:15	5	0.10	05/12/23 16:40	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.83	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:15	ROJ	SM 4500P E 1999
Phosphorus - total as P	0.98	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:45	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.6	mg/L		05/05/23 11:37	1	1.0	05/11/23 12:26	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

**Sample:** GE00705-08  
**Name:** UPDD  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 11:48

**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	16	mg/L		05/03/23 14:30	10	5.0	05/03/23 20:08	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	17	mg/L		05/12/23 16:26	20	1.0	05/12/23 16:26	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	51	mg/m3		05/02/23 11:48	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 14:01	1	0.10	05/09/23 14:01	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	15	mg/L		05/12/23 16:26	20	0.40	05/12/23 16:26	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.18	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:17	ROJ	SM 4500P E 1999
Phosphorus - total as P	0.28	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:46	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.6	mg/L		05/05/23 11:37	1	1.0	05/11/23 12:33	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GE00705-09  
**Name:** BWCU  
**Matrix:** Surface Water - Grab

**Sampled:** 05/02/23 12:48

**Received:** 05/03/23 11:55

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	1.6	mg/L	X	05/04/23 15:00	1	0.50	05/04/23 22:13	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.7	mg/L		05/12/23 13:51	1	1.0	05/12/23 13:51	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.8	mg/m3		05/02/23 12:48	1	1.0	05/12/23 16:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/09/23 14:02	1	0.10	05/09/23 14:02	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	1.7	mg/L		05/12/23 13:51	1	0.020	05/12/23 13:51	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L	H	05/12/23 16:48	1	0.020	05/12/23 17:18	ROJ	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		05/08/23 17:19	1	0.10	05/10/23 13:47	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/05/23 11:37	1	1.0	05/11/23 12:35	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



NOTES

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

- H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.
X Reanalyzed outside of hold time due to instrument stoppage in original analysis.



Certified by: Taylor Cordle, Project Manager



**CHAIN-OF-CUSTODY Analytical Request Document**  
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/files/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Northwater Consulting  
Address: 960 Clocktower Dr, Ste. F, Springfield IL  
Report To: ted@northwaterco.com  
Email To: jeff@northwaterco.com

Site Collection info/Address: Will County, IL  
State: County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Customer Project Name/Number: AQUA-NAPP Northwater Surface Water  
Phone: 618-781-6629  
Site/Facility ID #: [ ] Yes [X] No  
Compliance Monitoring?  
DW PWS ID #: [ ] Yes [ ] No  
DW Location Code: [ ] Yes [ ] No  
Immediately Packed on Ice: [ ] Yes [ ] No  
Field Filtered (if applicable): [X] Yes [ ] No  
Analysis: Chlorophyll

Sample Disposal: [ ] Same Day [ ] Next Day [ ] 12 Day [ ] 3 Day [ ] 14 Day [ ] 5 Day  
Rush: (Expedite Charges Apply)

Container Type: Plastic (P) or Glass (G)  
Matrix \*  
Comp / Grab  
Collected (or Composite Start) Date  
Time  
Volume filtered for chl-a  
Res # of Ctns  
None Dry Blue Wet

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Volume filtered for chl-a	Res # of Ctns
SBED	SW	Grab	5/2/23	15:49	500 mL	3
RCKLP	SW	Grab	5/2/23	17:00	1000 mL	3
5BRM	SW	Grab	5/2/23	15:05	1000 mL	3
UPDU	SW	Grab	5/2/23	10:17	500 mL	3
BD-1	SW	Grab	5/2/23	14:10	750 mL	3
5BRV	SW	Grab	5/2/23	14:05	750 mL	3
BWCD	SW	Grab	5/2/23	13:47	500 mL	3
VPDD	SW	Grab	5/2/23	11:48	500 mL	3
BWCU	SW	Grab	5/2/23	12:48	750 mL	3

Customer Remarks / Special Conditions / Possible Hazards:  
Taylor Cordle - Pace rep  
Raddchem sample(s) screened (<500 cpm): Y N NA  
Packing Material Used:  
Type of Ice Used: Wet Blue Dry None

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here  
**GED0705**

Container Preservative Type \*\*  
Lab Project Manager:

Container Type: Plastic (P) or Glass (G)

Short Holds Present (<72 hours): Y N N/A  
Lab Tracking #:  
Samples received via: FEDEX UPS Client Courier Pace Courier

Date/Time: 5/3/23 11:55  
Received by/Company: (Signature) *Jeff Clark*  
Date/Time: 5/3/23 11:55  
Received by/Company: (Signature)

Date/Time:   
Received by/Company: (Signature)

Date/Time:   
Received by/Company: (Signature)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Volume filtered for chl-a	Res # of Ctns	NITRATE N	TOTAL N	AMMONIA N	TOTAL PHOSPHORUS	ORTHO PHOSPHATE	CHLOROPHYLL A (Filtered)
SBED	SW	Grab	5/2/23	15:49	500 mL	3	X	X	X	X	X	X
RCKLP	SW	Grab	5/2/23	17:00	1000 mL	3	X	X	X	X	X	X
5BRM	SW	Grab	5/2/23	15:05	1000 mL	3	X	X	X	X	X	X
UPDU	SW	Grab	5/2/23	10:17	500 mL	3	X	X	X	X	X	X
BD-1	SW	Grab	5/2/23	14:10	750 mL	3	X	X	X	X	X	X
5BRV	SW	Grab	5/2/23	14:05	750 mL	3	X	X	X	X	X	X
BWCD	SW	Grab	5/2/23	13:47	500 mL	3	X	X	X	X	X	X
VPDD	SW	Grab	5/2/23	11:48	500 mL	3	X	X	X	X	X	X
BWCU	SW	Grab	5/2/23	12:48	750 mL	3	X	X	X	X	X	X

Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Lab Profile/Line:  
Lab Sample Receipt Checklist:  
Custody Seals Present/Intact Y N NA  
Custody Signatures Present Y N NA  
Collector Signatures Present Y N NA  
Bottles Intact Y N NA  
Correct Bottles Y N NA  
Sufficient Volume Y N NA  
Samples Received on Ice Y N NA  
VOA - Headspace Acceptable Y N NA  
USDA Regulated Soils Y N NA  
Sampling in Holding Time Y N NA  
Residual Chlorine Present Y N NA  
Cl Strips: Y N NA  
Sample pH Acceptable Y N NA  
pH Strips: Y N NA  
Sulfide Present Y N NA  
Lead Acetate Strips: Y N NA  
LAB USE ONLY:  
Lab Sample # / Comments:

LAB Sample Temperature Info:  
Temp Blank Received: Y N NA  
Therm ID#:  
Cooler 1 Temp Upon Receipt: °C  
Cooler 1 Therm Corr. Factor: °C  
Cooler 1 Corrected Temp: °C  
Comments: 4.6°C

Trip Blank Received: Y N NA  
HCL MeOH TSP Other  
Non Conformance(s):  
YES / NO of:   
Page: of:



**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**

*ASH*  
*5-5-23*

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: GE00705-01	Water	Sampled: 05/02/23 15:46	[REDACTED]	1-30
Chlor a	05/15/23 16:00	05/23/23 15:46		
Chlorophyll prep	05/08/23 16:00	05/04/23 15:46		
NO3 + NO2	05/15/23 16:00	05/30/23 15:46		
PO4 ortho-P	05/15/23 16:00	05/04/23 15:46		
PO4 total- P	05/15/23 16:00	05/30/23 15:46		
TKN	05/15/23 16:00	05/30/23 15:46		
Ammonia-N	05/15/23 16:00	05/30/23 15:46		

Containers Supplied:

Sample ID: GE00705-02	Water	Sampled: 05/02/23 17:00	[REDACTED]	1-30
Chlor a	05/15/23 16:00	05/23/23 17:00		
TKN	05/15/23 16:00	05/30/23 17:00		
PO4 total- P	05/15/23 16:00	05/30/23 17:00		
PO4 ortho-P	05/15/23 16:00	05/04/23 17:00		
Chlorophyll prep	05/08/23 16:00	05/04/23 17:00		
Ammonia-N	05/15/23 16:00	05/30/23 17:00		
NO3 + NO2	05/15/23 16:00	05/30/23 17:00		

Containers Supplied:

*27 total*  
*SD 9 chlorophylls uncounted*  
*36 total*

*0.6°C*  
*course*

*Joe Clarke* 5/3/23  
 Released By Date

*MMW* 5-4-23 1050  
 Received By Date

*MMW* 5-4-23 1150  
 Released By Date

*MMW* 5/4/23 1650  
 Received By Date

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GE00705-03</b>	<b>Water</b>	<b>Sampled:05/02/23 15:05</b>		<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 15:05		
Ammonia-N	05/15/23 16:00	05/30/23 15:05		
TKN	05/15/23 16:00	05/30/23 15:05		
PO4 total- P	05/15/23 16:00	05/30/23 15:05		
NO3 + NO2	05/15/23 16:00	05/30/23 15:05		
Chlor a	05/15/23 16:00	05/23/23 15:05		
Chlorophyll prep	05/08/23 16:00	05/04/23 15:05		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-04</b>	<b>Water</b>	<b>Sampled:05/02/23 10:17</b>		<b>1-30</b>
Ammonia-N	05/15/23 16:00	05/30/23 10:17		
Chlor a	05/15/23 16:00	05/23/23 10:17		
Chlorophyll prep	05/08/23 16:00	05/04/23 10:17		
NO3 + NO2	05/15/23 16:00	05/30/23 10:17		
PO4 ortho-P	05/15/23 16:00	05/04/23 10:17		
PO4 total- P	05/15/23 16:00	05/30/23 10:17		
TKN	05/15/23 16:00	05/30/23 10:17		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-05</b>	<b>Water</b>	<b>Sampled:05/02/23 14:10</b>		<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 14:10		
Ammonia-N	05/15/23 16:00	05/30/23 14:10		
Chlor a	05/15/23 16:00	05/23/23 14:10		
Chlorophyll prep	05/08/23 16:00	05/04/23 14:10		
PO4 total- P	05/15/23 16:00	05/30/23 14:10		
TKN	05/15/23 16:00	05/30/23 14:10		
NO3 + NO2	05/15/23 16:00	05/30/23 14:10		
<i>Containers Supplied:</i>				

5-4-23  
1050

Released By		Date	5-4-23 1630	Received By		Date	
Released By		Date		Received By		Date	





**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GE00705-03</b>	<b>Water</b>	<b>Sampled:05/02/23 15:05</b>		<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 15:05		
Ammonia-N	05/15/23 16:00	05/30/23 15:05		
TKN	05/15/23 16:00	05/30/23 15:05		
PO4 total- P	05/15/23 16:00	05/30/23 15:05		
NO3 + NO2	05/15/23 16:00	05/30/23 15:05		
Chlor a	05/15/23 16:00	05/23/23 15:05		
Chlorophyll prep	05/08/23 16:00	05/04/23 15:05		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-04</b>	<b>Water</b>	<b>Sampled:05/02/23 10:17</b>		<b>1-30</b>
Ammonia-N	05/15/23 16:00	05/30/23 10:17		
Chlor a	05/15/23 16:00	05/23/23 10:17		
Chlorophyll prep	05/08/23 16:00	05/04/23 10:17		
NO3 + NO2	05/15/23 16:00	05/30/23 10:17		
PO4 ortho-P	05/15/23 16:00	05/04/23 10:17		
PO4 total- P	05/15/23 16:00	05/30/23 10:17		
TKN	05/15/23 16:00	05/30/23 10:17		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-05</b>	<b>Water</b>	<b>Sampled:05/02/23 14:10</b>		<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 14:10		
Ammonia-N	05/15/23 16:00	05/30/23 14:10		
Chlor a	05/15/23 16:00	05/23/23 14:10		
Chlorophyll prep	05/08/23 16:00	05/04/23 14:10		
PO4 total- P	05/15/23 16:00	05/30/23 14:10		
TKN	05/15/23 16:00	05/30/23 14:10		
NO3 - NO2	05/15/23 16:00	05/30/23 14:10		
<i>Containers Supplied:</i>				

Released By  Date 5-4-23 1630

Received By  Date 5-4-23 1050

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**

*ASH*  
*5-5-23*

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GE00705-01</b>	<b>Water</b>	<b>Sampled: 05/02/23 15:46</b>	[REDACTED]	<b>1-30</b>
Chlor a	05/15/23 16:00	05/23/23 15:46		
Chlorophyll prep	05/08/23 16:00	05/04/23 15:46		
NO3 + NO2	05/15/23 16:00	05/30/23 15:46		
PO4 ortho-P	05/15/23 16:00	05/04/23 15:46		
PO4 total- P	05/15/23 16:00	05/30/23 15:46		
TKN	05/15/23 16:00	05/30/23 15:46		
Ammonia-N	05/15/23 16:00	05/30/23 15:46		

Containers Supplied:

<b>Sample ID: GE00705-02</b>	<b>Water</b>	<b>Sampled: 05/02/23 17:00</b>	[REDACTED]	<b>1-30</b>
Chlor a	05/15/23 16:00	05/23/23 17:00		
TKN	05/15/23 16:00	05/30/23 17:00		
PO4 total- P	05/15/23 16:00	05/30/23 17:00		
PO4 ortho-P	05/15/23 16:00	05/04/23 17:00		
Chlorophyll prep	05/08/23 16:00	05/04/23 17:00		
Ammonia-N	05/15/23 16:00	05/30/23 17:00		
NO3 + NO2	05/15/23 16:00	05/30/23 17:00		

Containers Supplied:

*27 total*  
*SPD 9 chlorophylls uncounted*  
*36 total*

*0.5°C*  
*course*

*Joe Clarke*  
 Released By  
 Date: *5/3/23*

*MMW*  
 Received By  
 Date: *5-4-23 1050*

*MMW*  
 Released By  
 Date: *5-4-23 1650*

*MMW*  
 Received By  
 Date: *5/4/23 1650*

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**


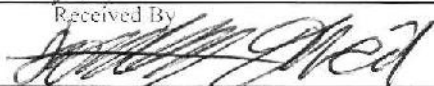
Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GE00705-06</b>	<b>Water</b>	<b>Sampled:05/02/23 14:05</b>	[REDACTED]	<b>1-30</b>
Ammonia-N	05/15/23 16:00	05/30/23 14:05		
Chlor a	05/15/23 16:00	05/23/23 14:05		
Chlorophyll prep	05/08/23 16:00	05/04/23 14:05		
NO3 + NO2	05/15/23 16:00	05/30/23 14:05		
PO4 ortho-P	05/15/23 16:00	05/04/23 14:05		
PO4 total- P	05/15/23 16:00	05/30/23 14:05		
TKN	05/15/23 16:00	05/30/23 14:05		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-07</b>	<b>Water</b>	<b>Sampled:05/02/23 13:47</b>	[REDACTED]	<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 13:47		
PO4 total- P	05/15/23 16:00	05/30/23 13:47		
NO3 + NO2	05/15/23 16:00	05/30/23 13:47		
Chlor a	05/15/23 16:00	05/23/23 13:47		
Ammonia-N	05/15/23 16:00	05/30/23 13:47		
TKN	05/15/23 16:00	05/30/23 13:47		
Chlorophyll prep	05/08/23 16:00	05/04/23 13:47		
<i>Containers Supplied:</i>				


<b>Sample ID: GE00705-08</b>	<b>Water</b>	<b>Sampled:05/02/23 11:48</b>	[REDACTED]	<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 11:48		
PO4 total- P	05/15/23 16:00	05/30/23 11:48		
NO3 + NO2	05/15/23 16:00	05/30/23 11:48		
Chlorophyll prep	05/08/23 16:00	05/04/23 11:48		
Chlor a	05/15/23 16:00	05/23/23 11:48		
Ammonia-N	05/15/23 16:00	05/30/23 11:48		
TKN	05/15/23 16:00	05/30/23 11:48		
<i>Containers Supplied:</i>				

0.6°C  
COURT

5-4-23  
1050

Released By	Date	Received By	Date
	5-4-23 1630		5/4/23 1050
Released By	Date	Received By	Date

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**


Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: GE00705-09	Water	Sampled:05/02/23 12:48		1-30
TKN	05/15/23 16:00	05/30/23 12:48		
Ammonia-N	05/15/23 16:00	05/30/23 12:48		
Chlor a	05/15/23 16:00	05/23/23 12:48		
Chlorophyll prep	05/08/23 16:00	05/04/23 12:48		
NO3 + NO2	05/15/23 16:00	05/30/23 12:48		
PO4 ortho- P	05/15/23 16:00	05/04/23 12:48		
PO4 total- P	05/15/23 16:00	05/30/23 12:48		
<i>Containers Supplied:</i>				

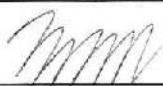

*MM*

5-4-23  
1050

Released By	<i>MM</i>	Date	5-4-23 1630	Received By	<i>MM</i>	Date	5-4-23 1050
Released By		Date		Received By		Date	

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: GE00705-09	Water	Sampled:05/02/23 12:48		1-30
TKN	05/15/23 16:00	05/30/23 12:48		
Ammonia-N	05/15/23 16:00	05/30/23 12:48		
Chlor a	05/15/23 16:00	05/23/23 12:48		
Chlorophyll prep	05/08/23 16:00	05/04/23 12:48		
NO3 - NO2	05/15/23 16:00	05/30/23 12:48		
PO4 ortho-P	05/15/23 16:00	05/04/23 12:48		
PO4 total-P	05/15/23 16:00	05/30/23 12:48		
<i>Containers Supplied:</i>				


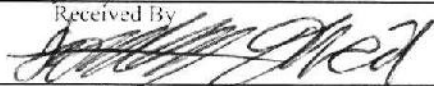
Released By		Date	5-4-23 1630
Released By		Received By	5-4-23 1050
Released By		Received By	

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GE00705**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GE00705-06</b>	<b>Water</b>	<b>Sampled:05/02/23 14:05</b>	[REDACTED]	<b>1-30</b>
Ammonia-N	05/15/23 16:00	05/30/23 14:05		
Chlor a	05/15/23 16:00	05/23/23 14:05		
Chlorophyll prep	05/08/23 16:00	05/04/23 14:05		
NO3 + NO2	05/15/23 16:00	05/30/23 14:05		
PO4 ortho-P	05/15/23 16:00	05/04/23 14:05		
PO4 total- P	05/15/23 16:00	05/30/23 14:05		
TKN	05/15/23 16:00	05/30/23 14:05		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-07</b>	<b>Water</b>	<b>Sampled:05/02/23 13:47</b>	[REDACTED]	<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 13:47		
PO4 total- P	05/15/23 16:00	05/30/23 13:47		
NO3 + NO2	05/15/23 16:00	05/30/23 13:47		
Chlor a	05/15/23 16:00	05/23/23 13:47		
Ammonia-N	05/15/23 16:00	05/30/23 13:47		
TKN	05/15/23 16:00	05/30/23 13:47		
Chlorophyll prep	05/08/23 16:00	05/04/23 13:47		
<i>Containers Supplied:</i>				

<b>Sample ID: GE00705-08</b>	<b>Water</b>	<b>Sampled:05/02/23 11:48</b>	[REDACTED]	<b>1-30</b>
PO4 ortho-P	05/15/23 16:00	05/04/23 11:48		
PO4 total- P	05/15/23 16:00	05/30/23 11:48		
NO3 + NO2	05/15/23 16:00	05/30/23 11:48		
Chlorophyll prep	05/08/23 16:00	05/04/23 11:48		
Chlor a	05/15/23 16:00	05/23/23 11:48		
Ammonia-N	05/15/23 16:00	05/30/23 11:48		
TKN	05/15/23 16:00	05/30/23 11:48		
<i>Containers Supplied:</i>				

Released By		Date	5-4-23 1630
Received By		Date	5/4/23 1050

0.6°C  
control



Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

June 16, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **5/17/23 12:20 pm** and logged in under work order **GE03477**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise . We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GE03477

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
NO	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
YES	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
YES	Case narrative provided





Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

### Case Narrative

Due to a login error, 300.0 Nitrate was not analyzed within hold time.

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**ANALYTICAL RESULTS**

Sample: GE03477-01  
 Name: SBRD  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 15:30  
 Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	6.6	mg/L	H	06/06/23 16:00	10	5.0	06/07/23 01:15	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	6.2	mg/L		05/26/23 13:02	10	1.0	05/26/23 13:02	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.6	mg/m3		05/16/23 15:30	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:30	1	0.10	05/25/23 13:30	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	6.2	mg/L		05/26/23 13:02	10	0.20	05/26/23 13:02	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.14	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:26	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:19	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-02  
 Name: RCKD  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 16:10

Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	8.2	mg/L	H	06/06/23 16:00	10	5.0	06/07/23 01:53	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	7.7	mg/L		05/24/23 17:19	10	1.0	05/26/23 11:45	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.8	mg/m3		05/16/23 16:10	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/22/23 15:15	1	0.10	05/22/23 15:15	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	7.7	mg/L		05/24/23 17:19	10	0.20	05/24/23 17:19	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		05/22/23 17:15	1	0.10	05/24/23 11:52	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/22/23 13:14	1	1.0	05/26/23 11:45	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-03  
 Name: SBRM  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 14:55

Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	6.5	mg/L	H	06/06/23 16:00	10	5.0	06/07/23 02:30	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	6.2	mg/L		05/26/23 13:03	10	1.0	05/26/23 13:03	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.3	mg/m3		05/16/23 14:55	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:29	1	0.10	05/25/23 13:29	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	6.2	mg/L		05/26/23 13:03	10	0.20	05/26/23 13:03	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:26	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:21	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-04  
 Name: SBRU  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 14:30

Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	8.8	mg/L	H	06/06/23 16:00	10	5.0	06/07/23 03:08	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	8.2	mg/L		05/26/23 13:03	10	1.0	05/26/23 13:03	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	14	mg/m3		05/16/23 14:30	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:30	1	0.10	05/25/23 13:30	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	8.2	mg/L		05/26/23 13:03	10	0.20	05/26/23 13:03	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:27	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:22	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-05  
 Name: BWCU  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 13:12

Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	2.0	mg/L	H	06/06/23 16:00	1	0.50	06/07/23 03:27	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	2.3	mg/L		05/26/23 13:04	5	1.0	05/26/23 13:04	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.3	mg/m3		05/16/23 13:12	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:31	1	0.10	05/25/23 13:31	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	2.3	mg/L		05/26/23 13:04	5	0.10	05/26/23 13:04	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:28	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:24	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-06  
 Name: UPDU  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 10:55  
 Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	1.2	mg/L	H	06/06/23 16:00	1	0.50	06/07/23 05:02	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.2	mg/L		05/26/23 12:12	1	1.0	05/26/23 12:25	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	4.3	mg/m3		05/16/23 10:55	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	0.16	mg/L		05/26/23 13:19	1	0.10	05/26/23 13:19	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	1.2	mg/L		05/26/23 12:12	1	0.020	05/26/23 12:12	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.62	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:36	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:25	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	0.48	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-07  
 Name: BD-1  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 13:25  
 Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	2.0	mg/L	H	06/06/23 16:00	1	0.50	06/07/23 05:40	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.9	mg/L		05/26/23 13:05	5	1.0	05/26/23 13:05	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	3.1	mg/m3		05/16/23 13:25	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:37	1	0.10	05/25/23 13:37	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	1.9	mg/L		05/26/23 13:05	5	0.10	05/26/23 13:05	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:30	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:31	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*





**ANALYTICAL RESULTS**

Sample: GE03477-08  
 Name: BWCD  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 13:50

Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	2.5	mg/L	H	06/06/23 16:00	1	0.50	06/07/23 06:18	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	2.6	mg/L		05/26/23 13:06	5	1.0	05/26/23 13:06	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	11	mg/m3		05/16/23 13:50	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:37	1	0.10	05/25/23 13:37	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	2.6	mg/L		05/26/23 13:06	5	0.10	05/26/23 13:06	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.19	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:37	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:33	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	0.082	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GE03477-09  
 Name: UPDD  
 Matrix: Surface Water - Grab

Sampled: 05/16/23 12:25  
 Received: 05/17/23 12:20

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	12	mg/L	H	06/06/23 16:00	10	5.0	06/07/23 07:15	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	13	mg/L		05/26/23 13:10	10	1.0	05/26/23 13:10	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.3	mg/m3		05/16/23 12:25	1	1.0	05/23/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		05/25/23 13:38	1	0.10	05/25/23 13:38	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	12	mg/L		05/26/23 13:10	10	0.20	05/26/23 13:10	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.26	mg/L		05/22/23 17:15	1	0.10	05/24/23 12:37	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.2	mg/L		05/23/23 11:34	1	1.0	05/26/23 12:34	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	0.13	mg/L		05/18/23 08:06	1	0.050	05/18/23 08:06	NDM	SM 4500-P B E*



NOTES

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

**Qualifiers**

H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.



Certified by: Taylor Cordle, Project Manager



CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://rfo.pacelabs.com/html/pas-standard-terms.pdf

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Northwater Consulting
Address: 960 Clocktower Dr, Ste. F, Springfield IL

Report To: ted@northwaterco.com

Copy To: jeff@northwaterco.com

Customer Project Name/Number: AQUANAAP - Northwater Surface Water

Phone: 618-781-6629

Email: ted@northwaterco.com

Collected By (print): J. Kraiss

Sample Disposal: [X] Dispose as appropriate

[ ] Return

[ ] Archive

[ ] Hold

\* Matrix Codes (insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SU), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID

Matrix \*

Comp / Grab

Collected for Composite Start Date

Volume

Res CI

# of Ctns

Container Type: Plastic (P) or Glass (G)

SBRD SW 5/16/23 15:30 500 mL 3

PKCD SW 5/16/23 16:10 800 mL 3

SBRM SW 5/16/23 14:55 800 mL 3

SBRV SW 5/16/23 14:30 800 mL 3

BWCV SW 5/16/23 13:12 800 mL 3

VPDV SW 5/16/23 10:55 500 mL 3

BWDI SW 5/16/23 13:25 800 mL 3

BWCD SW 5/16/23 13:50 800 mL 3

UPDD SW 5/16/23 12:25 800 mL 3

Customer Remarks / Special Conditions / Possible Hazards: Taylor Cordle - Pace PM

Type of Ice Used: Wet Blue Dry None

Packchem sample(s) screened (<500 gpm): Y N NA

Relinquished by/Company: (Signature) Date/Time: Received by/Company: (Signature)

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or NTLL Log-In Number Here

ALL BOLD OUTLINED AREAS are for LAB USE ONLY

\*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Table with columns: Container Preservative Type, Analyses (NITRATE N, TOTAL N, AMMONIA N, TOTAL PHOSPHORUS, ORTHOPHOSPHATE, CHLOROPHYLL A)

Table with columns: Lab Profile/Line, Lab Sample Receipt Checklist, Lab Sample Temperature Info, Non Conformance(s)

powered off for total P

2.3

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**

**Pace Analytical Services, LLC**

**GE03477**

*ARH*  
*5-22-23*

**SENDING LABORATORY**

PDC Laboratories, Inc.  
944 Anglum Road  
Hazelwood, MO 63042  
(800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
2231 W Altorfer Dr  
Peoria, IL 61615  
(309) 692-9688

**Sample: GE03477-01**  
**Name: SBRD**

**Sampled: 05/16/23 15:30**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	05/29/23 16:00	06/13/23 15:30	
Chlor a	05/29/23 16:00	06/06/23 15:30	
NO3 + NO2	05/29/23 16:00	06/13/23 15:30	
PO4 total- P	05/29/23 16:00	06/13/23 15:30	
TKN GD	05/29/23 16:00	06/13/23 15:30	

**Sample: GE03477-03**  
**Name: SBRM**

**Sampled: 05/16/23 14:55**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	05/29/23 16:00	06/13/23 14:55	
Chlor a	05/29/23 16:00	06/06/23 14:55	
NO3 + NO2	05/29/23 16:00	06/13/23 14:55	
PO4 total- P	05/29/23 16:00	06/13/23 14:55	
TKN GD	05/29/23 16:00	06/13/23 14:55	

**Sample: GE03477-04**  
**Name: SBRU**

**Sampled: 05/16/23 14:30**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	05/29/23 16:00	06/13/23 14:30	
Chlor a	05/29/23 16:00	06/06/23 14:30	
NO3 + NO2	05/29/23 16:00	06/13/23 14:30	
PO4 total- P	05/29/23 16:00	06/13/23 14:30	
TKN GD	05/29/23 16:00	06/13/23 14:30	

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**

**Pace Analytical Services, LLC**

**GE03477**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GE03477-05**  
**Name: BWCU**

**Sampled: 05/16/23 13:12**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 13:12	
Chlor a	05/29/23 16:00	06/06/23 13:12	
NO3 + NO2	05/29/23 16:00	06/13/23 13:12	
PO4 total- P	05/29/23 16:00	06/13/23 13:12	
TKN GD	05/29/23 16:00	06/13/23 13:12	

**Sample: GE03477-06**  
**Name: UPDU**

**Sampled: 05/16/23 10:55**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 10:55	
Chlor a	05/29/23 16:00	06/06/23 10:55	
NO3 + NO2	05/29/23 16:00	06/13/23 10:55	
PO4 total- P	05/29/23 16:00	06/13/23 10:55	
TKN GD	05/29/23 16:00	06/13/23 10:55	

**Sample: GE03477-07**  
**Name: BD-1**

**Sampled: 05/16/23 13:25**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 13:25	
Chlor a	05/29/23 16:00	06/06/23 13:25	
NO3 + NO2	05/29/23 16:00	06/13/23 13:25	
PO4 total- P	05/29/23 16:00	06/13/23 13:25	
TKN GD	05/29/23 16:00	06/13/23 13:25	

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GE03477**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Aitorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GE03477-05**  
**Name: BWCU**

**Sampled: 05/16/23 13:12**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 13:12	
Chlor a	05/29/23 16:00	06/06/23 13:12	
NO3 + NO2	05/29/23 16:00	06/13/23 13:12	
PO4 total- P	05/29/23 16:00	06/13/23 13:12	
TKN GD	05/29/23 16:00	06/13/23 13:12	

**Sample: GE03477-06**  
**Name: UPDU**

**Sampled: 05/16/23 10:55**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 10:55	
Chlor a	05/29/23 16:00	06/06/23 10:55	
NO3 + NO2	05/29/23 16:00	06/13/23 10:55	
PO4 total- P	05/29/23 16:00	06/13/23 10:55	
TKN GD	05/29/23 16:00	06/13/23 10:55	

**Sample: GE03477-07**  
**Name: BD-1**

**Sampled: 05/16/23 13:25**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 13:25	
Chlor a	05/29/23 16:00	06/06/23 13:25	
NO3 + NO2	05/29/23 16:00	06/13/23 13:25	
PO4 total- P	05/29/23 16:00	06/13/23 13:25	
TKN GD	05/29/23 16:00	06/13/23 13:25	

**SUBCONTRACT ORDER**

Transfer Chain of Custody

Pace Analytical Services, LLC

GE03477

ASH  
5-22-23

**SENDING LABORATORY**

PDC Laboratories, Inc.  
944 Anglum Road  
Hazelwood, MO 63042  
(800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
2231 W Altorfer Dr  
Peoria, IL 61615  
(309) 692-9688

**Sample:** GE03477-01  
**Name:** SBRD

**Sampled:** 05/16/23 15:30  
**Matrix:** Surface Water  
**Preservative:** H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 15:30	
Chlor a	05/29/23 16:00	06/06/23 15:30	
NO3 + NO2	05/29/23 16:00	06/13/23 15:30	
PO4 total- P	05/29/23 16:00	06/13/23 15:30	
TKN GD	05/29/23 16:00	06/13/23 15:30	

**Sample:** GE03477-03  
**Name:** SBRM

**Sampled:** 05/16/23 14:55  
**Matrix:** Surface Water  
**Preservative:** H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 14:55	
Chlor a	05/29/23 16:00	06/06/23 14:55	
NO3 + NO2	05/29/23 16:00	06/13/23 14:55	
PO4 total- P	05/29/23 16:00	06/13/23 14:55	
TKN GD	05/29/23 16:00	06/13/23 14:55	

**Sample:** GE03477-04  
**Name:** SBRU

**Sampled:** 05/16/23 14:30  
**Matrix:** Surface Water  
**Preservative:** H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 14:30	
Chlor a	05/29/23 16:00	06/06/23 14:30	
NO3 + NO2	05/29/23 16:00	06/13/23 14:30	
PO4 total- P	05/29/23 16:00	06/13/23 14:30	
TKN GD	05/29/23 16:00	06/13/23 14:30	



**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**

Pace Analytical Services, LLC

**GE03477**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GE03477-08**  
**Name: BWCD**

**Sampled: 05/16/23 13:50**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 13:50	
Chlor a	05/29/23 16:00	06/06/23 13:50	
NO3 + NO2	05/29/23 16:00	06/13/23 13:50	
PO4 total- P	05/29/23 16:00	06/13/23 13:50	
TKN GD	05/29/23 16:00	06/13/23 13:50	

**Sample: GE03477-09**  
**Name: UPDD**

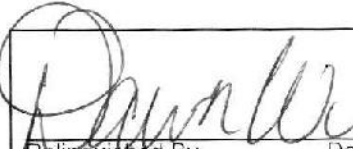
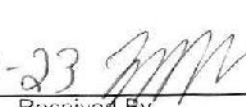


**Sampled: 05/16/23 12:25**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	05/29/23 16:00	06/13/23 12:25	
Chlor a	05/29/23 16:00	06/06/23 12:25	
NO3 + NO2	05/29/23 16:00	06/13/23 12:25	
PO4 total- P	05/29/23 16:00	06/13/23 12:25	
TKN GD	05/29/23 16:00	06/13/23 12:25	

Please email results to Taylor Cordle at [taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)

Date Shipped: \_\_\_\_\_ Total # of Containers: 27 Sample Origin (State): \_\_\_\_\_ PO #: \_\_\_\_\_

Turn-Around Time Requested  NORMAL  RUSH Date Results Needed: \_\_\_\_\_

	5-17-23		5-17-23	Sample Temperature Upon Receipt	1.7 °C
			1640	Sample(s) Received on Ice	Y or N
				Proper Bottles Received in Good Condition	Y or N
				Bottles Filled with Adequate Volume	Y or N
				Samples Received Within Hold Time	Y or N
				Date/Time Taken From Sample Bottle	Y or N
	5-18-23		5/18/23		
	1640		1640		



Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

June 16, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water Monitoring

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **6/2/23 11:30 am** and logged in under work order **GF00313**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

---

Work Order    GF00313

---

YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
NO	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
YES	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



**ANALYTICAL RESULTS**

**Sample:** GF00313-01  
**Name:** SBRM  
**Matrix:** Surface Water - Grab

**Sampled:** 06/01/23 14:35  
**Received:** 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	9.9	mg/L	Xa	06/02/23 17:28	10	5.0	06/03/23 18:17	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	9.6	mg/L		06/09/23 11:45	10	1.0	06/09/23 12:33	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.7	mg/m3		06/01/23 14:35	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/08/23 11:16	1	0.10	06/08/23 11:16	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	9.6	mg/L		06/09/23 11:45	10	0.20	06/09/23 11:45	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.18	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:17	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:33	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-02  
 Name: RCKD  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 15:50  
 Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	5.8	mg/L	X	06/06/23 16:00	10	5.0	06/06/23 17:28	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	4.6	mg/L		06/09/23 11:46	10	1.0	06/09/23 12:34	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.0	mg/m3		06/01/23 15:50	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/08/23 11:19	1	0.10	06/08/23 11:19	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	4.6	mg/L		06/09/23 11:46	10	0.20	06/09/23 11:46	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.11	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:18	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:34	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-03  
 Name: SBRD  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 15:20

Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	8.5	mg/L		06/02/23 17:28	10	5.0	06/02/23 19:39	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	8.7	mg/L		06/09/23 11:47	10	1.0	06/09/23 12:36	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.4	mg/m3		06/01/23 15:20	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	0.13	mg/L		06/08/23 11:20	1	0.10	06/08/23 11:20	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	7.5	mg/L		06/09/23 11:47	10	0.20	06/09/23 11:47	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.18	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:19	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.2	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:36	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-04  
 Name: UPDD  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 12:05

Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	20	mg/L		06/02/23 17:28	10	5.0	06/03/23 07:42	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	19	mg/L		06/09/23 11:47	10	1.0	06/09/23 12:42	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.2	mg/m3		06/01/23 12:05	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/08/23 11:20	1	0.10	06/08/23 11:20	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	18	mg/L		06/09/23 11:47	10	0.20	06/09/23 11:47	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.39	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:19	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.2	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:42	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	0.20	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-05  
 Name: BWCD  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 13:25

Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	6.5	mg/L		06/02/23 17:28	10	5.0	06/03/23 09:15	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	7.0	mg/L		06/09/23 11:48	10	1.0	06/09/23 12:43	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	3.9	mg/m3		06/01/23 13:25	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	0.31	mg/L		06/08/23 11:21	1	0.10	06/08/23 11:21	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	6.0	mg/L		06/09/23 11:48	10	0.20	06/09/23 11:48	CGL	EPA 353.2 REV 2
Phosphorus - total as P	0.47	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:20	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:43	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	0.33	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*





**ANALYTICAL RESULTS**

Sample: GF00313-06  
 Name: SBRU  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 14:00  
 Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	9.3	mg/L		06/02/23 17:28	10	5.0	06/03/23 09:53	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	8.8	mg/L		06/09/23 11:49	10	1.0	06/09/23 12:45	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	3.1	mg/m3		06/01/23 14:00	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/08/23 11:22	1	0.10	06/08/23 11:22	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	8.8	mg/L		06/09/23 11:49	10	0.20	06/09/23 11:49	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:26	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:45	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-07  
 Name: BWCU  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 13:05

Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	2.1	mg/L		06/02/23 17:28	1	0.50	06/03/23 10:11	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.8	mg/L		06/09/23 11:52	10	1.0	06/09/23 12:51	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.6	mg/m3		06/01/23 13:05	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/08/23 11:23	1	0.10	06/08/23 11:23	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	1.8	mg/L		06/09/23 11:52	10	0.20	06/09/23 11:52	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:27	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:51	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-08  
 Name: BD-1  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 14:10  
 Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	8.5	mg/L		06/02/23 17:28	10	5.0	06/03/23 11:07	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	8.7	mg/L		06/09/23 11:53	10	1.0	06/09/23 12:52	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	4.0	mg/m3		06/01/23 14:10	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/08/23 11:24	1	0.10	06/08/23 11:24	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	8.7	mg/L		06/09/23 11:53	10	0.20	06/09/23 11:53	CGL	EPA 353.2 REV 2
Phosphorus - total as P	< 0.10	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:28	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:52	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	< 0.050	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



**ANALYTICAL RESULTS**

Sample: GF00313-09  
 Name: UPDU  
 Matrix: Surface Water - Grab

Sampled: 06/01/23 10:52

Received: 06/02/23 11:30

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - STL</u></b>									
Nitrate-N	1.1	mg/L	Xa	06/02/23 17:28	1	0.50	06/03/23 11:26	NDM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.0	mg/L		06/09/23 11:58	10	1.0	06/09/23 12:54	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	< 1.0	mg/m3		06/01/23 10:52	1	1.0	06/13/23 14:00	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	0.17	mg/L		06/08/23 11:28	1	0.10	06/08/23 11:28	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	1.0	mg/L		06/09/23 11:58	10	0.20	06/09/23 11:58	CGL	EPA 353.2 REV 2
Phosphorus - total as P	1.1	mg/L		06/06/23 09:05	1	0.10	06/07/23 12:28	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/07/23 11:53	1	1.0	06/09/23 12:54	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
<b><u>Nutrients - STL</u></b>									
Phosphorus - ortho as P	0.87	mg/L		06/02/23 14:27	1	0.050	06/02/23 14:27	NDM	SM 4500-P B E*



NOTES

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

- X Reanalyzed outside of hold time because initial result fell outside of calibration.
Xa Sample analyzed outside of hold time due to instrument stoppage.



Certified by: Taylor Cordle, Project Manager

**CHAIN-OF-CUSTODY Analytical Request Document**

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

**Billing Information:**

Company: Northwater Consulting  
Address: 960 Clocktower Dr, Ste. F, Springfield IL

Report To: ted@northwaterco.com  
Copy To: jeff@northwaterco.com

Customer Project Name/Number: Northwater Surface Water Monitoring  
Phone: 618-781-6629  
Site/Facility ID #: \_\_\_\_\_  
Email: ted@northwaterco.com  
Collected-By (print): Ted K  
Quote #: \_\_\_\_\_  
Turnaround Date Required: \_\_\_\_\_  
Rush: (Expedite Charges Apply)  
 Same Day  Next Day  
 12 Day  13 Day  
 14 Day  15 Day

State: IL / County/City: \_\_\_\_\_ Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET  
Site Collection Info/Address: Will County, IL  
Compliance Monitoring? [ ] Yes [x] No  
DW PWS ID #: \_\_\_\_\_  
DW Location Code: \_\_\_\_\_  
Immediately Packed on Ice:  Yes [ ] No  
Field Filtered (if applicable):  Yes [ ] No  
Analysis: chl-a

Container Type: Plastic (P) or Glass (G)

Customer Sample ID Matrix \* Comp / Grab Collected (or Composite Start) Time Volume filtered Res Cl # of Ctns

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Time	Volume filtered	Res Cl	# of Ctns
SBRM	SW	Grab	6/1/23 14:35	500 mL		3
RCKD	SW	Grab	6/1/23 15:50	750 mL		3
SBRD	SW	Grab	6/1/23 15:20	600 mL		3
UPDD	SW	Grab	6/1/23 12:05	750 mL		3
BWCD	SW	Grab	6/1/23 13:25	600 mL		3
SBRU	SW	Grab	6/1/23 14:00	500 mL		3
BWCU	SW	Grab	6/1/23 13:05	500 mL		3
BD-1	SW	Grab	6/1/23 14:10	500 mL		3
UPDU	SW	Grab	6/1/23 10:52	500 mL		3

Customer Remarks / Special Conditions / Possible Hazards: Taylor Cordle - Pace rep

Type of Ice Used: Wet Blue Dry None

Packing Material Used: Radchem sample(s) screened (<500 cpm): Y N NA

Date/Time:	Received by/Company: (Signature)
6-2-23 11:30	<i>[Signature]</i>
	<i>[Signature]</i>
	<i>[Signature]</i>

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here  
GF-00613  
ALL BOLD OUTLINED AREAS are for LAB USE ONLY

Container Preservative Type \*\*  
Lab Project Manager:

\*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses  
NITRATE N  
AMMONIA N  
TOTAL PHOSPHORUS  
ORTHOPHOSPHATE  
CHLOROPHYLL A

Lab Profile/Line:	Lab Sample Receipt Checklist:
Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signatures Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VQA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	Y N NA
Sample pH Acceptable	Y N NA
pH Strips:	Y N NA
Sulfide Present	Y N NA
Lead Acetate Strips:	Y N NA

LAB USE ONLY:  
Lab Sample # / Comments:

LAB Sample Temperature Info:	Temp Blank Received:	Y	N	N/A
Temp Blank Received:	Y	N	N/A	
Therm ID#:				
Cooler 1 Temp Upon Receipt:				°C
Cooler 1 Therm Corr. Factor:				°C
Cooler 1 Corrected Temp:				°C

Comments: *[Handwritten]*

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Short Holds Present (<72 hours):	Y	N	N/A
Short Holds Present (<72 hours):	Y	N	N/A

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GF00313**

*ARH*  
*6-5-23*

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GF00313-01**  
**Name: SBRM**

**Sampled: 06/01/23 14:35**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 14:35	
Chlor a	06/14/23 16:00	06/22/23 14:35	
PO4 total- P	06/14/23 16:00	06/29/23 14:35	

**Sample: GF00313-02**  
**Name: RCKD**

**Sampled: 06/01/23 15:50**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 15:50	
Chlor a	06/14/23 16:00	06/22/23 15:50	
PO4 total- P	06/14/23 16:00	06/29/23 15:50	

**Sample: GF00313-03**  
**Name: SBRD**

**Sampled: 06/01/23 15:20**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 15:20	
Chlor a	06/14/23 16:00	06/22/23 15:20	
PO4 total- P	06/14/23 16:00	06/29/23 15:20	

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GF00313**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GF00313-04**  
**Name: UPDD**

**Sampled: 06/01/23 12:05**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 12:05	
Chlor a	06/14/23 16:00	06/22/23 12:05	
PO4 total- P	06/14/23 16:00	06/29/23 12:05	

**Sample: GF00313-05**  
**Name: BWCD**

**Sampled: 06/01/23 13:25**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 13:25	
Chlor a	06/14/23 16:00	06/22/23 13:25	
PO4 total- P	06/14/23 16:00	06/29/23 13:25	

**Sample: GF00313-06**  
**Name: SBRU**

**Sampled: 06/01/23 14:00**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 14:00	
Chlor a	06/14/23 16:00	06/22/23 14:00	
PO4 total- P	06/14/23 16:00	06/29/23 14:00	



**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GF00313**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GF00313-04**  
**Name: UPDD**

**Sampled: 06/01/23 12:05**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 12:05	
Chlor a	06/14/23 16:00	06/22/23 12:05	
PO4 total- P	06/14/23 16:00	06/29/23 12:05	

**Sample: GF00313-05**  
**Name: BWCD**

**Sampled: 06/01/23 13:25**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 13:25	
Chlor a	06/14/23 16:00	06/22/23 13:25	
PO4 total- P	06/14/23 16:00	06/29/23 13:25	

**Sample: GF00313-06**  
**Name: SBRU**

**Sampled: 06/01/23 14:00**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 14:00	
Chlor a	06/14/23 16:00	06/22/23 14:00	
PO4 total- P	06/14/23 16:00	06/29/23 14:00	

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GF00313**

*ARH*  
*6-5-23*

**SENDING LABORATORY**

PDC Laboratories, Inc.  
 944 Anglum Road  
 Hazelwood, MO 63042  
 (800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 (309) 692-9688

**Sample: GF00313-01**  
**Name: SBRM**

**Sampled: 06/01/23 14:35**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 14:35	
Chlor a	06/14/23 16:00	06/22/23 14:35	
PO4 total- P	06/14/23 16:00	06/29/23 14:35	

**Sample: GF00313-02**  
**Name: RCKD**

**Sampled: 06/01/23 15:50**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 15:50	
Chlor a	06/14/23 16:00	06/22/23 15:50	
PO4 total- P	06/14/23 16:00	06/29/23 15:50	

**Sample: GF00313-03**  
**Name: SBRD**

**Sampled: 06/01/23 15:20**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

Analysis	Due	Expires	Comments
Ammonia-N	06/14/23 16:00	06/29/23 15:20	
Chlor a	06/14/23 16:00	06/22/23 15:20	
PO4 total- P	06/14/23 16:00	06/29/23 15:20	

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**

Pace Analytical Services, LLC

**GF00313**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
944 Anglum Road  
Hazelwood, MO 63042  
(800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
2231 W Altorfer Dr  
Peoria, IL 61615  
(309) 692-9688

**Sample: GF00313-07**  
**Name: BWCU**

**Sampled: 06/01/23 13:05**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	06/14/23 16:00	06/29/23 13:05	
Chlor a	06/14/23 16:00	06/22/23 13:05	
PO4 total- P	06/14/23 16:00	06/29/23 13:05	

**Sample: GF00313-08**  
**Name: BD-1**

**Sampled: 06/01/23 14:10**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	06/14/23 16:00	06/29/23 14:10	
Chlor a	06/14/23 16:00	06/22/23 14:10	
PO4 total- P	06/14/23 16:00	06/29/23 14:10	

**Sample: GF00313-09**  
**Name: UPDU**

**Sampled: 06/01/23 10:52**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	06/14/23 16:00	06/29/23 10:52	
Chlor a	06/14/23 16:00	06/22/23 10:52	
PO4 total- P	06/14/23 16:00	06/29/23 10:52	

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GF00313**

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Please email results to Taylor Cordle at [taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)

Date Shipped: \_\_\_\_\_ Total # of Containers: 27 Sample Origin (State): \_\_\_\_\_ PO #: \_\_\_\_\_  
 Turn-Around Time Requested  NORMAL  RUSH Date Results Needed: \_\_\_\_\_

Relinquished By	Date/Time	Received By	Date/Time	Sample Temperature Upon Receipt	2.3°C
<i>Devin Walden</i>	<i>6-2-23</i>	<i>MMW</i>	<i>6-5-23 1240</i>	Sample(s) Received on Ice	Y or N
				Proper Bottles Received in Good Condition	Y or N
				Bottles Filled with Adequate Volume	Y or N
				Samples Received Within Hold Time	Y or N
Relinquished By	Date/Time	Received By	Date/Time	Date/Time Taken From Sample Bottle	Y or N
<i>MMW</i>	<i>6-5-23 1515</i>	<i>gracy</i>	<i>6/5/23 15:15</i>		(N)

**SUBCONTRACT ORDER**  
**Transfer Chain of Custody**  
**Pace Analytical Services, LLC**  
**GF00313**

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Please email results to Taylor Cordle at [taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)

Date Shipped: \_\_\_\_\_ Total # of Containers: 27 Sample Origin (State): \_\_\_\_\_ PO #: \_\_\_\_\_  
 Turn-Around Time Requested  NORMAL  RUSH Date Results Needed: \_\_\_\_\_

<u>Dawn Walden</u>	<u>6-2-23</u>	<u>MMW</u>	<u>6-5-23</u>	Sample Temperature Upon Receipt	<u>2.3</u> °C
Relinquished By	Date/Time	Received By	Date/Time	Sample(s) Received on Ice	<input checked="" type="checkbox"/> Y or N
<u>MMW</u>	<u>6-5-23</u>	<u>gracy</u>	<u>6/5/23</u>	Proper Bottles Received in Good Condition	<input checked="" type="checkbox"/> Y or N
Relinquished By	Date/Time	Received By	Date/Time	Bottles Filled with Adequate Volume	<input checked="" type="checkbox"/> Y or N
				Samples Received Within Hold Time	<input checked="" type="checkbox"/> Y or N
				Date/Time Taken From Sample Bottle	<input checked="" type="checkbox"/> Y or N

**SUBCONTRACT ORDER  
Transfer Chain of Custody**

**Pace Analytical Services, LLC**

**GF00313**

**SENDING LABORATORY**

PDC Laboratories, Inc.  
944 Anglum Road  
Hazelwood, MO 63042  
(800) 333-3278

**RECEIVING LABORATORY**

Pace Analytical Services, LLC - Peoria  
2231 W Altorfer Dr  
Peoria, IL 61615  
(309) 692-9688

**Sample: GF00313-07**  
**Name: BWCU**

**Sampled: 06/01/23 13:05**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	06/14/23 16:00	06/29/23 13:05	
Chlor a	06/14/23 16:00	06/22/23 13:05	
PO4 total- P	06/14/23 16:00	06/29/23 13:05	

**Sample: GF00313-08**  
**Name: BD-1**

**Sampled: 06/01/23 14:10**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	06/14/23 16:00	06/29/23 14:10	
Chlor a	06/14/23 16:00	06/22/23 14:10	
PO4 total- P	06/14/23 16:00	06/29/23 14:10	

**Sample: GF00313-09**  
**Name: UPDU**

**Sampled: 06/01/23 10:52**  
**Matrix: Surface Water**  
**Preservative: H2SO4, cool <6**

<b>Analysis</b>	<b>Due</b>	<b>Expires</b>	<b>Comments</b>
Ammonia-N	06/14/23 16:00	06/29/23 10:52	
Chlor a	06/14/23 16:00	06/22/23 10:52	
PO4 total- P	06/14/23 16:00	06/29/23 10:52	



Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

June 27, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **6/14/23 9:00 am** and logged in under work order **GF02454**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise . We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GF02454

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
NO	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided





**ANALYTICAL RESULTS**

**Sample:** GF02454-01  
**Name:** UPDU  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 09:11  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	1.6	mg/L		06/15/23 01:46	1	0.03	06/15/23 01:46	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/15/23 02:04	5	0.20	06/15/23 02:04	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.6	mg/L		06/16/23 11:32	5	1.0	06/23/23 12:06	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.9	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	0.10	mg/L		06/16/23 14:07	1	0.10	06/16/23 14:07	ARB	EPA 350.1 REV2
Phosphorus - ortho as P	0.98	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:10	CGL	SM 4500P E 1999
Phosphorus - total as P	1.0	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:40	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:06	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

**Sample:** GF02454-02  
**Name:** UPDD  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 11:25  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	25	mg/L		06/15/23 03:17	25	0.75	06/15/23 03:17	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	25	mg/L		06/16/23 13:27	50	1.0	06/23/23 12:08	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.6	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:11	1	0.10	06/16/23 14:11	ARB	EPA 350.1 REV2
Nitrate/Nitrite-N	24	mg/L		06/16/23 13:27	50	1.0	06/16/23 13:27	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.29	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:11	CGL	SM 4500P E 1999
Phosphorus - total as P	0.40	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:41	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.2	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:08	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GF02454-03  
**Name:** BWCU  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 13:03  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	0.42	mg/L		06/15/23 04:11	1	0.03	06/15/23 04:11	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/15/23 04:29	5	0.20	06/15/23 04:29	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	< 1.0	mg/L		06/16/23 11:32	5	1.0	06/23/23 12:09	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.7	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:12	1	0.10	06/16/23 14:12	ARB	EPA 350.1 REV2
Phosphorus - ortho as P	< 0.020	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:12	CGL	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:45	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:09	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

**Sample:** GF02454-04  
**Name:** BWCD  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 13:21  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	4.4	mg/L		06/15/23 05:25	5	0.15	06/15/23 05:25	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	4.4	mg/L		06/16/23 13:01	10	1.0	06/23/23 12:11	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.0	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:13	1	0.10	06/16/23 14:13	ARB	EPA 350.1 REV2
Nitrate/Nitrite-N	4.4	mg/L		06/16/23 13:01	10	0.20	06/16/23 13:01	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.75	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:13	CGL	SM 4500P E 1999
Phosphorus - total as P	0.76	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:50	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:11	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GF02454-05  
**Name:** BD  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 13:08  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	0.41	mg/L		06/15/23 06:02	1	0.03	06/15/23 06:02	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/15/23 06:21	5	0.20	06/15/23 06:21	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	< 1.0	mg/L		06/16/23 11:32	5	1.0	06/23/23 12:12	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.8	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:15	1	0.10	06/16/23 14:15	ARB	EPA 350.1 REV2
Phosphorus - ortho as P	< 0.020	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:14	CGL	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:51	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:12	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

**Sample:** GF02454-06  
**Name:** SBRU  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 13:57  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	2.0	mg/L		06/15/23 01:03	1	0.03	06/15/23 01:03	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/15/23 01:21	5	0.20	06/15/23 01:21	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	2.0	mg/L		06/16/23 11:32	5	1.0	06/23/23 12:14	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.4	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:16	1	0.10	06/16/23 14:16	ARB	EPA 350.1 REV2
Phosphorus - ortho as P	< 0.020	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:16	CGL	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:51	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:14	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2

**Sample:** GF02454-07  
**Name:** SBRM  
**Matrix:** Surface Water - Grab

**Sampled:** 06/13/23 14:14  
**Received:** 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	1.9	mg/L		06/15/23 01:57	1	0.03	06/15/23 01:57	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.8	mg/L		06/16/23 13:02	10	1.0	06/23/23 12:15	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	1.4	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:17	1	0.10	06/16/23 14:17	ARB	EPA 350.1 REV2
Nitrate/Nitrite-N	1.8	mg/L		06/16/23 13:02	10	0.20	06/16/23 13:02	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:17	CGL	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:52	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:15	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

Sample: GF02454-08  
 Name: SBRD  
 Matrix: Surface Water - Grab

Sampled: 06/13/23 15:02

Received: 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	1.7	mg/L		06/15/23 03:31	1	0.03	06/15/23 03:31	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/15/23 03:50	5	0.20	06/15/23 03:50	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	1.9	mg/L		06/16/23 13:03	10	1.0	06/23/23 12:17	NWT	Calculated - See Notes
Total Nitrogen	1.7	mg/L		06/16/23 11:32	5	1.0	06/23/23 12:17	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	< 1.0	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:18	1	0.10	06/16/23 14:18	ARB	EPA 350.1 REV2
Nitrate/Nitrite-N	1.9	mg/L		06/16/23 13:03	10	0.20	06/16/23 13:03	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.14	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:17	CGL	SM 4500P E 1999
Phosphorus - total as P	0.17	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:53	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:17	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



**ANALYTICAL RESULTS**

Sample: GF02454-09  
 Name: RCKD  
 Matrix: Surface Water - Grab

Sampled: 06/13/23 15:37

Received: 06/14/23 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>									
Nitrate-N	2.6	mg/L		06/15/23 04:47	5	0.15	06/15/23 04:47	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/15/23 04:47	5	0.20	06/15/23 04:47	CRD	EPA 300.0 REV 2.1
<b><u>General Chemistry - PIA</u></b>									
Total Nitrogen	3.7	mg/L		06/16/23 11:32	5	1.0	06/23/23 12:18	NWT	Calculated - See Notes
<b><u>Microbiology - PIA</u></b>									
Chlorophyll a	2.7	mg/m3		06/15/23 08:20	1	1.0	06/21/23 15:30	SDW	SM 10200H*
<b><u>Nutrients - PIA</u></b>									
Ammonia-N	< 0.10	mg/L		06/16/23 14:19	1	0.10	06/16/23 14:19	ARB	EPA 350.1 REV2
Phosphorus - ortho as P	0.056	mg/L		06/14/23 16:27	1	0.020	06/14/23 17:18	CGL	SM 4500P E 1999
Phosphorus - total as P	0.16	mg/L		06/19/23 17:37	1	0.10	06/21/23 10:29	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.1	mg/L		06/16/23 11:32	1	1.0	06/23/23 12:18	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2



NOTES

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

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Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050



Certified by: Taylor Cordle, Project Manager

650434  
JK



### CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Northwater Consulting  
Address: 960 Clocktower Dr, Ste. F, Springfield IL  
Report To: ted@northwaterco.com  
Copy To: jeff@northwaterco.com

Billing Information:  
Email To: jeff@northwaterco.com  
Site Collection Info/Address:  
Will County, IL

Customer Project Name/Number:  
Northwater Surface Water Monitoring  
Phone: 618-781-6629  
Email: ted@northwaterco.com  
Collected By (print):  
Collected By (Signature):  
Sample Disposal:  
 Dispose as appropriate  
 Return  
 Archive:  
 Hold:

State: IL / County/City: Time Zone Collected:  
Compliance Monitoring?  
 Yes  No  
DW PWS ID #:  
DW Location Code:  
Immediately Packed on Ice:  
 Yes  No  
Field Filtered (if applicable):  
 Yes  No  
Analysis:

\* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Volume filtered	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)
			Date	Time				
UPDU	G-W	G-Grab	6/13/23	9:11			3	P
UPDP	G-W	G-Grab	6/13/23	11:25			3	P
BUCU	G-W	G-Grab	6/13/23	13:03			3	P
BUCD	G-W	G-Grab	6/13/23	13:21			3	P
BU	G-W	G-Grab	6/13/23	13:08			3	P
SBRU	G-W	G-Grab	6/13/23	13:57			3	P
SBRM	G-W	G-Grab	6/13/23	14:14			3	P
SBRD	G-W	G-Grab	6/13/23	15:02			3	P
ACKD	G-W	G-Grab	6/13/23	15:37			3	P

Customer Remarks / Special Conditions / Possible Hazards:  
Taylor Cordle - Pace rep

Type of Ice Used: Wet Blue Dry None  
Packing Material Used:  
Radchem sample(s) screened (<500 cpm): Y N NA

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

Container Preservative Type \*\*  
Lab Project Manager:  
\*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses	NITRATE N	TOTAL N	AMMONIA N	TOTAL PHOSPHORUS	ORTHOPHOSPHATE	CHLOROPHYLL A
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X

Lab Profile/Line:  
Lab Sample Receipt Checklist:  
Custody Seals Present/Intact Y N NA  
Custody Signatures Present Y N NA  
Collector Signature Present Y N NA  
Bottles Intact Y N NA  
Correct Bottles Y N NA  
Sufficient Volume Y N NA  
Samples Received on Ice Y N NA  
VOA - Headspace Acceptable Y N NA  
USDA Regulated Soils Y N NA  
Samples in Holding Time Y N NA  
Residual Chlorine Present Y N NA  
Cl Strips:  
Sample pH Acceptable Y N NA  
pH Strips:  
Sulfide Present Y N NA  
Lead Acetate Strips:  
LAB USE ONLY:  
Lab Sample # / Comments:

Relinquished by/Company: (Signature)  
Date/Time:  
Relinquished by/Company: (Signature)  
Date/Time:  
Relinquished by/Company: (Signature)  
Date/Time:

Received by/Company: (Signature)  
Date/Time:  
Received by/Company: (Signature)  
Date/Time:  
Received by/Company: (Signature)  
Date/Time:

SHORT HOLDS PRESENT (<72 hours): Y N N/A  
Lab Tracking #:  
Samples received via:  
FEDEX UPS Client Courier Pace Courier

MTJL LAB USE ONLY  
Table #:  
Accnum:  
Template:  
Prelogin:  
PM:  
PB:

LAB Sample Temperature Info:  
Temp Blank Received: Y N NA  
Therm ID#:  
Cooler 1 Temp Upon Receipt: °C  
Cooler 1 Therm Corr. Factor: °C  
Cooler 1 Corrected Temp: 2.3 °C  
Comments:

Trip Blank Received: Y N NA  
HCL MeOH TSP Other  
Non Conformance(s): Page: \_\_\_\_  
YES / NO of: \_\_\_\_

900 6/14/23







Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

July 15, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **6/27/23 5:00 pm** and logged in under work order **GF04883**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GF04883

---

YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



Sample: GF04883-01  
Name: UPPU  
Matrix: Surface Water - Grab

Sampled: 06/27/23 09:50  
Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	0.14	mg/L		06/29/23 12:18	06/29/23 12:18	ARB	EPA 350.1 REV2
Chlorophyll a	2.8	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate-N	0.69	mg/L		06/28/23 09:35	06/28/23 09:35	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/28/23 09:53	06/28/23 09:53	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	1.7	mg/L		06/28/23 12:00	06/28/23 12:47	KAM	SM 4500P E 1999
Phosphorus - total as P	1.2	mg/L		07/03/23 16:20	07/06/23 11:01	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:10	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:10	NWT	Calculated - See Notes



Sample: GF04883-02  
Name: UPPD  
Matrix: Surface Water - Grab

Sampled: 06/27/23 10:40  
Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	0.10	mg/L		06/29/23 12:21	06/29/23 12:21	ARB	EPA 350.1 REV2
Chlorophyll a	1.4	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate/Nitrite-N	19	mg/L		06/30/23 16:20	06/30/23 16:20	CGL	EPA 353.2 REV 2
Nitrate-N	20	mg/L		06/28/23 11:05	06/28/23 11:05	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.26	mg/L		06/28/23 12:00	06/28/23 12:41	KAM	SM 4500P E 1999
Phosphorus - total as P	0.35	mg/L		07/03/23 16:20	07/06/23 11:07	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:16	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	19	mg/L		06/30/23 16:20	07/07/23 13:16	NWT	Calculated - See Notes



Sample: GF04883-03

Name: BWCU

Matrix: Surface Water - Grab

Sampled: 06/27/23 11:20

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		06/29/23 12:25	06/29/23 12:25	ARB	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate-N	0.10	mg/L		06/28/23 11:23	06/28/23 11:23	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/28/23 11:41	06/28/23 11:41	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.035	mg/L		06/28/23 12:00	06/28/23 12:42	KAM	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		07/03/23 16:20	07/06/23 11:08	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:18	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:18	NWT	Calculated - See Notes



Sample: GF04883-04

Name: BWCUD

Matrix: Surface Water - Grab

Sampled: 06/27/23 11:25

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		06/29/23 12:26	06/29/23 12:26	ARB	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate-N	0.10	mg/L		06/28/23 12:17	06/28/23 12:17	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/28/23 13:12	06/28/23 13:12	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.035	mg/L		06/28/23 12:00	06/28/23 12:43	KAM	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		07/03/23 16:20	07/06/23 11:09	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:19	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/29/23 10:04	07/07/23 13:19	NWT	Calculated - See Notes



Sample: GF04883-05

Name: BWCD

Matrix: Surface Water - Grab

Sampled: 06/27/23 11:45

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	1.0	mg/L		06/29/23 12:14	06/29/23 12:14	ARB	EPA 350.1 REV2
Chlorophyll a	2.1	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate-N	0.52	mg/L		06/28/23 13:48	06/28/23 13:48	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		06/28/23 14:06	06/28/23 14:06	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.62	mg/L		06/28/23 12:00	06/28/23 12:48	KAM	SM 4500P E 1999
Phosphorus - total as P	0.72	mg/L		07/03/23 16:20	07/06/23 11:10	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.4	mg/L		06/29/23 12:21	07/07/23 13:43	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.0	mg/L		06/29/23 12:21	07/07/23 13:43	NWT	Calculated - See Notes





Sample: GF04883-06

Name: SBRU

Matrix: Surface Water - Grab

Sampled: 06/27/23 12:15

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		06/29/23 12:15	06/29/23 12:15	ARB	EPA 350.1 REV2
Chlorophyll a	2.7	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate-N	< 0.03	mg/L		06/28/23 14:42	06/28/23 14:42	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.15	mg/L		06/28/23 14:42	06/28/23 14:42	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		06/28/23 12:00	06/28/23 12:49	KAM	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		07/03/23 16:20	07/06/23 11:10	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 12:21	07/07/23 13:45	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/29/23 12:21	07/07/23 13:45	NWT	Calculated - See Notes



Sample: GF04883-07

Name: SBRM

Matrix: Surface Water - Grab

Sampled: 06/27/23 12:40

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		06/29/23 12:15	06/29/23 12:15	ARB	EPA 350.1 REV2
Chlorophyll a	17	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate/Nitrite-N	0.75	mg/L		06/30/23 14:57	06/30/23 14:57	CGL	EPA 353.2 REV 2
Nitrate-N	0.54	mg/L		06/28/23 13:03	06/28/23 13:03	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.081	mg/L		06/28/23 12:00	06/28/23 12:50	KAM	SM 4500P E 1999
Phosphorus - total as P	0.15	mg/L		07/03/23 16:20	07/06/23 11:11	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 12:21	07/07/23 13:46	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/30/23 14:57	07/07/23 13:46	NWT	Calculated - See Notes



Sample: GF04883-08

Name: SBRD

Matrix: Surface Water - Grab

Sampled: 06/27/23 13:15

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		06/29/23 12:16	06/29/23 12:16	ARB	EPA 350.1 REV2
Chlorophyll a	3.1	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate/Nitrite-N	0.32	mg/L		06/30/23 14:58	06/30/23 14:58	CGL	EPA 353.2 REV 2
Nitrate-N	0.25	mg/L		06/28/23 13:57	06/28/23 13:57	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.32	mg/L		06/28/23 12:00	06/28/23 13:08	KAM	SM 4500P E 1999
Phosphorus - total as P	0.40	mg/L		07/03/23 16:20	07/06/23 11:12	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 12:21	07/07/23 13:48	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/30/23 14:58	07/07/23 13:48	NWT	Calculated - See Notes



Sample: GF04883-09

Name: RCKD

Matrix: Surface Water - Grab

Sampled: 06/27/23 13:55

Received: 06/27/23 17:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		06/29/23 12:17	06/29/23 12:17	ARB	EPA 350.1 REV2
Chlorophyll a	4.7	mg/m3		06/28/23 10:20	06/29/23 15:00	SDW	SM 10200H*
Nitrate/Nitrite-N	0.70	mg/L		06/30/23 14:59	06/30/23 14:59	CGL	EPA 353.2 REV 2
Nitrate-N	0.64	mg/L		06/28/23 15:28	06/28/23 15:28	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.22	mg/L		06/28/23 12:00	06/28/23 13:09	KAM	SM 4500P E 1999
Phosphorus - total as P	0.28	mg/L		07/03/23 16:20	07/06/23 11:12	ARB	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		06/29/23 12:21	07/07/23 13:54	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		06/30/23 14:59	07/07/23 13:54	NWT	Calculated - See Notes



**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
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SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050



Certified by: Taylor Cordle, Project Manager



### CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubfs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Northwater Consulting  
Address: 960 Clocktower Dr, Ste. F, Springfield IL  
Report To: ted@northwaterco.com  
Copy To: jeff@northwaterco.com  
Billing Information:  
Email To: jeff@northwaterco.com  
Site Collection Info/Address: Will County, IL  
Customer Project Name/Number: AQUA NARP  
Phone: 618-781-6629  
Email: ted@northwaterco.com  
Site/Facility ID #: \_\_\_\_\_  
Purchase Order #: \_\_\_\_\_  
Quote #: \_\_\_\_\_  
Turnaround Date Required: \_\_\_\_\_  
Rush: [ ] Expedite Charges Apply [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day  
Compliance Monitoring? [ ] Yes [x] No  
DW PWS ID #: \_\_\_\_\_  
DW Location Code: \_\_\_\_\_  
Immediately Packed on Ice: [x] Yes [ ] No  
Field Filtered (if applicable): [ ] Yes [x] No  
Analysis: \_\_\_\_\_  
Sample Disposal: [x] Dispose as appropriate [ ] Return [ ] Archive [ ] Hold

\* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Composite End		Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)
			Date	Time	Date	Time			
UADW									
UPD4	GW	Grab	6/27/23	9:50				3	P
UPD0	GW	Grab	6/27/23	10:40				3	P
BUCU	GW	Grab	6/27/23	11:20				3	P
BUCUD	GW	Grab	6/27/23	11:25				3	P
BUCD	GW	Grab	6/27/23	11:45				3	P
SARU	GW	Grab	6/27/23	12:15				3	P
SBRM	GW	Grab	6/27/23	12:40				3	P
SBRD	GW	Grab	6/27/23	13:15				3	P
RCD	GW	Grab	6/27/23	13:55				3	P

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here  
**6FO4883 JPO**  
**ALL BOLD OUTLINED AREAS are for LAB USE ONLY**  
Container Preservative Type \*\*  
Lab Project Manager:

\*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses	Lab Profile/Line:				
	NITRATE N	TOTAL N	AMMONIA N	TOTAL PHOSPHORUS	ORTHOPHOSPHATE
Lab Sample Receipt Checklist:					
Custody Seals Present/Intact	Y	N	NA		
Custody Signatures Present	Y	N	NA		
Collector Signatures Present	Y	N	NA		
Bottles Intact	Y	N	NA		
Correct Bottles	Y	N	NA		
Sufficient Volume	Y	N	NA		
Samples Received on Ice	Y	N	NA		
VOA - Headspace Acceptable	Y	N	NA		
USDA Regulated Soils	Y	N	NA		
Samples in Holding Time	Y	N	NA		
Residual Chlorine Present	Y	N	NA		
Cl Strips:					
Sample pH Acceptable	Y	N	NA		
pH Strips:					
Sulfide Present	Y	N	NA		
Lead Acetate Strips:					

Customer Remarks / Special Conditions / Possible Hazards: \_\_\_\_\_  
Type of Ice Used: Wet Blue Dry None  
SHORT HOLDS PRESENT (<72 hours): Y N N/A  
Packing Material Used: \_\_\_\_\_  
Lab Tracking #: \_\_\_\_\_  
Radchem sample(s) screened (<500 cpm): Y N NA  
Samples received via: FEDEX UPS Client Courier Pace Courier

Relinquished by/Company: (Signature) \_\_\_\_\_ Date/Time: 6/27/23  
Received by/Company: (Signature) \_\_\_\_\_ Date/Time: \_\_\_\_\_  
Relinquished by/Company: (Signature) \_\_\_\_\_ Date/Time: \_\_\_\_\_  
Received by/Company: (Signature) \_\_\_\_\_ Date/Time: 6/27/23 1700  
Relinquished by/Company: (Signature) \_\_\_\_\_ Date/Time: \_\_\_\_\_  
Received by/Company: (Signature) \_\_\_\_\_ Date/Time: \_\_\_\_\_

LAB Sample Temperature Info:  
Temp Blank Received: Y N NA  
Therm ID#: 157  
Cooler 1 Temp Upon Receipt: 10C  
Cooler 1 Therm Corr. Factor: 0C  
Cooler 1 Corrected Temp: 10C  
Comments: walk in  
Trip Blank Received: Y N NA  
HCL MeOH TSP Other  
Non Conformance(s): Page: \_\_\_\_\_  
YES / NO





Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

July 24, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **7/11/23 4:35 pm** and logged in under work order **GG01468**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)





**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order GG01468

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



Sample: GG01468-01  
Name: UPDU  
Matrix: Surface Water - Grab

Sampled: 07/11/23 09:00  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	0.11	mg/L		07/18/23 14:50	07/18/23 14:50	TTH	EPA 350.1 REV2
Chlorophyll a	7.1	mg/m3		07/13/23 08:30	07/17/23 15:30	SDW	SM 10200H*
Nitrate-N	1.2	mg/L		07/12/23 22:22	07/12/23 22:22	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.15	mg/L		07/12/23 22:22	07/12/23 22:22	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.55	mg/L		07/12/23 10:55	07/12/23 11:40	CGL	SM 4500P E 1999
Phosphorus - total as P	0.68	mg/L		07/19/23 11:51	07/19/23 11:51	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.1	mg/L		07/14/23 10:36	07/20/23 11:19	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.3	mg/L		07/14/23 10:36	07/20/23 11:19	NWT	Calculated - See Notes



Sample: GG01468-02  
Name: UPDD  
Matrix: Surface Water - Grab

Sampled: 07/11/23 10:40  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:51	07/18/23 14:51	TTH	EPA 350.1 REV2
Chlorophyll a	1.7	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	14	mg/L		07/14/23 15:09	07/14/23 15:09	CGL	EPA 353.2 REV 2
Nitrate-N	14	mg/L		07/13/23 00:47	07/13/23 00:47	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.46	mg/L		07/12/23 10:55	07/12/23 11:41	CGL	SM 4500P E 1999
Phosphorus - total as P	0.45	mg/L		07/19/23 11:52	07/19/23 11:52	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/14/23 10:36	07/20/23 12:00	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	14	mg/L		07/14/23 15:09	07/20/23 12:00	NWT	Calculated - See Notes



Sample: GG01468-03  
Name: BWCU  
Matrix: Surface Water - Grab

Sampled: 07/11/23 11:15  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:47	07/18/23 14:47	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate-N	2.0	mg/L		07/13/23 01:23	07/13/23 01:23	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.15	mg/L		07/13/23 01:05	07/13/23 01:05	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		07/12/23 10:55	07/12/23 11:41	CGL	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		07/19/23 11:53	07/19/23 11:53	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/14/23 10:36	07/20/23 11:25	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.0	mg/L		07/14/23 10:36	07/20/23 11:25	NWT	Calculated - See Notes



Sample: GG01468-04  
Name: BWCD  
Matrix: Surface Water - Grab

Sampled: 07/11/23 11:40

Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:52	07/18/23 14:52	TTH	EPA 350.1 REV2
Chlorophyll a	31	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate-N	3.5	mg/L		07/13/23 01:59	07/13/23 01:59	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		07/13/23 01:59	07/13/23 01:59	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.24	mg/L		07/12/23 10:55	07/12/23 11:42	CGL	SM 4500P E 1999
Phosphorus - total as P	0.30	mg/L		07/19/23 11:53	07/19/23 11:53	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		07/14/23 10:36	07/20/23 11:27	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	4.5	mg/L		07/14/23 10:36	07/20/23 11:27	NWT	Calculated - See Notes



Sample: GG01468-05  
Name: BD-1  
Matrix: Surface Water - Grab

Sampled: 07/11/23 11:50

Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:52	07/18/23 14:52	TTH	EPA 350.1 REV2
Chlorophyll a	4.2	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	3.9	mg/L		07/14/23 14:08	07/14/23 14:08	CGL	EPA 353.2 REV 2
Nitrate-N	3.7	mg/L		07/13/23 02:35	07/13/23 02:35	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.27	mg/L		07/12/23 10:55	07/12/23 11:42	CGL	SM 4500P E 1999
Phosphorus - total as P	0.30	mg/L		07/19/23 11:55	07/19/23 11:55	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.2	mg/L		07/14/23 10:36	07/20/23 12:01	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	5.1	mg/L		07/14/23 14:08	07/20/23 12:01	NWT	Calculated - See Notes



Sample: GG01468-06  
Name: SBRU  
Matrix: Surface Water - Grab

Sampled: 07/11/23 12:35  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:53	07/18/23 14:53	TTH	EPA 350.1 REV2
Chlorophyll a	1.5	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate-N	1.9	mg/L		07/13/23 03:13	07/13/23 03:13	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.15	mg/L		07/13/23 03:13	07/13/23 03:13	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		07/12/23 10:55	07/12/23 11:44	CGL	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		07/19/23 12:02	07/19/23 12:02	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/14/23 10:36	07/20/23 11:28	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.9	mg/L		07/14/23 10:36	07/20/23 11:28	NWT	Calculated - See Notes



Sample: GG01468-07  
Name: SBRM  
Matrix: Surface Water - Grab

Sampled: 07/11/23 13:05  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:58	07/18/23 14:58	TTH	EPA 350.1 REV2
Chlorophyll a	1.5	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	3.2	mg/L		07/14/23 14:09	07/14/23 14:09	CGL	EPA 353.2 REV 2
Nitrate-N	3.2	mg/L		07/13/23 04:47	07/13/23 04:47	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.046	mg/L		07/12/23 10:55	07/12/23 11:44	CGL	SM 4500P E 1999
Phosphorus - total as P	0.12	mg/L		07/19/23 12:02	07/19/23 12:02	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/14/23 10:36	07/20/23 12:03	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	3.2	mg/L		07/14/23 14:09	07/20/23 12:03	NWT	Calculated - See Notes





Sample: GG01468-08  
Name: SBRD  
Matrix: Surface Water - Grab

Sampled: 07/11/23 13:35  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 14:59	07/18/23 14:59	TTH	EPA 350.1 REV2
Chlorophyll a	1.0	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	2.6	mg/L		07/14/23 14:09	07/14/23 14:09	CGL	EPA 353.2 REV 2
Nitrate-N	2.5	mg/L		07/13/23 05:25	07/13/23 05:25	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.19	mg/L		07/12/23 10:55	07/12/23 11:45	CGL	SM 4500P E 1999
Phosphorus - total as P	0.23	mg/L		07/19/23 12:03	07/19/23 12:03	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/14/23 10:36	07/20/23 12:04	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.6	mg/L		07/14/23 14:09	07/20/23 12:04	NWT	Calculated - See Notes



Sample: GG01468-09  
Name: RCKD  
Matrix: Surface Water - Grab

Sampled: 07/11/23 14:05  
Received: 07/11/23 16:35

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/18/23 15:00	07/18/23 15:00	TTH	EPA 350.1 REV2
Chlorophyll a	1.0	mg/m3		07/13/23 10:00	07/17/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	4.0	mg/L		07/14/23 14:14	07/14/23 14:14	CGL	EPA 353.2 REV 2
Nitrate-N	3.8	mg/L		07/13/23 06:03	07/13/23 06:03	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.11	mg/L		07/12/23 10:55	07/12/23 11:45	CGL	SM 4500P E 1999
Phosphorus - total as P	0.17	mg/L		07/19/23 12:04	07/19/23 12:04	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/14/23 10:36	07/20/23 12:06	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	4.0	mg/L		07/14/23 14:14	07/20/23 12:06	NWT	Calculated - See Notes



**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

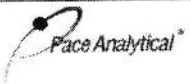
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050



Certified by: Taylor Cordle, Project Manager

6601458



**CHAIN-OF-CUSTODY Analytical Request Document**

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

Company: Northwater Consulting  
 Address: 960 Clocktower Dr, Ste. F, Springfield IL  
 Report To: ted@northwaterco.com  
 Copy To: jeff@northwaterco.com

Billing Information:  
 Email To: jeff@northwaterco.com  
 Site Collection Info/Address: Will County, IL

Customer Project Name/Number: Northwater Surface Water Monitoring  
 Phone: 618-781-6629  
 Email: ted@northwaterco.com  
 Collected By (print): T. Kraatzschmar  
 Collected By (signature): [Signature]  
 Sample Disposal: [X] Dispose as appropriate  
 [ ] Return [ ] Archive [ ] Hold

State: IL / County/City: [ ] PT [ ] MT [ ] CT [ ] JET  
 Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] JET  
 Compliance Monitoring? [ ] Yes [X] No  
 DW PWS ID #: [ ]  
 DW Location Code: [ ]  
 Immediately Packed on Ice: [X] Yes [ ] No  
 Field Filtered (if applicable): [ ] Yes [ ] No  
 Analysis: [ ]

\* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Volume filtered	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)	NITRATE N	TOTAL N	AMMONIA N	TOTAL PHOSPHORUS	ORTHO PHOSPHATE	CHLOROPHYLL A
			Date	Time										
UPDU	SW	Grab	7/11/23	9:00			3	P	X	X	X	X	X	X
UPDD	SW	Grab	7/11/23	10:40			3	P	X	X	X	X	X	X
BWCU	SW	Grab	7/11/23	11:15			3	P	X	X	X	X	X	X
BWCD	SW	Grab	7/11/23	11:40			3	P	X	X	X	X	X	X
BD-1	SW	Grab	7/11/23	11:50			3	P	X	X	X	X	X	X
SBRU	SW	Grab	7/11/23	12:35			3	P	X	X	X	X	X	X
SBRM	SW	Grab	7/11/23	13:05			3	P	X	X	X	X	X	X
SBRD	SW	Grab	7/11/23	13:35			3	P	X	X	X	X	X	X
RCKD	SW	Grab	7/11/23	14:05			3	P	X	X	X	X	X	X

**ALL BOLD OUTLINED AREAS are for LAB USE ONLY**

Container Preservative Type \*\*  
 Lab Project Manager:  
 \*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses

Analyses	Lab Profile/Line:
	Lab Sample Receipt Checklist:
	Custody Seals Present/Intact Y N NA
	Custody Signatures Present Y N NA
	Collector Signatures Present Y N NA
	Bottles Intact Y N NA
	Correct Bottles Y N NA
	Sufficient Volume Y N NA
	Samples Received on Ice Y N NA
	VQA - Headspace Acceptable Y N NA
	USDA Regulated Soils Y N NA
	Samples in Holding Time Y N NA
	Residual Chlorine Present Y N NA
	Cl Strips:
	Sample pH Acceptable Y N NA
	pH Strips:
	Sulfide Present Y N NA
	Lead Acetate Strips:
	LAB USE ONLY:
	Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards: Taylor Cordle - Pace rep  
 Type of Ice Used: Wet Blue Dry None  
 Packing Material Used:  
 Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A  
 Lab Tracking #:  
 Samples received via: FEDEX UPS Client Courier Pace Courier  
 LAB Sample Temperature Info:  
 Temp Blank Received: Y N NA  
 Therm ID#:  
 Cooler 1 Temp Upon Receipt: 0C  
 Cooler 2 Temp Upon Receipt: 0C  
 Cooler 3 Corrected Temp: 2.0C  
 Comments:

Relinquished by/Company: (Signature) [Signature] Date/Time: 7/11/23 16:35  
 Received by/Company: (Signature) [Signature] Date/Time: 1635 7/11/23

MTJL LAB USE ONLY  
 Table #:  
 Acctnum:  
 Template:  
 Prelogin:  
 PM:  
 PB:  
 Trip Blank Received: Y N NA  
 HCL MeOH TSP Other  
 Non Conformance(s): YES / NO Page: of:





Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

August 25, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **7/27/23 5:22 pm** and logged in under work order **GG04955**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise . We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order GG04955

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
NO	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



Sample: GG04955-01  
Name: SBRM  
Matrix: Surface Water - Grab

Sampled: 07/27/23 13:45  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	2.1	mg/L		07/31/23 16:41	07/31/23 16:41	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	0.57	mg/L		07/28/23 10:24	07/28/23 10:24	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		07/28/23 10:42	07/28/23 10:42	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.021	mg/L		07/28/23 17:53	07/28/23 18:03	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		08/02/23 13:22	08/02/23 13:22	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:04	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:04	NWT	Calculated - See Notes





Sample: GG04955-02  
Name: RCKD  
Matrix: Surface Water - Grab

Sampled: 07/27/23 14:50  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:39	07/31/23 16:39	TTH	EPA 350.1 REV2
Chlorophyll a	4.5	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	1.3	mg/L		07/28/23 11:18	07/28/23 11:18	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		07/28/23 11:36	07/28/23 11:36	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.16	mg/L		07/28/23 17:53	07/28/23 18:04	NWT	SM 4500P E 1999
Phosphorus - total as P	0.15	mg/L		08/02/23 13:24	08/02/23 13:24	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:05	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.3	mg/L		08/04/23 17:22	08/10/23 12:05	NWT	Calculated - See Notes



Sample: GG04955-03  
Name: SBRD  
Matrix: Surface Water - Grab

Sampled: 07/27/23 14:15  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:42	07/31/23 16:42	TTH	EPA 350.1 REV2
Chlorophyll a	15	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	1.1	mg/L		07/28/23 12:12	07/28/23 12:12	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		07/28/23 12:31	07/28/23 12:31	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.21	mg/L		07/28/23 17:53	07/28/23 18:04	NWT	SM 4500P E 1999
Phosphorus - total as P	0.20	mg/L		08/02/23 13:24	08/02/23 13:24	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:07	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.1	mg/L		08/04/23 17:22	08/10/23 12:07	NWT	Calculated - See Notes



Sample: GG04955-04  
Name: BD-1  
Matrix: Surface Water - Grab

Sampled: 07/27/23 14:30

Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:43	07/31/23 16:43	TTH	EPA 350.1 REV2
Chlorophyll a	19	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	1.2	mg/L		07/28/23 13:43	07/28/23 13:43	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		07/28/23 14:01	07/28/23 14:01	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.21	mg/L		07/28/23 17:53	07/28/23 18:05	NWT	SM 4500P E 1999
Phosphorus - total as P	0.18	mg/L		08/02/23 13:25	08/02/23 13:25	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:08	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.2	mg/L		08/04/23 17:22	08/10/23 12:08	NWT	Calculated - See Notes



Sample: GG04955-05  
Name: SBRU  
Matrix: Surface Water - Grab

Sampled: 07/27/23 13:17  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:44	07/31/23 16:44	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	< 0.03	mg/L		07/28/23 14:37	07/28/23 14:37	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.15	mg/L		07/28/23 14:37	07/28/23 14:37	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		07/28/23 17:53	07/28/23 18:05	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		08/02/23 13:36	08/02/23 13:36	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:10	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/04/23 17:22	08/10/23 12:10	NWT	Calculated - See Notes



Sample: GG04955-06  
Name: BWCD  
Matrix: Surface Water - Grab

Sampled: 07/27/23 12:50  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:49	07/31/23 16:49	TTH	EPA 350.1 REV2
Chlorophyll a	5.4	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	4.6	mg/L		07/28/23 15:31	07/28/23 15:31	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		07/28/23 15:31	07/28/23 15:31	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.52	mg/L		07/28/23 17:53	07/28/23 18:05	NWT	SM 4500P E 1999
Phosphorus - total as P	0.48	mg/L		08/02/23 13:37	08/02/23 13:37	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/11/23 16:02	08/17/23 11:39	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	4.6	mg/L		08/11/23 16:02	08/17/23 11:39	NWT	Calculated - See Notes



Sample: GG04955-07  
Name: BWCU  
Matrix: Surface Water - Grab

Sampled: 07/27/23 12:40  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:49	07/31/23 16:49	TTH	EPA 350.1 REV2
Chlorophyll a	1.7	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	0.14	mg/L		07/28/23 15:49	07/28/23 15:49	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.15	mg/L		07/28/23 15:49	07/28/23 15:49	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		07/28/23 17:53	07/28/23 18:06	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		08/02/23 13:38	08/02/23 13:38	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/11/23 16:02	08/17/23 11:43	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/11/23 16:02	08/17/23 11:43	NWT	Calculated - See Notes



Sample: GG04955-08  
Name: UPDD  
Matrix: Surface Water - Grab

Sampled: 07/27/23 12:15  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		07/31/23 16:50	07/31/23 16:50	TTH	EPA 350.1 REV2
Chlorophyll a	39	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	20	mg/L	H	07/31/23 11:26	07/31/23 11:26	TMS	EPA 300.0 REV 2.1
Nitrite-N	0.069	mg/L	H	08/01/23 16:30	08/01/23 16:30	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.47	mg/L		07/28/23 17:53	07/28/23 18:06	NWT	SM 4500P E 1999
Phosphorus - total as P	0.50	mg/L		08/02/23 13:38	08/02/23 13:38	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.6	mg/L		08/11/23 16:02	08/17/23 11:45	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	21	mg/L		08/11/23 16:02	08/17/23 11:45	NWT	Calculated - See Notes



Sample: GG04955-09  
Name: UDDU  
Matrix: Surface Water - Grab

Sampled: 07/27/23 08:55  
Received: 07/27/23 17:22

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	0.21	mg/L		07/31/23 16:51	07/31/23 16:51	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		07/28/23 11:45	08/03/23 15:30	SDW	SM 10200H*
Nitrate-N	0.84	mg/L	H	07/31/23 11:44	07/31/23 11:44	TMS	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L	H	07/31/23 12:02	07/31/23 12:02	TMS	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.73	mg/L		07/28/23 17:53	07/28/23 18:08	NWT	SM 4500P E 1999
Phosphorus - total as P	0.76	mg/L		08/02/23 13:39	08/02/23 13:39	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		08/11/23 16:02	08/17/23 11:46	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.2	mg/L		08/11/23 16:02	08/17/23 11:46	NWT	Calculated - See Notes





**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050  
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615  
TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807  
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042  
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389  
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050  
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

**Qualifiers**

H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.



Certified by: Taylor Cordle, Project Manager





Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

September 21, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **8/11/23 12:37 pm** and logged in under work order **GH02654**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

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Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GH02654

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
NO	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
YES	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



Sample: GH02654-01  
Name: RCKD  
Matrix: Surface Water - Grab

Sampled: 08/10/23 14:00  
Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 15:50	08/21/23 15:50	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		08/10/23 14:00	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	1.2	mg/L		08/11/23 15:14	08/11/23 21:47	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		08/11/23 15:14	08/11/23 21:47	NDM	EPA 300.0
Phosphorus - ortho as P	0.25	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:38	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.2	mg/L		08/21/23 15:42	08/23/23 15:38	NWT	Calculated - See Notes



Sample: GH02654-02  
Name: BWCD  
Matrix: Surface Water - Grab

Sampled: 08/10/23 11:45  
Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 15:51	08/21/23 15:51	TTH	EPA 350.1 REV2
Chlorophyll a	2.5	mg/m3		08/10/23 11:45	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	3.4	mg/L		08/11/23 15:14	08/11/23 22:24	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		08/11/23 15:14	08/11/23 22:24	NDM	EPA 300.0
Phosphorus - ortho as P	0.59	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:40	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	3.4	mg/L		08/21/23 15:42	08/23/23 15:40	NWT	Calculated - See Notes



Sample: GH02654-03  
Name: BD-1  
Matrix: Surface Water - Grab

Sampled: 08/10/23 13:35  
Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 15:51	08/21/23 15:51	TTH	EPA 350.1 REV2
Chlorophyll a	43	mg/m3		08/10/23 13:35	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	1.1	mg/L		08/11/23 15:14	08/12/23 00:16	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		08/11/23 15:14	08/12/23 00:16	NDM	EPA 300.0
Phosphorus - ortho as P	0.27	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:41	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.1	mg/L		08/21/23 15:42	08/23/23 15:41	NWT	Calculated - See Notes



Sample: GH02654-04

Name: SBRU

Matrix: Surface Water - Grab

Sampled: 08/10/23 12:15

Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 16:46	08/21/23 16:46	TTH	EPA 350.1 REV2
Chlorophyll a	1.1	mg/m3		08/10/23 12:15	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	< 0.50	mg/L		08/11/23 15:14	08/12/23 00:53	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		08/11/23 15:14	08/12/23 00:53	NDM	EPA 300.0
Phosphorus - ortho as P	0.053	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:46	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:46	NWT	Calculated - See Notes





Sample: GH02654-05  
Name: SBRM  
Matrix: Surface Water - Grab

Sampled: 08/10/23 12:40  
Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 16:50	08/21/23 16:50	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		08/10/23 12:40	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	0.74	mg/L		08/11/23 15:14	08/12/23 01:31	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		08/11/23 15:14	08/12/23 01:31	NDM	EPA 300.0
Phosphorus - ortho as P	0.17	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:55	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:55	NWT	Calculated - See Notes



Sample: GH02654-06  
Name: BWCU  
Matrix: Surface Water - Grab

Sampled: 08/10/23 11:20

Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 16:47	08/21/23 16:47	TTH	EPA 350.1 REV2
Chlorophyll a	1.1	mg/m3		08/10/23 11:20	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	< 0.50	mg/L		08/11/23 15:14	08/12/23 02:08	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		08/11/23 15:14	08/12/23 02:08	NDM	EPA 300.0
Phosphorus - ortho as P	0.057	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:56	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:56	NWT	Calculated - See Notes



Sample: GH02654-07  
Name: UPDD  
Matrix: Surface Water - Grab

Sampled: 08/10/23 10:35  
Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 16:48	08/21/23 16:48	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		08/10/23 10:35	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	17	mg/L		08/11/23 15:14	08/12/23 03:04	NDM	EPA 300.0
Nitrite-N	< 5.0	mg/L	X	08/11/23 15:14	08/12/23 03:04	NDM	EPA 300.0
Phosphorus - ortho as P	0.40	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:58	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	17	mg/L		08/21/23 15:42	08/23/23 15:58	NWT	Calculated - See Notes



Sample: GH02654-08  
Name: UPDU  
Matrix: Surface Water - Grab

Sampled: 08/10/23 10:15

Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	0.13	mg/L		08/21/23 16:48	08/21/23 16:48	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		08/10/23 10:15	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	0.87	mg/L	Xa	08/14/23 14:29	08/14/23 19:46	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L	Xa	08/14/23 14:29	08/14/23 19:46	NDM	EPA 300.0
Phosphorus - ortho as P	0.94	mg/L		08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:59	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		08/21/23 15:42	08/23/23 15:59	NDM	Calculated - See Notes



Sample: GH02654-09  
Name: SBRD  
Matrix: Surface Water - Grab

Sampled: 08/10/23 13:25  
Received: 08/11/23 12:37

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		08/21/23 16:49	08/21/23 16:49	TTH	EPA 350.1 REV2
Chlorophyll a	1.7	mg/m3		08/10/23 13:25	08/22/23 16:00	SDW	SM 10200H*
Nitrate-N	1.1	mg/L	Xa	08/14/23 14:29	08/14/23 20:23	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L	Xa	08/14/23 14:29	08/14/23 20:23	NDM	EPA 300.0
Phosphorus - ortho as P	0.27	mg/L	Q4	08/11/23 15:11	08/11/23 18:25	CLH	SM 4500-P B E*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/21/23 15:42	08/23/23 16:01	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.1	mg/L		08/21/23 15:42	08/23/23 16:01	NDM	Calculated - See Notes



NOTES

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

- Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level. The associated blank spike was acceptable.
X Elevated reporting limit due to high levels of a non-target analyte.
Xa Reanalyzed outside of hold time due to instrument stoppage.



Certified by: Taylor Cordle, Project Manager



# CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

6402654

Company: Northwater Consulting

Address: 960 Clocktower Dr, Ste. F, Springfield IL

Report To: ted@northwaterco.com

Email To: jeff@northwaterco.com

Copy To: jeff@northwaterco.com

Site Collection Info/Address: Will County, IL

Customer Project Name/Number: Northwater Surface Water Monitoring

Phone: 618-781-6629

State: IL / County/City: JPT | JMT | XCT | JET

Email: ted@northwaterco.com

Compliance Monitoring? [ ] Yes [x] No

Collected By (print):

DW PWS ID #: DW Location Code: Immediately Packed on Ice: [ ] Yes [ ] No

Collected By (signature):

Field Filtered (if applicable): [x] Yes [ ] No

Sample Disposal: X) Dispose as appropriate

[ ] Return

[ ] Archive:

[ ] Hold:

Analysis: chl-a

\* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Type: Plastic (P) or Glass (G)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date		Volume filtered	Res Cl	# of Ctns
			Date	Time			
RC1D	SW	Grab	8/10/23	14:00	800 mL		3
BWCD	SW	Grab	8/10/23	11:45	800 mL		3
BD-1	SW	Grab	8/10/23	13:35	800 mL		3
SBRU	SW	Grab	8/10/23	12:15	800 mL		3
SBRM	SW	Grab	8/10/23	12:40	800 mL		3
BWCU	SW	Grab	8/10/23	11:20	800 mL		3
UPDD	SW	Grab	8/10/23	10:35	800 mL		3
UPDU	SW	Grab	8/10/23	10:15	800 mL		3
SBRD	SW	Grab	8/10/23	13:25	800 mL		3

Customer Remarks / Special Conditions / Possible Hazards:

Taylor Cordle - Pace rep

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Acquired by/Company: (Signature)  
Acquired by/Company: (Signature)  
Acquired by/Company: (Signature)

Date/Time: 12:57 8/11  
Date/Time: Received by/Company: (Signature)  
Date/Time: Received by/Company: (Signature)

Date/Time: 8/11/23 12:37  
Date/Time: Received by/Company: (Signature)  
Date/Time: Received by/Company: (Signature)

FEDEX UPS Client Courier Pace Courier  
Date/Time: 8/11/23 12:37  
Date/Time: Samples received via:

MTJL LAB USE ONLY  
Table #:  
Acctnum:  
Template:  
Prelogin:  
PM:  
PB:

LAB Sample Temperature Info:  
Temp Blank Received: Y N NA  
Therm ID#:  
Cooler 1 Temp Upon Receipt: °C  
Cooler 1 Therm Corr. Factor: °C  
Cooler 1 Corrected Temp: °C  
Comments: 3.50C  
Trip Blank Received: Y N NA  
HCL MeOH TSP Other  
Non Conformance(s): Page: of:

Container Preservative Type \*\*

Lab Project Manager:

\*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses

Lab Profile/Line:

Analyses	Lab Profile/Line:
NITRATE N	Lab Sample Receipt Checklist: Custody Seals Present/Intact Y N NA Custody Signatures Present Y N NA Collector Signature Present Y N NA Bottles Intact Y N NA Correct Bottles Y N NA Sufficient Volume Y N NA Samples Received on Ice Y N NA VQA - Headspace Acceptable Y N NA USDA Regulated Soils Y N NA Samples in Holding Time Y N NA Residual Chlorine Present Y N NA C.I. Strips: Y N NA Sample pH Acceptable Y N NA pH Strips: Y N NA Sulfide Present Y N NA Lead Acetate Strips: Y N NA
AMMONIA N	LAB USE ONLY: Lab Sample # / Comments:
TOTAL N	
TOTAL PHOSPHORUS	
ORTHOPHOSPHATE	
CHLOROPHYLL A	

OC  
OC  
OC

4 33



**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GH02654**

Analysis	Due	Expires	Laboratory ID	Comments
<hr/>				
<b>Sample ID: GH02654-05</b>	<b>Water</b>	<b>Sampled:08/10/23 12:40</b>	[REDACTED]	<b>1-4</b>
TKN GD	08/23/23 16:00	09/07/23 12:40		
Chlor a	08/23/23 16:00	08/31/23 12:40		
Ammonia-N	08/23/23 16:00	09/07/23 12:40		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GH02654-06</b>	<b>Water</b>	<b>Sampled:08/10/23 11:20</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 11:20		
Chlor a	08/23/23 16:00	08/31/23 11:20		
TKN GD	08/23/23 16:00	09/07/23 11:20		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GH02654-07</b>	<b>Water</b>	<b>Sampled:08/10/23 10:35</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 10:35		
Chlor a	08/23/23 16:00	08/31/23 10:35		
TKN GD	08/23/23 16:00	09/07/23 10:35		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GH02654-08</b>	<b>Water</b>	<b>Sampled:08/10/23 10:15</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 10:15		
Chlor a	08/23/23 16:00	08/31/23 10:15		
TKN GD	08/23/23 16:00	09/07/23 10:15		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GH02654-09</b>	<b>Water</b>	<b>Sampled:08/10/23 13:25</b>	[REDACTED]	<b>1-4</b>
TKN GD	08/23/23 16:00	09/07/23 13:25		
Ammonia-N	08/23/23 16:00	09/07/23 13:25		
Chlor a	08/23/23 16:00	08/31/23 13:25		
<i>Containers Supplied:</i>				
<hr/>				

Released By	Date	Received By	Date
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Released By	Date	Received By	Date
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**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GH02654**

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GH02654-01</b>	<b>Water</b>	<b>Sampled:08/10/23 14:00</b>	[REDACTED]	<b>1-4</b>
Chlor a	08/23/23 16:00	08/31/23 14:00		
TKN GD	08/23/23 16:00	09/07/23 14:00		
Ammonia-N	08/23/23 16:00	09/07/23 14:00		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-02</b>	<b>Water</b>	<b>Sampled:08/10/23 11:45</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 11:45		
Chlor a	08/23/23 16:00	08/31/23 11:45		
TKN GD	08/23/23 16:00	09/07/23 11:45		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-03</b>	<b>Water</b>	<b>Sampled:08/10/23 13:35</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 13:35		
Chlor a	08/23/23 16:00	08/31/23 13:35		
TKN GD	08/23/23 16:00	09/07/23 13:35		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-04</b>	<b>Water</b>	<b>Sampled:08/10/23 12:15</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 12:15		
Chlor a	08/23/23 16:00	08/31/23 12:15		
TKN GD	08/23/23 16:00	09/07/23 12:15		
<i>Containers Supplied:</i>				

*9 Total Chlorophyll Filters Only 20C*

<i>Oliver Clark</i>	<i>8/16/23</i>	<i>Brenden Bliven</i>	<i>8/16/23</i>
Released By	Date	Received By	Date
<i>Brenden Bliven</i>	<i>8/16/23</i>	<i>[Signature]</i>	<i>8/16/23</i>
Released By	Date	Received By	Date

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GH02654**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GH02654-05</b>	<b>Water</b>	<b>Sampled: 08/10/23 12:40</b>	[REDACTED]	<b>1-4</b>
TKN GD	08/23/23 16:00	09/07/23 12:40		
Chlor a	08/23/23 16:00	08/31/23 12:40		
Ammonia-N	08/23/23 16:00	09/07/23 12:40		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-06</b>	<b>Water</b>	<b>Sampled: 08/10/23 11:20</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 11:20		
Chlor a	08/23/23 16:00	08/31/23 11:20		
TKN GD	08/23/23 16:00	09/07/23 11:20		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-07</b>	<b>Water</b>	<b>Sampled: 08/10/23 10:35</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 10:35		
Chlor a	08/23/23 16:00	08/31/23 10:35		
TKN GD	08/23/23 16:00	09/07/23 10:35		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-08</b>	<b>Water</b>	<b>Sampled: 08/10/23 10:15</b>	[REDACTED]	<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 10:15		
Chlor a	08/23/23 16:00	08/31/23 10:15		
TKN GD	08/23/23 16:00	09/07/23 10:15		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-09</b>	<b>Water</b>	<b>Sampled: 08/10/23 13:25</b>	[REDACTED]	<b>1-4</b>
TKN GD	08/23/23 16:00	09/07/23 13:25		
Ammonia-N	08/23/23 16:00	09/07/23 13:25		
Chlor a	08/23/23 16:00	08/31/23 13:25		
<i>Containers Supplied:</i>				

(18) Containers

3.3

Released By <u>Joe Clark</u> Date <u>8/11/23</u>	Received By <u>[Signature]</u> Date <u>11/01/23</u>
Released By <u>[Signature]</u> Date <u>11/01/23</u>	Received By <u>V. You</u> Date <u>8-14-23</u> <u>1545</u>

*Carth*





**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GH02654**

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GH02654-01</b>	<b>Water</b>	<b>Sampled:08/10/23 14:00</b>		<b>1-4</b>
Chlor a	08/23/23 16:00	08/31/23 14:00		
TKN GD	08/23/23 16:00	09/07/23 14:00		
Ammonia-N	08/23/23 16:00	09/07/23 14:00		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-02</b>	<b>Water</b>	<b>Sampled:08/10/23 11:45</b>		<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 11:45		
Chlor a	08/23/23 16:00	08/31/23 11:45		
TKN GD	08/23/23 16:00	09/07/23 11:45		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-03</b>	<b>Water</b>	<b>Sampled:08/10/23 13:35</b>		<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 13:35		
Chlor a	08/23/23 16:00	08/31/23 13:35		
TKN GD	08/23/23 16:00	09/07/23 13:35		
<i>Containers Supplied:</i>				
<b>Sample ID: GH02654-04</b>	<b>Water</b>	<b>Sampled:08/10/23 12:15</b>		<b>1-4</b>
Ammonia-N	08/23/23 16:00	09/07/23 12:15		
Chlor a	08/23/23 16:00	08/31/23 12:15		
TKN GD	08/23/23 16:00	09/07/23 12:15		
<i>Containers Supplied:</i>				

Released By	Date	Received By	Date
Released By	Date	Received By	Date



Pace Analytical Services, LLC  
2231 W. Altorfer Drive  
Peoria, IL 61615  
(800)752-6651

September 21, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water - Aqua

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **9/1/23 9:00 am** and logged in under work order **G100010**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GI00010

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
NO	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



Sample: GI00010-01  
Name: BWCU  
Matrix: Surface Water - Grab

Sampled: 08/31/23 14:51  
Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:11	09/05/23 17:11	TTH	EPA 350.1 REV2
Chlorophyll a	1.5	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	0.07	mg/L		09/01/23 17:18	09/01/23 17:18	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/01/23 17:36	09/01/23 17:36	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.022	mg/L		09/01/23 16:17	09/01/23 16:26	NWT	SM 4500P E 1999
Phosphorus - total as P	1.0	mg/L		09/06/23 13:04	09/06/23 13:04	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:06	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:06	NWT	Calculated - See Notes



Sample: GI00010-02

Name: BWCD

Matrix: Surface Water - Grab

Sampled: 08/31/23 15:15

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:11	09/05/23 17:11	TTH	EPA 350.1 REV2
Chlorophyll a	4.7	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	8.5	mg/L		09/01/23 19:06	09/01/23 19:06	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/01/23 19:06	09/01/23 19:06	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.93	mg/L		09/01/23 16:17	09/01/23 16:29	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		09/06/23 13:06	09/06/23 13:06	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:08	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	8.5	mg/L		09/05/23 16:33	09/06/23 16:08	NWT	Calculated - See Notes





Sample: GI00010-03

Name: SBRU

Matrix: Surface Water - Grab

Sampled: 08/31/23 15:38

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:12	09/05/23 17:12	TTH	EPA 350.1 REV2
Chlorophyll a	1.5	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	< 0.03	mg/L		09/01/23 19:42	09/01/23 19:42	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/01/23 20:00	09/01/23 20:00	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		09/01/23 16:17	09/01/23 16:30	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		09/06/23 13:07	09/06/23 13:07	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:09	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:09	NWT	Calculated - See Notes



Sample: GI00010-04

Name: RCKD

Matrix: Surface Water - Grab

Sampled: 08/31/23 17:23

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:21	09/05/23 17:21	TTH	EPA 350.1 REV2
Chlorophyll a	1.7	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	0.29	mg/L		09/01/23 20:36	09/01/23 20:36	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/01/23 20:55	09/01/23 20:55	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.20	mg/L		09/01/23 16:17	09/01/23 16:30	NWT	SM 4500P E 1999
Phosphorus - total as P	0.23	mg/L		09/06/23 13:08	09/06/23 13:08	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:11	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:11	NWT	Calculated - See Notes



Sample: GI00010-05

Name: SBRM

Matrix: Surface Water - Grab

Sampled: 08/31/23 16:17

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:22	09/05/23 17:22	TTH	EPA 350.1 REV2
Chlorophyll a	23	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	0.28	mg/L		09/01/23 21:31	09/01/23 21:31	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/01/23 22:25	09/01/23 22:25	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.12	mg/L		09/01/23 16:17	09/01/23 16:31	NWT	SM 4500P E 1999
Phosphorus - total as P	0.17	mg/L		09/06/23 13:08	09/06/23 13:08	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	33	mg/L		09/05/23 16:33	09/06/23 16:12	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	34	mg/L		09/05/23 16:33	09/06/23 16:12	NWT	Calculated - See Notes



Sample: GI00010-06

Name: SBRD

Matrix: Surface Water - Grab

Sampled: 08/31/23 16:46

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:23	09/05/23 17:23	TTH	EPA 350.1 REV2
Chlorophyll a	4.7	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	1.1	mg/L		09/01/23 23:01	09/01/23 23:01	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/01/23 23:19	09/01/23 23:19	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.58	mg/L		09/01/23 16:17	09/01/23 16:31	NWT	SM 4500P E 1999
Phosphorus - total as P	0.30	mg/L		09/06/23 13:09	09/06/23 13:09	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:14	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.1	mg/L		09/05/23 16:33	09/06/23 16:14	NWT	Calculated - See Notes



Sample: GI00010-07

Name: UPDD

Matrix: Surface Water - Grab

Sampled: 08/31/23 14:05

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:24	09/05/23 17:24	TTH	EPA 350.1 REV2
Chlorophyll a	26	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	27	mg/L		09/02/23 00:32	09/02/23 00:32	CRD	EPA 300.0 REV 2.1
Nitrite-N	0.025	mg/L	H	09/07/23 10:25	09/07/23 11:01	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.97	mg/L		09/01/23 16:17	09/01/23 16:32	NWT	SM 4500P E 1999
Phosphorus - total as P	0.64	mg/L		09/06/23 13:14	09/06/23 13:14	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.4	mg/L		09/05/23 16:33	09/06/23 16:15	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	28	mg/L		09/07/23 10:25	09/07/23 11:01	NWT	Calculated - See Notes



Sample: GI00010-08

Name: UPDU

Matrix: Surface Water - Grab

Sampled: 08/31/23 12:00

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:25	09/05/23 17:25	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	0.86	mg/L		09/02/23 00:51	09/02/23 00:51	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		09/02/23 01:10	09/02/23 01:10	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.28	mg/L		09/01/23 16:17	09/01/23 16:33	NWT	SM 4500P E 1999
Phosphorus - total as P	1.0	mg/L		09/06/23 13:15	09/06/23 13:15	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		09/05/23 16:33	09/06/23 16:17	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.9	mg/L		09/05/23 16:33	09/06/23 16:17	NWT	Calculated - See Notes



Sample: GI00010-09

Name: FUBU

Matrix: Surface Water - Grab

Sampled: 08/31/23 15:30

Received: 09/01/23 09:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/05/23 17:26	09/05/23 17:26	TTH	EPA 350.1 REV2
Chlorophyll a	4.9	mg/m3		09/01/23 12:00	09/05/23 15:30	SDW	SM 10200H*
Nitrate-N	8.6	mg/L		09/02/23 02:44	09/02/23 02:44	CRD	EPA 300.0 REV 2.1
Nitrite-N	0.024	mg/L	H	09/07/23 10:25	09/07/23 11:02	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.94	mg/L		09/01/23 16:17	09/01/23 16:34	NWT	SM 4500P E 1999
Phosphorus - total as P	0.98	mg/L		09/06/23 13:15	09/06/23 13:15	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/05/23 16:33	09/06/23 16:18	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	8.7	mg/L		09/07/23 10:25	09/07/23 11:02	NWT	Calculated - See Notes



**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050  
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615  
TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807  
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042  
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389  
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050  
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

**Qualifiers**

H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.



Certified by: Taylor Cordle, Project Manager





**PACE ANALYTICAL SERVICES**  
 WWW.PACELABS.COM

REGULATORY PROGRAM (CIRCLE):  
 MORBCA NPDES  
 CCDD RCRA  
 TACO: RES OR IND/COMM

**CHAIN OF CUSTODY RECORD**  
 SAMPLE COLLECTED IN THE STATE OF IL

6100010

CLIENT		PROJECT LOCATION		PURCHASE ORDER #		ANALYSIS REQUESTED		REMARKS	
1	Northwater Surface Water - AQUA	PROJECT NUMBER	PHONE NUMBER	E-MAIL	DATE SHIPPED	3		4	
ADDRESS	Will County, IL Northwater Co	618-781-6629	618-781-6629	ted@northwaterco.com		Total 2		LOGIN # <u>6116</u>	
CITY	Springfield	SAMPLER (PLEASE PRINT)	Brenan Richardson			Ammonia 2		LOGGED BY: <u>[Signature]</u>	
STATE	Illinois	SAMPLER'S SIGNATURE	<u>[Signature]</u>			Nitrate 2		CLIENT:	
ZIP	62704					X Chlorophyll A		PROJECT:	
CONTACT PERSON	Ted Kratschmer	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE	MATRIX TYPE	BOTTLE COUNT	PRES CODE	PROJ. MGR.:	
2	(UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	8/13/23	1450	X	GW	3		CUSTODY SEAL #:	
BWCU			1515	X					
BWCD			1538	X					
SBRU			1723	X					
RKRD			1617	X					
SBRN			1648	X					
SBRD			1405	X					
UPDD			1200	X					
UPDU			1530	X					
PUBU									
ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)									
CHEMICAL PRESERVATION CODES: 1 - HCL 2 - H2SO4 3 - HNO3 4 - NAOH 5 - NA2S2O3 6 - UNPRESERVED 7 - OTHER									
5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH TAT IS SUBJECT TO PACE LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL PHONE									
6 DATE RESULTS NEEDED									
7 RELINQUISHED BY: (SIGNATURE) DATE 8/31/23 TIME 2013 RECEIVED BY: (SIGNATURE) DATE TIME RELINQUISHED BY: (SIGNATURE) DATE TIME RECEIVED BY: (SIGNATURE) DATE TIME									
8 COMMENTS: (FOR LAB USE ONLY) SAMPLE TEMPERATURE UPON RECEIPT 10.4 °C TEMPERATURE GUN ID YORN CHILL PROCESS STARTED PRIOR TO RECEIPT YORN SAMPLE(S) RECEIVED ON ICE YORN SAMPLE ACCEPTANCE NONCONFORMANT YORN REPORT IS NEEDED YORN DATE AND TIME TAKEN FROM SAMPLE BOTTLE									



Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

October 11, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water - Aqua

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **9/15/23 8:52 am** and logged in under work order **GI02573**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GI02573

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
YES	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



Sample: GI02573-01  
Name: SBRD  
Matrix: Surface Water - Grab

Sampled: 09/14/23 13:25  
Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:03	09/18/23 17:03	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		09/14/23 13:25	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	2.7	mg/L		09/15/23 14:18	09/15/23 17:25	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 17:25	NDM	EPA 300.0
Phosphorus - ortho as P	0.42	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.42	mg/L		09/27/23 12:37	09/27/23 12:38	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:18	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.7	mg/L		09/21/23 13:19	09/27/23 12:18	NWT	Calculated - See Notes



Sample: GI02573-02

Name: SBRU

Matrix: Surface Water - Grab

Sampled: 09/14/23 12:00

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:01	09/18/23 17:01	TTH	EPA 350.1 REV2
Chlorophyll a	5.4	mg/m3		09/14/23 12:00	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 18:02	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 18:02	NDM	EPA 300.0
Phosphorus - ortho as P	< 0.050	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	< 0.10	mg/L		09/27/23 12:37	09/27/23 12:38	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:20	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:20	NWT	Calculated - See Notes



Sample: GI02573-03

Name: RCKD

Matrix: Surface Water - Grab

Sampled: 09/14/23 13:55

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:04	09/18/23 17:04	TTH	EPA 350.1 REV2
Chlorophyll a	9.4	mg/m3		09/14/23 13:55	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	1.3	mg/L		09/15/23 14:18	09/15/23 19:36	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 19:36	NDM	EPA 300.0
Phosphorus - ortho as P	0.20	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.24	mg/L		09/27/23 12:37	09/27/23 12:39	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:21	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	1.3	mg/L		09/21/23 13:19	09/27/23 12:21	NWT	Calculated - See Notes



Sample: GI02573-04

Name: SBRM

Matrix: Surface Water - Grab

Sampled: 09/14/23 12:30

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:05	09/18/23 17:05	TTH	EPA 350.1 REV2
Chlorophyll a	1.0	mg/m3		09/14/23 12:30	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	0.63	mg/L		09/15/23 14:18	09/15/23 20:13	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 20:13	NDM	EPA 300.0
Phosphorus - ortho as P	0.11	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.16	mg/L		09/27/23 12:37	09/27/23 12:46	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:27	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:27	NWT	Calculated - See Notes



Sample: GI02573-05

Name: BWCD

Matrix: Surface Water - Grab

Sampled: 09/14/23 11:40

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:06	09/18/23 17:06	TTH	EPA 350.1 REV2
Chlorophyll a	3.2	mg/m3		09/14/23 11:40	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	5.2	mg/L		09/15/23 14:18	09/15/23 20:51	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 20:51	NDM	EPA 300.0
Phosphorus - ortho as P	0.73	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.71	mg/L		09/27/23 12:37	09/27/23 12:47	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:29	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	5.2	mg/L		09/21/23 13:19	09/27/23 12:29	NWT	Calculated - See Notes





Sample: GI02573-06

Name: BD-1

Matrix: Surface Water - Grab

Sampled: 09/14/23 11:50

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 14:05	09/18/23 14:05	TTH	EPA 350.1 REV2
Chlorophyll a	2.1	mg/m3		09/14/23 11:50	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	5.2	mg/L		09/15/23 14:18	09/15/23 21:28	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 21:28	NDM	EPA 300.0
Phosphorus - ortho as P	0.73	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.68	mg/L		09/27/23 12:37	09/27/23 12:47	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:30	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	5.2	mg/L		09/21/23 13:19	09/27/23 12:30	NWT	Calculated - See Notes



Sample: GI02573-07

Name: BWCU

Matrix: Surface Water - Grab

Sampled: 09/14/23 11:15

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:08	09/18/23 17:08	TTH	EPA 350.1 REV2
Chlorophyll a	25	mg/m3		09/14/23 11:15	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 22:05	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 22:05	NDM	EPA 300.0
Phosphorus - ortho as P	< 0.050	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	< 0.10	mg/L		09/27/23 12:37	09/27/23 12:48	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:32	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:32	NWT	Calculated - See Notes



Sample: GI02573-08

Name: UPDU

Matrix: Surface Water - Grab

Sampled: 09/14/23 08:45

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:12	09/18/23 17:12	TTH	EPA 350.1 REV2
Chlorophyll a	6.5	mg/m3		09/14/23 08:45	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	0.78	mg/L		09/15/23 14:18	09/15/23 23:39	NDM	EPA 300.0
Nitrite-N	< 0.50	mg/L		09/15/23 14:18	09/15/23 23:39	NDM	EPA 300.0
Phosphorus - ortho as P	0.96	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.95	mg/L		09/27/23 12:37	09/27/23 12:49	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L	Q3	09/21/23 13:19	09/27/23 12:33	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	< 1.0	mg/L		09/21/23 13:19	09/27/23 12:33	NWT	Calculated - See Notes



Sample: GI02573-09

Name: UPDD

Matrix: Surface Water - Grab

Sampled: 09/14/23 07:45

Received: 09/15/23 08:52

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		09/18/23 17:13	09/18/23 17:13	TTH	EPA 350.1 REV2
Chlorophyll a	1.5	mg/m3		09/14/23 07:45	09/18/23 16:00	SDW	SM 10200H*
Nitrate-N	16	mg/L		09/15/23 14:18	09/16/23 00:35	NDM	EPA 300.0
Nitrite-N	< 5.0	mg/L	X	09/15/23 14:18	09/16/23 00:35	NDM	EPA 300.0
Phosphorus - ortho as P	0.42	mg/L		09/15/23 10:59	09/15/23 10:59	MAS	SM 4500-P B E*
Phosphorus - total as P	0.43	mg/L		09/27/23 12:37	09/27/23 12:49	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.1	mg/L		09/21/23 13:19	09/27/23 12:38	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	17	mg/L		09/21/23 13:19	09/27/23 12:38	NWT	Calculated - See Notes



**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050  
TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615  
TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807  
USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042  
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389  
TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050  
Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

**Qualifiers**

- Q3 Matrix Spike/Matrix Spike Duplicate both failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
- X Elevated reporting limit due to high levels of a non-target analyte.



Certified by: Taylor Cordle, Project Manager



**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

ASH  
9-18-23

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-01</b>	<b>Water</b>	<b>Sampled:09/14/23 13:25</b>	[REDACTED]	<b>1-29</b>
Chlor a	09/27/23 16:00	10/05/23 13:25		
TKN GD	09/26/23 16:00	10/12/23 13:25		
Ammonia-N	09/27/23 16:00	10/12/23 13:25		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-02</b>	<b>Water</b>	<b>Sampled:09/14/23 12:00</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:00		
Chlor a	09/27/23 16:00	10/05/23 12:00		
TKN GD	09/26/23 16:00	10/12/23 12:00		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-03</b>	<b>Water</b>	<b>Sampled:09/14/23 13:55</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 13:55		
Chlor a	09/27/23 16:00	10/05/23 13:55		
TKN GD	09/26/23 16:00	10/12/23 13:55		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-04</b>	<b>Water</b>	<b>Sampled:09/14/23 12:30</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:30		
Chlor a	09/27/23 16:00	10/05/23 12:30		
TKN GD	09/26/23 16:00	10/12/23 12:30		
<i>Containers Supplied:</i>				

Released By	Date	Received By	Date
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Released By	Date	Received By	Date
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**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-05</b>	<b>Water</b>	<b>Sampled:09/14/23 11:40</b>	[REDACTED]	<b>1-29</b>
TKN GD	09/26/23 16:00	10/12/23 11:40		
Chlor a	09/27/23 16:00	10/05/23 11:40		
Ammonia-N	09/27/23 16:00	10/12/23 11:40		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-06</b>	<b>Water</b>	<b>Sampled:09/14/23 11:50</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 11:50		
Chlor a	09/27/23 16:00	10/05/23 11:50		
TKN GD	09/26/23 16:00	10/12/23 11:50		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-07</b>	<b>Water</b>	<b>Sampled:09/14/23 11:15</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 11:15		
Chlor a	09/27/23 16:00	10/05/23 11:15		
TKN GD	09/26/23 16:00	10/12/23 11:15		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-08</b>	<b>Water</b>	<b>Sampled:09/14/23 08:45</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 08:45		
Chlor a	09/27/23 16:00	10/05/23 08:45		
TKN GD	09/26/23 16:00	10/12/23 08:45		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-09</b>	<b>Water</b>	<b>Sampled:09/14/23 07:45</b>	[REDACTED]	<b>1-29</b>
TKN GD	09/26/23 16:00	10/12/23 07:45		
Ammonia-N	09/27/23 16:00	10/12/23 07:45		
Chlor a	09/27/23 16:00	10/05/23 07:45		
<i>Containers Supplied:</i>				

(18) containers

<i>Chris Clark</i>	9/15/23	<i>GM</i>	9-15-23
Released By	Date	Received By	Date
<i>GM</i>	9-15-23	<i>[Signature]</i>	9/15/23
Released By	Date	Received By	Date
	1450		1450



**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-05</b>	<b>Water</b>	<b>Sampled:09/14/23 11:40</b>	[REDACTED]	<b>1-29</b>
TKN GD	09/26/23 16:00	10/12/23 11:40		
Chlor a	09/27/23 16:00	10/05/23 11:40		
Ammonia-N	09/27/23 16:00	10/12/23 11:40		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-06</b>	<b>Water</b>	<b>Sampled:09/14/23 11:50</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 11:50		
Chlor a	09/27/23 16:00	10/05/23 11:50		
TKN GD	09/26/23 16:00	10/12/23 11:50		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-07</b>	<b>Water</b>	<b>Sampled:09/14/23 11:15</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 11:15		
Chlor a	09/27/23 16:00	10/05/23 11:15		
TKN GD	09/26/23 16:00	10/12/23 11:15		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-08</b>	<b>Water</b>	<b>Sampled:09/14/23 08:45</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 08:45		
Chlor a	09/27/23 16:00	10/05/23 08:45		
TKN GD	09/26/23 16:00	10/12/23 08:45		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-09</b>	<b>Water</b>	<b>Sampled:09/14/23 07:45</b>	[REDACTED]	<b>1-29</b>
TKN GD	09/26/23 16:00	10/12/23 07:45		
Ammonia-N	09/27/23 16:00	10/12/23 07:45		
Chlor a	09/27/23 16:00	10/05/23 07:45		
<i>Containers Supplied:</i>				

*18 containers*

<i>[Signature]</i>	<i>9/15/23</i>	<i>[Signature]</i>	<i>9-15-23</i>
Released By	Date	Received By	Date
<i>[Signature]</i>	<i>9-15-23</i>	<i>[Signature]</i>	<i>9/15/23</i>
Released By	Date	Received By	Date
	<i>1450</i>		<i>1450</i>

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

ASH  
9-18-23

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-01</b>	<b>Water</b>	<b>Sampled:09/14/23 13:25</b>	[REDACTED]	<b>1-29</b>
Chlor a	09/27/23 16:00	10/05/23 13:25		
TKN GD	09/26/23 16:00	10/12/23 13:25		
Ammonia-N	09/27/23 16:00	10/12/23 13:25		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-02</b>	<b>Water</b>	<b>Sampled:09/14/23 12:00</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:00		
Chlor a	09/27/23 16:00	10/05/23 12:00		
TKN GD	09/26/23 16:00	10/12/23 12:00		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-03</b>	<b>Water</b>	<b>Sampled:09/14/23 13:55</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 13:55		
Chlor a	09/27/23 16:00	10/05/23 13:55		
TKN GD	09/26/23 16:00	10/12/23 13:55		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-04</b>	<b>Water</b>	<b>Sampled:09/14/23 12:30</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:30		
Chlor a	09/27/23 16:00	10/05/23 12:30		
TKN GD	09/26/23 16:00	10/12/23 12:30		
<i>Containers Supplied:</i>				

Released By	Date	Received By	Date

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

ARCH  
 9-25-23

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-01</b>	<b>Water</b>	<b>Sampled:09/14/23 13:25</b>	[REDACTED]	<b>1-29</b>
Chlor a	09/27/23 16:00	10/05/23 13:25		
PO4 total- P	09/27/23 16:00	10/12/23 13:25		
TKN GD	09/26/23 16:00	10/12/23 13:25		
Ammonia-N	09/27/23 16:00	10/12/23 13:25		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-02</b>	<b>Water</b>	<b>Sampled:09/14/23 12:00</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:00		
Chlor a	09/27/23 16:00	10/05/23 12:00		
PO4 total- P	09/27/23 16:00	10/12/23 12:00		
TKN GD	09/26/23 16:00	10/12/23 12:00		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-03</b>	<b>Water</b>	<b>Sampled:09/14/23 13:55</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 13:55		
TKN GD	09/26/23 16:00	10/12/23 13:55		
Chlor a	09/27/23 16:00	10/05/23 13:55		
PO4 total- P	09/27/23 16:00	10/12/23 13:55		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-04</b>	<b>Water</b>	<b>Sampled:09/14/23 12:30</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:30		
Chlor a	09/27/23 16:00	10/05/23 12:30		
PO4 total- P	09/27/23 16:00	10/12/23 12:30		
TKN GD	09/26/23 16:00	10/12/23 12:30		
<i>Containers Supplied:</i>				

9 Total

Released By: Jim Clark Date: 9/21/23  
 Released By: [Signature] Date: 9/22/23 1530  
 Received By: [Signature] Date: 9/22/23 1115  
 Received By: [Signature] Date: 9/22/23 1530

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-05</b>	<b>Water</b>	<b>Sampled:09/14/23 11:40</b>	[REDACTED]	<b>1-29</b>
Chlor a	09/27/23 16:00	10/05/23 11:40		
PO4 total- P	09/27/23 16:00	10/12/23 11:40		
TKN GD	09/26/23 16:00	10/12/23 11:40		
Ammonia-N	09/27/23 16:00	10/12/23 11:40		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-06</b>	<b>Water</b>	<b>Sampled:09/14/23 11:50</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 11:50		
Chlor a	09/27/23 16:00	10/05/23 11:50		
PO4 total- P	09/27/23 16:00	10/12/23 11:50		
TKN GD	09/26/23 16:00	10/12/23 11:50		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-07</b>	<b>Water</b>	<b>Sampled:09/14/23 11:15</b>	[REDACTED]	<b>1-29</b>
PO4 total- P	09/27/23 16:00	10/12/23 11:15		
TKN GD	09/26/23 16:00	10/12/23 11:15		
Chlor a	09/27/23 16:00	10/05/23 11:15		
Ammonia-N	09/27/23 16:00	10/12/23 11:15		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-08</b>	<b>Water</b>	<b>Sampled:09/14/23 08:45</b>	[REDACTED]	<b>1-29</b>
Chlor a	09/27/23 16:00	10/05/23 08:45		
PO4 total- P	09/27/23 16:00	10/12/23 08:45		
TKN GD	09/26/23 16:00	10/12/23 08:45		
Ammonia-N	09/27/23 16:00	10/12/23 08:45		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-09</b>	<b>Water</b>	<b>Sampled:09/14/23 07:45</b>	[REDACTED]	<b>1-29</b>
TKN GD	09/26/23 16:00	10/12/23 07:45		
Ammonia-N	09/27/23 16:00	10/12/23 07:45		
Chlor a	09/27/23 16:00	10/05/23 07:45		
PO4 total- P	09/27/23 16:00	10/12/23 07:45		
<i>Containers Supplied:</i>				

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-05</b>				
Water		Sampled:09/14/23 11:40		1-29
Chlor a	09/27/23 16:00	10/05/23 11:40		
PO4 total- P	09/27/23 16:00	10/12/23 11:40		
TKN GD	09/26/23 16:00	10/12/23 11:40		
Ammonia-N	09/27/23 16:00	10/12/23 11:40		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GI02573-06</b>				
Water		Sampled:09/14/23 11:50		1-29
Ammonia-N	09/27/23 16:00	10/12/23 11:50		
Chlor a	09/27/23 16:00	10/05/23 11:50		
PO4 total- P	09/27/23 16:00	10/12/23 11:50		
TKN GD	09/26/23 16:00	10/12/23 11:50		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GI02573-07</b>				
Water		Sampled:09/14/23 11:15		1-29
PO4 total- P	09/27/23 16:00	10/12/23 11:15		
TKN GD	09/26/23 16:00	10/12/23 11:15		
Chlor a	09/27/23 16:00	10/05/23 11:15		
Ammonia-N	09/27/23 16:00	10/12/23 11:15		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GI02573-08</b>				
Water		Sampled:09/14/23 08:45		1-29
Chlor a	09/27/23 16:00	10/05/23 08:45		
PO4 total- P	09/27/23 16:00	10/12/23 08:45		
TKN GD	09/26/23 16:00	10/12/23 08:45		
Ammonia-N	09/27/23 16:00	10/12/23 08:45		
<i>Containers Supplied:</i>				
<hr/>				
<b>Sample ID: GI02573-09</b>				
Water		Sampled:09/14/23 07:45		1-29
TKN GD	09/26/23 16:00	10/12/23 07:45		
Ammonia-N	09/27/23 16:00	10/12/23 07:45		
Chlor a	09/27/23 16:00	10/05/23 07:45		
PO4 total- P	09/27/23 16:00	10/12/23 07:45		
<i>Containers Supplied:</i>				

Released By	Date	Received By	Date

**SUBCONTRACT ORDER**  
**Pace Analytical Services, LLC**  
**GI02573**

ASH  
9-25-23

**SENDING LABORATORY:**

Pace Analytical Services, LLC  
 2231 West Altorfer Drive  
 Peoria, IL 61615  
 Phone: (309) 692-9688  
 Fax: (309) 692-9689  
 Project Manager: Taylor Cordle

**RECEIVING LABORATORY:**

Pace Analytical Services, LLC - Peoria  
 2231 W Altorfer Dr  
 Peoria, IL 61615  
 Phone : (309) 692-9688  
 Fax: (309) 692-9689

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: GI02573-01</b>	<b>Water</b>	<b>Sampled:09/14/23 13:25</b>	[REDACTED]	<b>1-29</b>
Chlor a	09/27/23 16:00	10/05/23 13:25		
PO4 total- P	09/27/23 16:00	10/12/23 13:25		
TKN GD	09/26/23 16:00	10/12/23 13:25		
Ammonia-N	09/27/23 16:00	10/12/23 13:25		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-02</b>	<b>Water</b>	<b>Sampled:09/14/23 12:00</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:00		
Chlor a	09/27/23 16:00	10/05/23 12:00		
PO4 total- P	09/27/23 16:00	10/12/23 12:00		
TKN GD	09/26/23 16:00	10/12/23 12:00		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-03</b>	<b>Water</b>	<b>Sampled:09/14/23 13:55</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 13:55		
TKN GD	09/26/23 16:00	10/12/23 13:55		
Chlor a	09/27/23 16:00	10/05/23 13:55		
PO4 total- P	09/27/23 16:00	10/12/23 13:55		
<i>Containers Supplied:</i>				
<b>Sample ID: GI02573-04</b>	<b>Water</b>	<b>Sampled:09/14/23 12:30</b>	[REDACTED]	<b>1-29</b>
Ammonia-N	09/27/23 16:00	10/12/23 12:30		
Chlor a	09/27/23 16:00	10/05/23 12:30		
PO4 total- P	09/27/23 16:00	10/12/23 12:30		
TKN GD	09/26/23 16:00	10/12/23 12:30		
<i>Containers Supplied:</i>				

9 Total

Released By: Jim Clark Date: 9/21/23  
 Released By: [Signature] Date: 9/22/23 1530  
 Received By: [Signature] Date: 9/22/23 1115  
 Received By: [Signature] Date: 9/22/23 510



Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

October 19, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water - Aqua

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **9/27/23 3:05 pm** and logged in under work order **G104808**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise . We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GI04808

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided





Sample: GI04808-01  
Name: SBRD  
Matrix: Surface Water - Grab

Sampled: 09/26/23 12:30  
Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:19	10/02/23 16:19	TTH	EPA 350.1 REV2
Chlorophyll a	13	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	2.5	mg/L		10/06/23 13:16	10/06/23 13:16	CGL	EPA 353.2 REV 2
Nitrate-N	2.6	mg/L		09/27/23 19:53	09/27/23 19:53	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.23	mg/L		09/27/23 18:01	09/27/23 18:01	CRD	SM 4500P E 1999
Phosphorus - total as P	0.27	mg/L		10/04/23 11:24	10/04/23 11:24	TTH	SM 4500P F 1999
Total Nitrogen	2.5	mg/L		10/06/23 13:16	10/06/23 13:16	CGL	Calculated - See Notes



Sample: GI04808-02

Name: RCKD

Matrix: Surface Water - Grab

Sampled: 09/26/23 13:00

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:38	10/02/23 16:38	TTH	EPA 350.1 REV2
Chlorophyll a	17	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	1.9	mg/L		10/06/23 11:47	10/06/23 11:47	CGL	EPA 353.2 REV 2
Nitrate-N	2.0	mg/L		09/27/23 20:29	09/27/23 20:29	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.19	mg/L		09/27/23 17:55	09/27/23 17:55	CRD	SM 4500P E 1999
Phosphorus - total as P	0.24	mg/L		10/04/23 11:25	10/04/23 11:25	TTH	SM 4500P F 1999
Total Nitrogen	1.9	mg/L		10/06/23 11:47	10/06/23 11:47	CGL	Calculated - See Notes



Sample: GI04808-03

Name: UPDD

Matrix: Surface Water - Grab

Sampled: 09/26/23 07:38

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	0.17	mg/L		10/02/23 16:39	10/02/23 16:39	TTH	EPA 350.1 REV2
Chlorophyll a	13	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	13	mg/L		10/06/23 12:33	10/06/23 12:33	CGL	EPA 353.2 REV 2
Nitrate-N	13	mg/L		09/27/23 21:42	09/27/23 21:42	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.24	mg/L		09/27/23 17:56	09/27/23 17:56	CRD	SM 4500P E 1999
Phosphorus - total as P	0.34	mg/L		10/04/23 11:26	10/04/23 11:26	TTH	SM 4500P F 1999
Total Nitrogen	13	mg/L		10/06/23 12:33	10/06/23 12:33	CGL	Calculated - See Notes



Sample: GI04808-04

Name: BWCU

Matrix: Surface Water - Grab

Sampled: 09/26/23 10:20

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:39	10/02/23 16:39	TTH	EPA 350.1 REV2
Chlorophyll a	13	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	0.52	mg/L		10/06/23 13:17	10/06/23 13:17	CGL	EPA 353.2 REV 2
Nitrate-N	0.54	mg/L		09/27/23 22:00	09/27/23 22:00	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		09/27/23 17:56	09/27/23 17:56	CRD	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		10/04/23 11:31	10/04/23 11:31	TTH	SM 4500P F 1999
Total Nitrogen	0.52	mg/L		10/06/23 13:17	10/06/23 13:17	CGL	Calculated - See Notes



Sample: GI04808-05

Name: UPDU

Matrix: Surface Water - Grab

Sampled: 09/26/23 08:40

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:43	10/02/23 16:43	TTH	EPA 350.1 REV2
Chlorophyll a	17	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	0.46	mg/L		10/06/23 13:18	10/06/23 13:18	CGL	EPA 353.2 REV 2
Nitrate-N	0.59	mg/L		09/27/23 22:36	09/27/23 22:36	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.47	mg/L		09/27/23 17:57	09/27/23 17:57	CRD	SM 4500P E 1999
Phosphorus - total as P	0.62	mg/L		10/04/23 11:31	10/04/23 11:31	TTH	SM 4500P F 1999
Total Nitrogen	0.46	mg/L		10/06/23 13:18	10/06/23 13:18	CGL	Calculated - See Notes



Sample: GI04808-06

Name: SBRU

Matrix: Surface Water - Grab

Sampled: 09/26/23 11:15

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:44	10/02/23 16:44	TTH	EPA 350.1 REV2
Chlorophyll a	12	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate-N	< 0.03	mg/L		09/27/23 23:12	09/27/23 23:12	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		09/27/23 17:57	09/27/23 17:57	CRD	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		10/04/23 11:32	10/04/23 11:32	TTH	SM 4500P F 1999
Total Nitrogen	< 0.030	mg/L		09/27/23 23:12	09/27/23 23:12	CRD	Calculated - See Notes



Sample: G104808-07

Name: BD-1

Matrix: Surface Water - Grab

Sampled: 09/26/23 11:25

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:45	10/02/23 16:45	TTH	EPA 350.1 REV2
Chlorophyll a	11	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate-N	< 0.03	mg/L		09/27/23 23:48	09/27/23 23:48	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	< 0.020	mg/L		09/27/23 17:58	09/27/23 17:58	CRD	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		10/04/23 11:33	10/04/23 11:33	TTH	SM 4500P F 1999
Total Nitrogen	< 0.030	mg/L		09/27/23 23:48	09/27/23 23:48	CRD	Calculated - See Notes



Sample: GI04808-08

Name: BWCD

Matrix: Surface Water - Grab

Sampled: 09/26/23 10:45

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:46	10/02/23 16:46	TTH	EPA 350.1 REV2
Chlorophyll a	12	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	4.8	mg/L		10/06/23 13:19	10/06/23 13:19	CGL	EPA 353.2 REV 2
Nitrate-N	5.7	mg/L		09/28/23 01:19	09/28/23 01:19	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.76	mg/L		09/27/23 17:59	09/27/23 17:59	CRD	SM 4500P E 1999
Phosphorus - total as P	0.83	mg/L		10/04/23 11:33	10/04/23 11:33	TTH	SM 4500P F 1999
Total Nitrogen	4.8	mg/L		10/06/23 13:19	10/06/23 13:19	CGL	Calculated - See Notes





Sample: GI04808-09

Name: SBRM

Matrix: Surface Water - Grab

Sampled: 09/26/23 11:35

Received: 09/27/23 15:05

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		10/02/23 16:50	10/02/23 16:50	TTH	EPA 350.1 REV2
Chlorophyll a	13	mg/m3		09/27/23 17:15	10/05/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	0.90	mg/L		10/06/23 11:51	10/06/23 11:51	CGL	EPA 353.2 REV 2
Nitrate-N	0.96	mg/L		09/28/23 01:37	09/28/23 01:37	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.062	mg/L		09/27/23 17:59	09/27/23 17:59	CRD	SM 4500P E 1999
Phosphorus - total as P	0.12	mg/L		10/04/23 11:35	10/04/23 11:35	TTH	SM 4500P F 1999
Total Nitrogen	0.90	mg/L		10/06/23 11:51	10/06/23 11:51	CGL	Calculated - See Notes



**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050



Certified by: Taylor Cordle, Project Manager

**CHAIN-OF-CUSTODY Analytical Request Document**  
 Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hub/spas-standard-terms.pdf>  
 Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields.

Company: Northwater Consulting  
 Address: 960 Clocktower Dr, Ste. F, Springfield IL  
 Report To: ted@northwaterco.com  
 Copy To: jeff@northwaterco.com  
 Email To: jeff@northwaterco.com  
 Site Collection Info/Address: Will County, IL  
 State: IL / County/City: [ ] PT [ ] MT [ ] CT [ ] VT [ ] NY [ ] NJ [ ] PA [ ] OH [ ] WV [ ] KY [ ] TN [ ] MS [ ] AL [ ] GA [ ] SC [ ] NC [ ] VA [ ] MD [ ] DE [ ] DC [ ] HI [ ] AK [ ] VT [ ] NH [ ] ME [ ]

Customer Project Name/Number: Northwater Surface Water Monitoring - AAVA  
 Site/Facility ID #: 618-781-6629  
 Phone: 618-781-6629  
 Email: ted@northwaterco.com  
 Collected By (Print): [Signature]  
 Collected By (Signature): [Signature]  
 Sample Disposal: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day  
 Dispose as appropriate [ ] Return [ ] Archive  
 Hold: [ ]  
 \* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET [ ] AT [ ]  
 Compliance Monitoring? [ ] Yes [x] No  
 DW PWS ID #: [ ]  
 DW Location Code: [ ]  
 Immediately Packed on Ice: [x] Yes [ ] No  
 Field Filtered (if applicable): [ ] Yes [ ] No  
 Analysis: [ ]  
 Container Type: Plastic (P) or Glass (G)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date Time		Volume filtered	Res CI	# of Ctns
			Date	Time			
SBRD	SW	Grab	9/26/23	12:30			3
RCKD	SW	Grab	9/26/23	13:00			3
UPDD	SW	Grab	9/26/23	7:38			3
BWCV	SW	Grab	9/26/23	10:20			3
UPDU	SW	Grab	9/26/23	8:40			3
SBRV	SW	Grab	9/26/23	11:15			3
BD-1	SW	Grab	9/26/23	11:25			3
BWGD	SW	Grab	9/26/23	10:46			3
SBRM	SW	Grab	9/26/23	11:35			3

Customer Remarks / Special Conditions / Possible Hazards: Taylor Cordle - Pace rep

Type of Ice Used: Wet Blue Dry None

Packing Material Used: [ ]  
 Radchem sample(s) screened (<500 cpm): Y N NA

Received by Company: (Signature) [Signature] Date/Time: 9/26/23 16:45  
 Received by Company: (Signature) [Signature] Date/Time: 9/27/23 15:05  
 Received by Company: (Signature) [Signature] Date/Time: [ ]

Lab Profile/Line: [ ]  
 Lab Sample Receipt Checklist:  
 Custody Signatures Present: Y N NA  
 Collector Signatures Present: Y N NA  
 Bottles Intact: Y N NA  
 Corrupt Bottles: Y N NA  
 Sufficient Volume: Y N NA  
 Samples Weighed on Ice: Y N NA  
 VOA \* Headspace Acceptable: Y N NA  
 USPA Required Solids: Y N NA  
 Samples in Holding Time: Y N NA  
 Residual Chlorine Present: Y N NA  
 Cl Strips: Y N NA  
 pH Strips: Y N NA  
 Sulfide Present: Y N NA  
 Lead Acetate Strip: Y N NA  
 Lab USE ONLY:  
 Lab Sample #: [ ]  
 Comment: [ ]

Lab Sample Temperature Info:  
 Temp Blank Received: Y N NA  
 Therm ID: [ ]  
 Cooler Temp: [ ]  
 Cooler Therm Corr. Factor: [ ]  
 Cooler Corrected Temp: [ ]  
 Comments: [ ]

Short Holds Present (<72 hours): Y N N/A  
 Lab Tracking #: [ ]  
 Samples received via: FEDEX UPS Client Courier Pace Courier  
 Date/Time: 9/27/23 15:05  
 Date/Time: [ ]  
 Date/Time: 9/27/23 15:05

Table #: [ ]  
 Accum: [ ]  
 Template: [ ]  
 Prelogin: [ ]  
 PM: [ ]  
 PB: [ ]

Trip Blank Received: Y N NA  
 HCL MeOH TSP Other  
 Non Conformance(s): YES / NO Page: [ ] of: [ ]

Page

Time

n Date

ID

y Name



Pace Analytical Services, LLC

2231 W. Altorfer Drive

Peoria, IL 61615

(800)752-6651

November 02, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water - Aqua

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **10/12/23 5:00 pm** and logged in under work order **GJ02481**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order GJ02481

---

YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
YES	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided



**ANALYTICAL RESULTS**

**Sample:** GJ02481-01  
**Name:** UPDU  
**Matrix:** Ground Water

**Sampled:** 10/11/23 10:05  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	< 1.0	mg/L		10/27/23 12:42	10	1.0	10/27/23 12:42	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	< 1.0	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:30	1	0.10	10/19/23 12:30	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	0.83	mg/L	Pc	10/27/23 12:42	10	0.20	10/27/23 12:42	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.94	mg/L	Q3	10/13/23 09:31	1	0.020	10/13/23 09:49	CRD	SM 4500P E 1999
Phosphorus - total as P	0.92	mg/L		10/18/23 11:35	1	0.10	10/18/23 11:35	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		10/24/23 09:03	1	1.0	10/25/23 15:58	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	0.80	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*

**Sample:** GJ02481-02  
**Name:** UPDD  
**Matrix:** Ground Water

**Sampled:** 10/11/23 10:55  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	24	mg/L		10/27/23 13:24	50	1.0	10/27/23 13:24	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	1.7	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:31	1	0.10	10/19/23 12:31	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	23	mg/L	Pc	10/27/23 13:24	50	1.0	10/27/23 13:24	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.44	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:06	CRD	SM 4500P E 1999
Phosphorus - total as P	0.44	mg/L		10/18/23 11:36	1	0.10	10/18/23 11:36	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.1	mg/L		10/24/23 09:03	1	1.0	10/25/23 15:59	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	23	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*



**ANALYTICAL RESULTS**

**Sample:** GJ02481-03  
**Name:** BD1  
**Matrix:** Ground Water

**Sampled:** 10/11/23 11:00  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	21	mg/L		10/27/23 12:51	10	1.0	10/27/23 12:51	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	1.4	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:32	1	0.10	10/19/23 12:32	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	20	mg/L	Pc	10/27/23 12:51	10	0.20	10/27/23 12:51	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.44	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:07	CRD	SM 4500P E 1999
Phosphorus - total as P	0.38	mg/L		10/18/23 11:37	1	0.10	10/18/23 11:37	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:37	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	20	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*

**Sample:** GJ02481-04  
**Name:** BUCU  
**Matrix:** Ground Water

**Sampled:** 10/11/23 11:40  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	2.8	mg/L		10/27/23 12:51	10	1.0	10/27/23 12:51	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	1.4	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:33	1	0.10	10/19/23 12:33	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	1.5	mg/L	Pc	10/27/23 12:51	10	0.20	10/27/23 12:51	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:08	CRD	SM 4500P E 1999
Phosphorus - total as P	0.15	mg/L		10/18/23 11:37	1	0.10	10/18/23 11:37	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:39	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	1.5	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*





**ANALYTICAL RESULTS**

**Sample:** GJ02481-05  
**Name:** BWCD  
**Matrix:** Ground Water

**Sampled:** 10/11/23 12:05  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	6.4	mg/L		10/27/23 12:52	10	1.0	10/27/23 12:52	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	< 1.0	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:34	1	0.10	10/19/23 12:34	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	6.4	mg/L	Pc	10/27/23 12:52	10	0.20	10/27/23 12:52	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.73	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:09	CRD	SM 4500P E 1999
Phosphorus - total as P	0.58	mg/L		10/18/23 11:38	1	0.10	10/18/23 11:38	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:40	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	6.4	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*

**Sample:** GJ02481-06  
**Name:** SBRU  
**Matrix:** Ground Water

**Sampled:** 10/11/23 13:25  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	< 1.0	mg/L		10/27/23 12:53	10	1.0	10/27/23 12:53	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	8.7	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:35	1	0.10	10/19/23 12:35	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	< 0.20	mg/L	Pc	10/27/23 12:53	10	0.20	10/27/23 12:53	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	< 0.020	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:10	CRD	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		10/18/23 11:39	1	0.10	10/18/23 11:39	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:42	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	< 0.020	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*



**ANALYTICAL RESULTS**

**Sample:** GJ02481-07  
**Name:** SBRM  
**Matrix:** Ground Water

**Sampled:** 10/11/23 13:45  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	< 1.0	mg/L		10/27/23 12:54	10	1.0	10/27/23 12:54	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	2.7	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:39	1	0.10	10/19/23 12:39	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	0.99	mg/L	Pc	10/27/23 12:54	10	0.20	10/27/23 12:54	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.068	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:10	CRD	SM 4500P E 1999
Phosphorus - total as P	0.11	mg/L		10/18/23 11:39	1	0.10	10/18/23 11:39	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:43	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	0.99	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*

**Sample:** GJ02481-08  
**Name:** SBRD  
**Matrix:** Ground Water

**Sampled:** 10/11/23 14:45  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	4.0	mg/L		10/27/23 12:57	10	1.0	10/27/23 12:57	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	1.4	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:40	1	0.10	10/19/23 12:40	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	3.0	mg/L	Pc	10/27/23 12:57	10	0.20	10/27/23 12:57	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.25	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:11	CRD	SM 4500P E 1999
Phosphorus - total as P	0.23	mg/L		10/18/23 11:40	1	0.10	10/18/23 11:40	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:57	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	3.0	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*



**ANALYTICAL RESULTS**

**Sample:** GJ02481-09  
**Name:** SBKD  
**Matrix:** Ground Water

**Sampled:** 10/11/23 15:15  
**Received:** 10/12/23 17:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>General Chemistry - PIA</b>									
Total Nitrogen	3.5	mg/L		10/27/23 12:57	10	1.0	10/27/23 12:57	NWT	Calculated - See Notes
<b>Microbiology - PIA</b>									
Chlorophyll a	2.5	mg/m3		10/13/23 09:45	1	1.0	10/16/23 15:30	SDW	SM 10200H*
<b>Nutrients - PIA</b>									
Ammonia-N	< 0.10	mg/L		10/19/23 12:41	1	0.10	10/19/23 12:41	TTH	EPA 350.1 REV2
Nitrate/Nitrite-N	2.4	mg/L	Pc	10/27/23 12:57	10	0.20	10/27/23 12:57	CGL	EPA 353.2 REV 2
Phosphorus - ortho as P	0.097	mg/L		10/13/23 09:31	1	0.020	10/13/23 10:12	CRD	SM 4500P E 1999
Phosphorus - total as P	0.14	mg/L		10/18/23 11:45	1	0.10	10/18/23 11:45	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		10/18/23 10:12	1	1.0	10/18/23 17:58	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Nitrate-N	2.4	mg/L		10/23/23 13:36	1	0.020	10/30/23 14:00	WJM	Calc - See Notes*



NOTES

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

Certifications

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

Qualifiers

Pc Chemical preservation discrepancy noted at the time of analysis

Q3 Matrix Spike/Matrix Spike Duplicate both failed % recovery acceptance limits. The associated blank spike recovery was acceptable.

Gail G Schindler



Certified by: Gail Schindler For Taylor Cordle, Project Manager



### CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/libfs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or  
MTJL Log-in Number Here **6202481**

Company: Northwater Consulting  
 Address: 960 Clocktower Dr, Ste. F, Springfield IL  
 Report To: ted@northwaterco.com  
 Copy To: jeff@northwaterco.com  
 Billing Information:  
 Email To: jeff@northwaterco.com  
 Site Collection Info/Address:  
 Will County, IL

Customer Project Name/Number:  
**Northwater Surface Water Monitoring**  
 Phone: 618-781-6629  
 Email: ted@northwaterco.com  
 Collected By (print):  
 Collected By (signature):  
 Sample Disposal:  
 Dispose as appropriate  
 Return  
 Archive:  
 Hold:  
 State: IL / County/City:  
 Time Zone Collected:  
 PT  MT  CT  ET  
 Compliance Monitoring?  
 Yes  No  
 DW PWS ID #:  
 DW Location Code:  
 Immediately Packed on Ice:  
 Yes  No  
 Field Filtered (if applicable):  
 Yes  No  
 Analysis:  
 Purchase Order #:  
 Quote #:  
 Turnaround Date Required:  
 Rush: (Expedite Charges Apply)  
 Same Day  Next Day  
 2 Day  3 Day  
 4 Day  5 Day

\* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Volume filtered	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)	NITRATE N	TOTAL N	AMMONIA N	TOTAL PHOSPHORUS	ORTHOPHOSPHATE	CHLOROPHYLL A
			Date	Time										
UPDU	GW	G-rab	10/11/23	10:05			3	P	X	X	X	X	X	X
UPDD	GW	G-rab	10/11/23	10:44			3	P	X	X	X	X	X	X
BDA	GW	G-rab	10/11/23	11:00			3	P	X	X	X	X	X	X
BUCH	GW	G-rab	10/11/23	11:40			3	P	X	X	X	X	X	X
BUCD	GW	G-rab	10/11/23	12:05			3	P	X	X	X	X	X	X
SBRU	GW	G-rab	10/11/23	13:25			3	P	X	X	X	X	X	X
SBRM	GW	G-rab	10/11/23	13:45			3	P	X	X	X	X	X	X
SBRD	GW	G-rab	10/11/23	14:45			3	P	X	X	X	X	X	X
RCKD	GW	G-rab	10/11/23	15:15			3	P	X	X	X	X	X	X

Container Preservative Type \*\*  
 Lab Project Manager:  
 \*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses

Lab Profile/Line:
Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips:
Sample pH Acceptable Y N NA
pH Strips:
Sulfide Present: Y N NA
Lead Acetate Strips:
LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:  
 Taylor Cordle - Pace rep  
 Type of Ice Used: Wet Blue Dry None  
 Packing Material Used:  
 Radchem sample(s) screened (<500 cpm): Y N NA  
 SHORT HOLDS PRESENT (<72 hours): Y N N/A  
 Lab Tracking #:  
 Samples received via:  
 FEDEX UPS Client Courier Pace Courier

Relinquished by/Company: (Signature) Date/Time: 10/11/23 1804 Received by/Company: (Signature) Date/Time: 10/12/23 1500  
 Relinquished by/Company: (Signature) Date/Time: 10/12/23 1700 Received by/Company: (Signature) Date/Time: 10/12/23 1700  
 Relinquished by/Company: (Signature) Date/Time: Received by/Company: (Signature) Date/Time:  
 MTJL LAB USE ONLY  
 Table #:  
 Acctnum:  
 Template:  
 Prelogin:  
 PM:  
 PB:  
 Trip Blank Received: Y N NA  
 HCL MeOH TSP Other  
 Non Conformance(s): YES / NO Page: of:





Pace Analytical Services, LLC  
2231 W. Altorfer Drive  
Peoria, IL 61615  
(800)752-6651

November 28, 2023

Ted Kratschmer  
Northwater Consulting  
960 Clocktower Drive Suite F  
Springfield, IL 62704

RE: Northwater Surface Water - Aqua

Dear Ted Kratschmer:

Please find enclosed the analytical results for the **9** sample(s) the laboratory received on **11/3/23 8:00 am** and logged in under work order **GK00557**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Pace Analytical Services, LLC.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

Pace Analytical Services appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the General Manager, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or [lisa.grant@pacelabs.com](mailto:lisa.grant@pacelabs.com).



Taylor Cordle  
Project Manager  
(309)683-1793  
[taylor.cordle@pacelabs.com](mailto:taylor.cordle@pacelabs.com)



**SAMPLE RECEIPT CHECK LIST**

Items not applicable will be marked as in compliance

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Work Order    GK00557

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YES	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
YES	Sampler name & signature present
YES	Unique sample IDs assigned
YES	Sample collection location recorded
YES	Date & time collected recorded on COC
YES	Relinquished by client signature on COC
YES	COC & labels match
YES	Sample labels are legible
YES	Appropriate bottle(s) received
YES	Sufficient sample volume received
YES	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
YES	All non-field analyses received within holding times
NO	Short hold time analysis
YES	Current PDC COC submitted
NO	Case narrative provided





Sample: GK00557-01  
Name: SBRD  
Matrix: Surface Water - Grab

Sampled: 11/02/23 11:40  
Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:46	11/14/23 15:46	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 11:40	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	4.2	mg/L		11/10/23 16:15	11/10/23 16:15	CGL	EPA 353.2 REV 2
Nitrate-N	5.6	mg/L		11/03/23 11:48	11/03/23 11:48	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.12	mg/L		11/03/23 15:43	11/03/23 16:15	NWT	SM 4500P E 1999
Phosphorus - total as P	0.15	mg/L		11/08/23 12:26	11/08/23 12:26	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		11/03/23 09:33	11/09/23 12:00	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	4.2	mg/L		11/10/23 16:15	11/10/23 16:15	NWT	Calculated - See Notes



Sample: GK00557-02  
Name: UPDU  
Matrix: Surface Water - Grab

Sampled: 11/02/23 10:40

Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:50	11/14/23 15:50	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 10:40	11/10/23 15:30	SDW	SM 10200H*
Nitrate-N	0.72	mg/L		11/03/23 12:06	11/03/23 12:06	CRD	EPA 300.0 REV 2.1
Nitrite-N	< 0.20	mg/L		11/03/23 12:24	11/03/23 12:24	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.25	mg/L		11/03/23 15:43	11/03/23 16:16	NWT	SM 4500P E 1999
Phosphorus - total as P	0.34	mg/L		11/08/23 12:26	11/08/23 12:26	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.6	mg/L		11/03/23 09:33	11/09/23 12:09	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	2.3	mg/L		11/03/23 12:24	11/09/23 12:09	NWT	Calculated - See Notes



Sample: GK00557-03  
Name: UPDD  
Matrix: Surface Water - Grab

Sampled: 11/02/23 10:00

Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:51	11/14/23 15:51	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 10:00	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	5.8	mg/L		11/10/23 16:18	11/10/23 16:18	CGL	EPA 353.2 REV 2
Nitrate-N	7.0	mg/L		11/03/23 12:42	11/03/23 12:42	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.24	mg/L		11/03/23 15:43	11/03/23 16:17	NWT	SM 4500P E 1999
Phosphorus - total as P	0.32	mg/L		11/08/23 12:27	11/08/23 12:27	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	2.2	mg/L		11/03/23 09:33	11/09/23 12:10	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	7.9	mg/L		11/10/23 16:18	11/10/23 16:18	NWT	Calculated - See Notes



Sample: GK00557-04  
Name: BWCU  
Matrix: Surface Water - Grab

Sampled: 11/02/23 09:25  
Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:55	11/14/23 15:55	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 09:25	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	4.7	mg/L		11/10/23 16:21	11/10/23 16:21	CGL	EPA 353.2 REV 2
Nitrate-N	5.2	mg/L		11/03/23 13:37	11/03/23 13:37	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.053	mg/L		11/03/23 15:43	11/03/23 16:18	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		11/08/23 12:28	11/08/23 12:28	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		11/03/23 09:33	11/09/23 12:12	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	4.7	mg/L		11/10/23 16:21	11/10/23 16:21	NWT	Calculated - See Notes



Sample: GK00557-05

Name: BWCD

Matrix: Surface Water - Grab

Sampled: 11/02/23 08:50

Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:56	11/14/23 15:56	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 08:50	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	5.1	mg/L		11/10/23 16:21	11/10/23 16:21	CGL	EPA 353.2 REV 2
Nitrate-N	5.6	mg/L		11/03/23 14:13	11/03/23 14:13	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.16	mg/L		11/03/23 15:43	11/03/23 16:18	NWT	SM 4500P E 1999
Phosphorus - total as P	0.18	mg/L		11/08/23 12:28	11/08/23 12:28	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		11/03/23 09:33	11/09/23 12:13	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	6.1	mg/L		11/10/23 16:21	11/10/23 16:21	NWT	Calculated - See Notes



Sample: GK00557-06  
Name: SBRU  
Matrix: Surface Water - Grab

Sampled: 11/02/23 08:10  
Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:57	11/14/23 15:57	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 08:10	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	5.6	mg/L		11/10/23 16:22	11/10/23 16:22	CGL	EPA 353.2 REV 2
Nitrate-N	6.7	mg/L		11/03/23 19:47	11/03/23 19:47	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.044	mg/L		11/03/23 15:43	11/03/23 16:18	NWT	SM 4500P E 1999
Phosphorus - total as P	< 0.10	mg/L		11/08/23 11:20	11/08/23 11:20	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		11/03/23 09:33	11/09/23 12:15	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	5.6	mg/L		11/10/23 16:22	11/10/23 16:22	NWT	Calculated - See Notes



Sample: GK00557-07

Name: SBRM

Matrix: Surface Water - Grab

Sampled: 11/02/23 07:35

Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:58	11/14/23 15:58	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 07:35	11/10/23 15:30	SDW	SM 10200H*
Nitrate-N	5.3	mg/L		11/03/23 20:23	11/03/23 20:23	CRD	EPA 300.0 REV 2.1
Nitrite-N	0.25	mg/L		11/03/23 20:23	11/03/23 20:23	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.069	mg/L		11/03/23 15:43	11/03/23 16:18	NWT	SM 4500P E 1999
Phosphorus - total as P	0.12	mg/L		11/08/23 11:22	11/08/23 11:22	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	1.0	mg/L		11/03/23 09:33	11/09/23 12:16	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	6.6	mg/L		11/03/23 20:23	11/09/23 12:16	NWT	Calculated - See Notes



Sample: GK00557-08

Name: RCKD

Matrix: Surface Water - Grab

Sampled: 11/02/23 12:10

Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:59	11/14/23 15:59	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 12:10	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	4.5	mg/L		11/10/23 16:23	11/10/23 16:23	CGL	EPA 353.2 REV 2
Nitrate-N	5.6	mg/L		11/03/23 21:35	11/03/23 21:35	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.083	mg/L		11/03/23 15:43	11/03/23 16:19	NWT	SM 4500P E 1999
Phosphorus - total as P	0.11	mg/L		11/08/23 11:23	11/08/23 11:23	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		11/03/23 09:33	11/09/23 12:18	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	4.5	mg/L		11/10/23 16:23	11/10/23 16:23	NWT	Calculated - See Notes





Sample: GK00557-09  
Name: BD-1  
Matrix: Surface Water - Grab

Sampled: 11/02/23 11:50  
Received: 11/03/23 08:00

**ANALYTICAL RESULTS FROM Pace Analytical Services, LLC**

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Ammonia-N	< 0.10	mg/L		11/14/23 15:59	11/14/23 15:59	TTH	EPA 350.1 REV2
Chlorophyll a	< 1.0	mg/m3		11/02/23 11:50	11/10/23 15:30	SDW	SM 10200H*
Nitrate/Nitrite-N	3.9	mg/L		11/10/23 16:24	11/10/23 16:24	CGL	EPA 353.2 REV 2
Nitrate-N	5.5	mg/L		11/03/23 22:11	11/03/23 22:11	CRD	EPA 300.0 REV 2.1
Phosphorus - ortho as P	0.11	mg/L		11/03/23 15:43	11/03/23 16:20	NWT	SM 4500P E 1999
Phosphorus - total as P	0.13	mg/L		11/08/23 11:23	11/08/23 11:23	TTH	SM 4500P F 1999
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		11/03/23 09:33	11/09/23 12:19	NWT	OIA/PAI-DK03 & EPA 351.2 REV 2
Total Nitrogen	3.9	mg/L		11/10/23 16:24	11/10/23 16:24	NWT	Calculated - See Notes



**NOTES**

Specifications regarding method revisions, method modifications, and calculations used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050



Certified by: Taylor Cordle, Project Manager



### CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubfs/pas-standard-terms.pdf>  
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here **OK 00357**

**ALL BOLD OUTLINED AREAS are for LAB USE ONLY**

Company: Northwater Consulting  
 Address: 960 Clocktower Dr, Ste. F, Springfield IL  
 Report To: ted@northwaterco.com  
 Copy To: jeff@northwaterco.com  
 Billing Information:  
 Email To: jeff@northwaterco.com  
 Site Collection Info/Address: Will County, IL  
 State: IL / County/City: Time Zone Collected: [ ] PT [ ] MT [  CT [ ] ET  
 Customer Project Name/Number: Northwater Surface Water Monitoring - Aqua  
 Phone: 618-781-6629 Site/Facility ID #: Compliance Monitoring? [ ] Yes [  ] No  
 Email: ted@northwaterco.com  
 Collected By (pint): Ted Krafschmer Purchase Order #: DW PWS ID #:  
 Collected By (signature): Turnaround Date Required: DW Location Code:  
 Sample Disposal: Rush: (Expedite Charges Apply) Field Filtered (if applicable):  
 Dispose as appropriate [ ] Same Day [ ] Next Day [ ] Yes [  ] No  
 Return [ ] 2 Day [ ] 3 Day [ ] Yes [ ] No  
 Archive: [ ] 4 Day [ ] 5 Day  
 Hold: Analysis:

Container Preservative Type \*\*  
 Lab Project Manager:  
 \*\* Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

\* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Volume filtered	Res Cl	# of Ctns
			Date	Time			
SBRD	SW	Grab	11/2/23	11:40			3
UPDU	SW	Grab	11/2/23	10:40			3
UPDD	SW	Grab	11/2/23	10:00			3
BWCU	SW	Grab	11/2/23	9:25			3
BWCD	SW	Grab	11/2/23	8:50			3
SBRU	SW	Grab	11/2/23	8:10			3
SBRM	SW	Grab	11/2/23	7:35			3
RCKD	SW	Grab	11/2/23	12:10			3
BD-1	SW	Grab	11/2/23	11:50			3

Container Type: Plastic (P) or Glass (G)	NITRATE N	TOTAL N	AMMONIA N	TOTAL PHOSPHORUS	ORTHOPHOSPHATE	CHLOROPHYLL A	Analyses	
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		
	X	X	X	X	X	X		

Lab Profile/Line:  
 Lab Sample Receipt Checklist:  
 Custody Seals Present/Intact Y N NA  
 Custody Signatures Present Y N NA  
 Collector Signature Present Y N NA  
 Bottles Intact Y N NA  
 Correct Bottles Y N NA  
 Sufficient Volume Y N NA  
 Samples Received on Ice Y N NA  
 VOA - Headspace Acceptable Y N NA  
 USDA Regulated Soils Y N NA  
 Samples in Holding Time Y N NA  
 Residual Chlorine Present Y N NA  
 Cl Strips: \_\_\_\_\_  
 Sample pH Acceptable Y N NA  
 pH Strips: \_\_\_\_\_  
 Sulfide Present Y N NA  
 Lead Acetate Strips: \_\_\_\_\_

Customer Remarks / Special Conditions / Possible Hazards:  
 Taylor Cordle - Pace rep

Type of Ice Used: Wet Blue Dry None  
 Packing Material Used:  
 Raachem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A  
 Lab Tracking #:  
 Samples received via:  
 FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:  
 Temp Blank Received: Y N NA  
 Therm ID#:  
 Cooler 1 Temp Upon Receipt: °C  
 Cooler 1 Therm Corr. Factor: °C  
 Cooler 1 Corrected Temp: 3.0 °C  
 Comments:

Relinquished by/Company: (Signature)  
 Relinquished by/Company: (Signature)  
 Relinquished by/Company: (Signature)

Date/Time: 11/3/23 800  
 Received by/Company: (Signature)  
 Date/Time: 11/3/23 800  
 Received by/Company: (Signature)

MTJL LAB USE ONLY  
 Table #:  
 Acctnum:  
 Template:  
 Prelogin:  
 PM:  
 PB:

Trip Blank Received: Y N NA  
 HCL MeOH TSP Other  
 Non Conformance(s):  
 YES / NO  
 Page: \_\_\_\_\_ of: \_\_\_\_\_



## APPENDIX C: FACILITY IMPROVEMENT PLAN



**Aqua Illinois**

1000 S Schuyler Ave | Kankakee, IL, 60901

# Manteno Sewage Treatment Works Capital Improvement Plan

---

October 2021



Prepared by:

**Donohue & Associates, Inc.**

1605 South State Street Suite 1C, Champaign, IL 61820-7240

[donohue-associates.com](http://donohue-associates.com)

Donohue Project No.: 13921

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Appendix D – Workshop No. 6 Slides
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Appendix F - Basis of Design Calculations – Scenario 1
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Appendix I – Kruger Information

## ABBREVIATIONS

---

BOD	Biological Oxygen Demand
DAF	Design Average Flow
DMF	Design Maximum Flow
HP	Horsepower
MGD	Million Gallons per Day
NPDES	National Pollutant Discharge Elimination System
PPD	Pounds per Day
SOR	Surface Overflow Rate
SWD	Side Water Depth
TSS	Total Suspended Solids
WOR	Weir Overflow Rate
WPCC	Water Pollution Control Center

# 1. EXECUTIVE SUMMARY

## 1.1 BACKGROUND

Aqua Illinois, Inc. (Aqua) owns and operates the Manteno Water Pollution and Control Center (WPCC) which treats wastewater generated by domestic, commercial and industrial customers in the area of Manteno, IL. Currently the WPCC is operating above capacity. A total evaluation of existing equipment and infrastructure with a focus on total plant capacity analysis, filter replacement, and headworks improvements was conducted. An active collaboration between Donohue and Aqua was used to develop a capital improvement plan for the Manteno Sewage Treatment Works.

## 1.2 RECOMMENDED PROJECT

An evaluation of seven treatment alternatives was conducted and documented in this report. Scenario 0 was developed to keep the plant capacity at 1.15 MGD DAF but upgrade current equipment and processes as needed. Scenario 1 aims to increase the average day flow to 2 MGD by maximizing flow capacity of current processes and equipment. Scenarios 2 and 3 were developed to expand capacity up to 3 and 4.2 MGD respectively by adding an MBR system to the plant's liquid treatment process. Scenarios 4, 5, 6 were developed to include current agreements AQUA Illinois has with the City of Kankakee and the Village of Bourbonnais to offload 1 MGD of sanitary waste each into their sewer and treatment systems. Table 1-1 shows the items included in each scenario.

**Table 1-1 Scenario Summary**

Process Change	Scenario						
	0	1	2	3	4	5	6
Offload via Bourbonnais						X	X
Offload via Kankakee					X		X
New Mechanical Bar Screen	X	X	X	X	X	X	X
Upgrade 2 raw sewage pumps	X	X	X	X	X	X	X
Add 1 Primary Clarifier		X			X	X	
CEPT	X	X			X	X	X
Replace aeration basin diffusers	X	X	X	X	X	X	X
Convert 2 final clarifiers to MBR			X	X			
Convert primary clarifiers to selectors			X	X			
Disc Filtration	X	X		X	X	X	X
Convert to UV Disinfection		X	X	X	X	X	
Add 1 aerobic digester			X	X			
Ventilation & HVAC Upgrades	X	X	X	X	X	X	X
Excess flow clarifier upgrade	X	X	X	X	X	X	X
DO Probes	X	X	X	X	X	X	X

As a result of the alternative evaluation, it is recommended to proceed with upgrades outlined in Scenario 1. Scenario 1 consists of treatment upgrades and expansions to raise the plant capacity to 2.0 MGD DAF and 5.3 MGD DMF and leave potential for future expansion. The changes under Scenario 1 include an update and expansion of headworks screening, the addition of a primary clarifier, conversion of chlorine disinfection to UV disinfection, conversion from sand filtration to disc filtration with four disc filters, and various minor equipment and chemical upgrades. The recommended improvements have a forecasted total capital cost of \$9,012,000.

## 2. PROJECT PLANNING AREA

### 2.1 FACILITY PLANNING AREA

Aqua owns and operates the Manteno Water Pollution and Control Center (WPCC). The plant has a design average flow (DAF) of 1.15 million gallons per day (MGD) and a design maximum flow (DMF) of 3.5 MGD. The plant was built in 1976 and updated in 1996, 2011, and 2013. The plant currently serves the Village of Manteno, the Illinois Diversatech Campus (IDC), unincorporated areas in the immediate vicinity, and the area east of Interstate 57 (I-57).

The plant consists of four raw sewage pumps (two are currently operational), two storm flow pumps, two grit chambers, three primary clarification tanks, three aeration tanks, four final settling tanks, six gravity sand filters, and two chlorine contact tanks. The plant also houses two aerobic digesters, two sludge storage tanks, and sludge drying beds. An aerial view of the plant is presented in Figure 2-1.

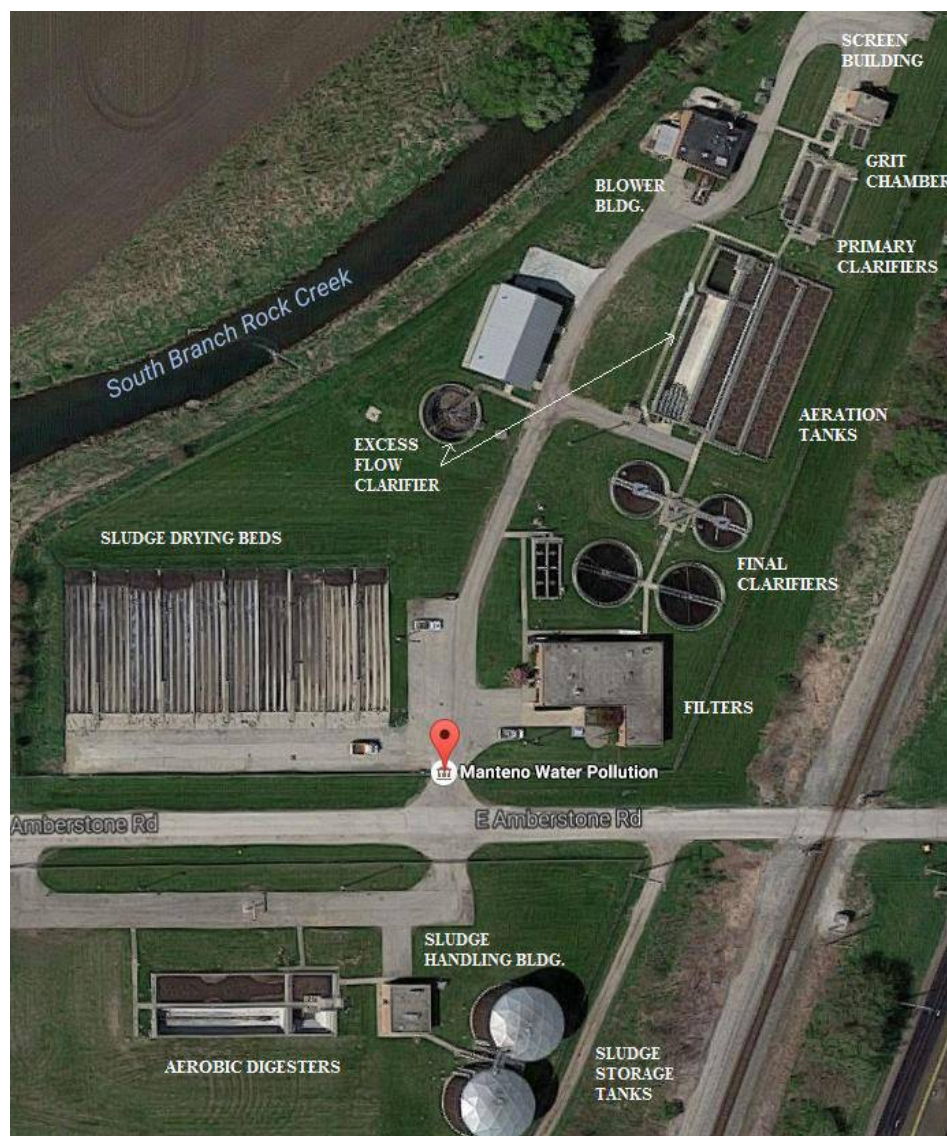


Figure 2-1: Manteno WPCC Overall Site Map

A majority of the flow enters the plant through a 24" sewer interceptor. Raw Sewage from IDC enters the plant through a 10" pipe directly to the mechanical screen. The mechanical screen is currently nonoperational so this influent instead flows into the grit tanks.

The plant discharges treated effluent to the South Branch Rock Creek under the authority of NPDES Permit IL0025089 issued on September 19, 2019. This permit expires on September 30, 2024. The permit covers three discharge conditions described as B01 STP Outfall, A01 Excess Flow Outfall, and 001 Combined Discharge. This permit is presented in Appendix A.

The B01 STP Outfall describes the plant discharge during dry conditions. During dry conditions the plant is permitted to discharge a design average flow of 1.15 MGD and a design maximum flow of 3.5 MGD. A01 Excess Flow Outfall describes the plant discharge during storm conditions when the plant is receiving more than the DMF of 3.5 MGD. 001 Combined Discharge describes the combined discharge of A01 and B01. Current effluent permit limits for each condition are summarized in Table 2-1, Table 2-2, and Table 2-3 below. Unit process sizes and capacities for the plant are provided in Table 2-4.

**Table 2-1: B01 STP Outfall Effluent Permit Limits**

Parameter	Load Limits (lbs/day)				Concentration Limits (mg/L)		
	Monthly Average		Daily Maximum		Monthly Average	Weekly Average	Daily Maximum
	DAF	DMF	DAF	DMF			
CBOD5	96	292	192	584	10		20
TSS	115	350	230	701	12		24
Chlorine Residual							0.05
Ammonia Nitrogen: (as N)	March-May; Sept-Oct	14	44	36	111	1.5	3.8
	June-Aug	8.6	26	42	128	0.9	2.3
	Nov -Feb	28	85	31	93	2.9	3.2
D.O.	March-July					>6.0	>5.0
	Aug-Feb					>5.5	>4.0
pH	6 to 9						
Fecal Coliforms	No greater than 400 per 100mL (May-Oct.)						

**Table 2-2: A01 Permit Effluent Limits**

Parameter	Concentration Limits (mg/L) Monthly Average
CBOD5	Monitor Only
TSS	Monitor Only
Total Phosphorus (as P)	Monitor Only
Ammonia Nitrogen: (as N)	Monitor Only
Fecal Coliforms	No greater than 400 per 100mL (May-Oct.)

**Table 2-3: 001 Effluent Permit Limits**

Parameter	Concentration Limits (mg/L)	
	Monthly Average	Weekly Average
CBOD5	30	45
TSS	30	45
Chlorine Residual	0.75	
pH	6 to 9	
Ammonia Nitrogen: (as N)	Monitor Only	
Total Phosphorus (as P)	Monitor Only	
Dissolved Oxygen	Monitor Only	

**Table 2-4: Unit Process Size/Capacity Summary**

Treatment Process	Quantity	Original Design Capacity	Sizing
Manual Bar Screen	1		1"
Raw Sewage Pumps	4 (raw sewage) 2 (storm flow)	6.4 MGD (2) 1.2 MGD (2) 6.4 MGD	
Mechanical Bar Screen	1		20ft
Grit Chamber	1 1		8' x 8' x 8' SWD 8' x 12'-8" x 8' SWD
Primary Clarifiers	2 1		10' x 47' x 7.5' SWD 11' x 47' x 7.5' SWD
Aeration Tanks	3		20'x123' x 12' SWD
Final Clarifiers	2 2	0.26 MG	35' dia, 10' SWD 42' dia, 10' SWD
Tertiary Filters (Gravity Sand)	6	3.5 MGD	27'x11'x9'
Chlorine Contact Tank	2		40.5' x 8' x 7.7' SWD
Excess Flow Clarifiers	1 1	1500 GPM 3000 GPM	40' dia, 10' SWD 20' x 123' x 12' SWD
Sludge Storage Tanks	2		50' dia, 28' SWD
Aerobic Digester	2		92' x 20' x 12' SWD
Sludge Drying Beds	15	33,000 sf Total	

## 2.2 PLANNING PERIOD

The project planning period is a 20-year period, extending from 2022 to 2051. It is intended that all equipment proposed in this report have a 20 year design life, with structural components having a useful life of 50 to 100 years.

## 2.3 FUTURE GROWTH

The Manteno and Bourbonnais areas are expected to see substantial commercial and industrial growth within the treatment plant's service area. Aqua contracted MG2A to estimate the impact of that growth on the water and sewer needs of the potential new serviced area east of I-57. According to the predictions of MG2A, future demand for this area could increase incoming flow to the Manteno plant in a range of 1.7 MGD to 5.2 MGD. The WPCC is not designed to handle these potential flows and plant capacity should be expanded.

### 3. TREATMENT PROCESS OVERVIEW

#### 3.1 HEADWORKS

The headworks are comprised of one manual bar screen, two raw sewage pumps, a non-operational mechanical bar screen, and two grit chambers. These units are held in and around the pump and blower building and the screen building shown in Figure 3-1 and Figure 3-2, respectively. Headworks processes are essential to a plant’s operation to remove large inorganics to protect downstream process equipment and treatment. General comments and concerns for these units are outlined below.

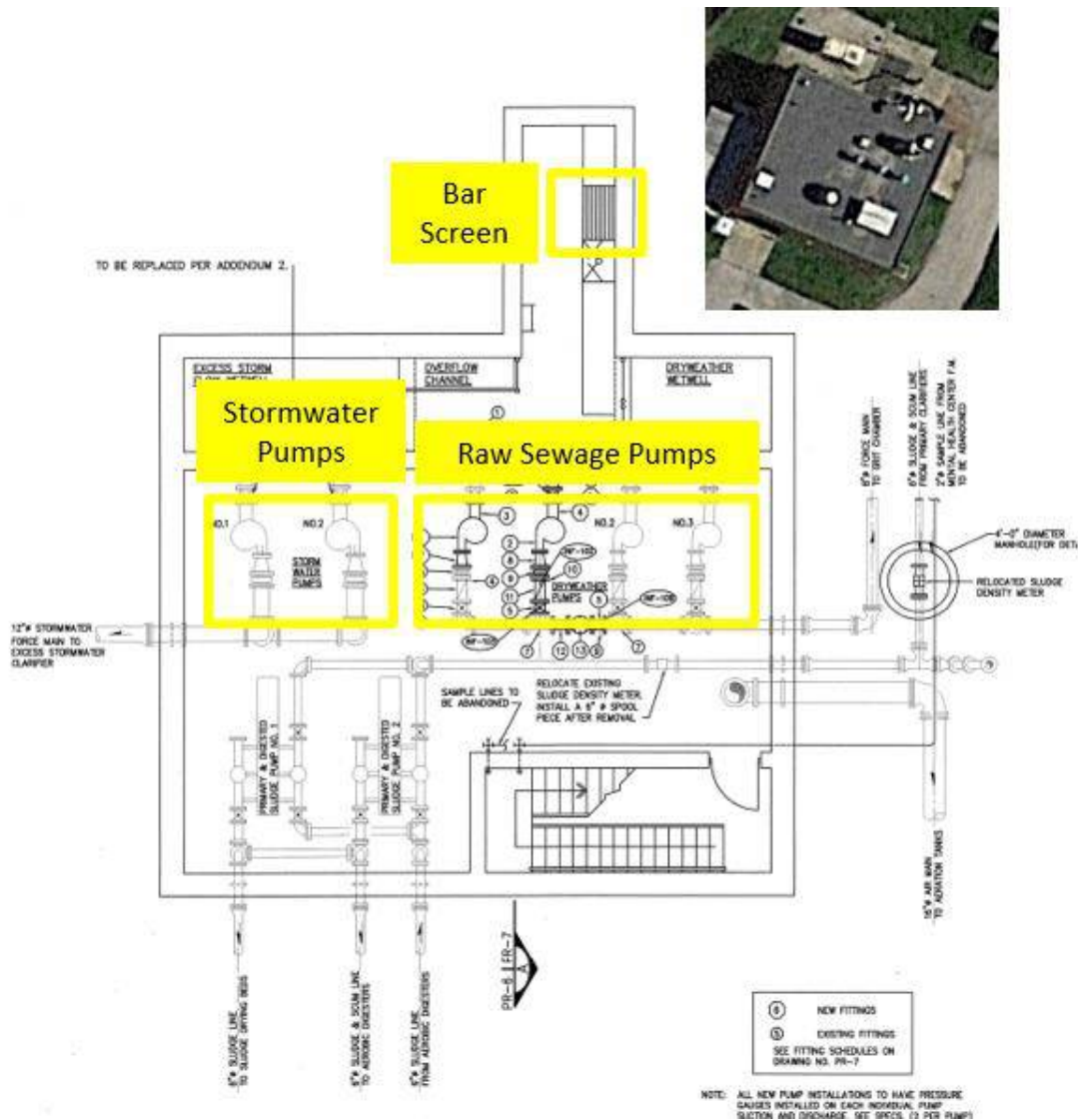


Figure 3-1: Pump and Blower Building

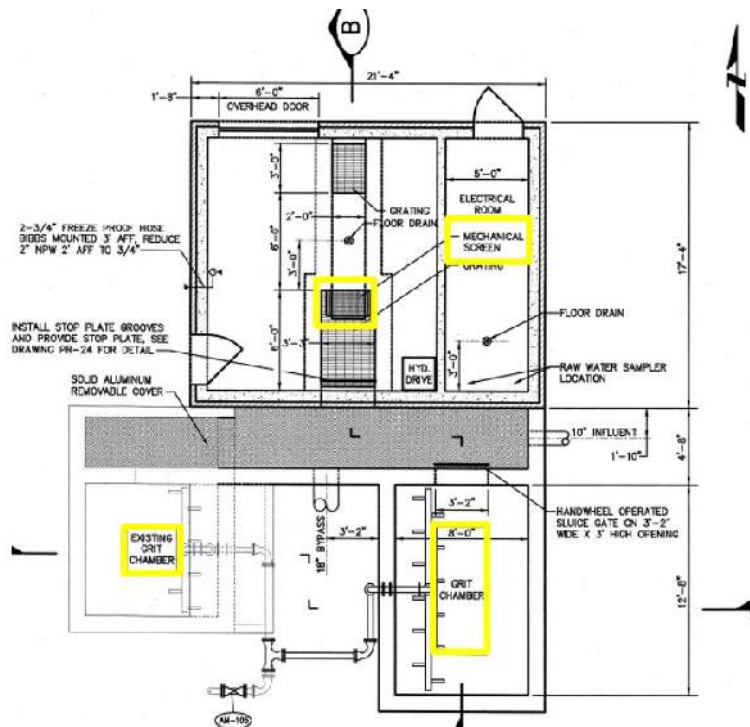


Figure 3-2: Screen Building

### 3.1.1 BUILDING INFRASTRUCTURE

There are ventilation issues within the small spaces of the pump and blower building, and the screen building. Some item improvements will need to be addressed in these buildings:

- HVAC
- Gas detection
- Fire alarm system

Also, electrical functions in the Screen Building will need upgrades. For example, the plant operator expressed that there is only one functional outlet for the entire building.

### 3.1.2 MANUAL BAR SCREEN

There is a 1" manual bar screen located upstream of the raw sewage pumps shown in Figure 3-3. The current screening process is not sufficient with significant trash and large debris getting through to downstream treatment. There are also concerns about protecting the raw sewage pumps downstream of this bar screen.

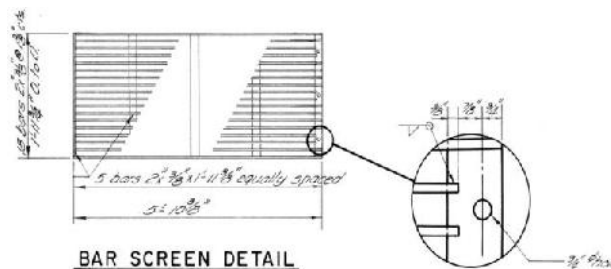


Figure 3-3: Manual Bar Screen



### 3.1.3 PUMPS

There is a total of 4 raw sewage pumps located in the pump and blower building. Only the two west pumps are currently in use. The two east pumps are not in use because the pumps and controls have not been updated in almost 30 years.

- 2 Stormwater Pumps (40 HP each)
- 2 Sludge Pumps (10 HP each)
- 2 Raw sewage Pumps in use (40 HP each)
- 2 Raw Sewage Pumps not in use (7.5 HP each)

### 3.1.4 MECHANICAL BAR SCREEN

The mechanical bar screen is currently not in use because the unit is damaged.

### 3.1.5 TWO GRIT CHAMBERS

There are two grit chambers located adjacent to the screen building that appear to be functioning effectively.

- Grit is taken out once a year
- Sizing
  - 8' x 8' x 8' SWD ; constructed in 1976
  - 8' x 12'-8" x 8' SWD ; added in 1996

## 3.2 PRIMARY TREATMENT

There are three primary rectangular clarifiers, shown in Figure 3-4, of which one was added in 1996. Large debris can be seen in the primary clarifier's weirs. This is most likely due to ineffective screening and no screening being performed on the IDC flow as mentioned earlier.

- Sizing
  - 10' x 47' x 7.5' SWD (2)
  - 11' x 47' x 7.5' SWD (1), added in 1996



**Figure 3-4: East (shown left), Middle (center), and West (right) Primary Clarifiers**

### 3.3 ACTIVATED SLUDGE - AERATION BASINS & BLOWER BUILDING

There are three aeration basins shown in Figure 3-5 and Figure 3-6. The west aeration basin was converted from an aerobic digester in 1996. The blowers for the basins are located in the pump and blower building and were replaced in 2011. The basins' membrane diffusers are reaching their end of design life as they were put in 10 years ago. DO is not monitored in any of the basins.

- Sizing
  - 20' x 123' x 12' SWD (3)



Figure 3-5: East (shown left) and Middle (right) Aeration Basins



Figure 3-6: West Aeration Basin

### 3.4 FINAL CLARIFIERS



Figure 3-7: Final Clarifiers

There are four circular final clarifiers located at the plant shown in Figure 3-7 and Figure 3-8. Final clarifiers allow for the flocs formed in the activated sludge process to settle out.

- Sizing
  - 35' diameter, 10' SWD (2); upgraded in 2013
  - 42' diameter, 10' SWD (2); added in 1996



Figure 3-8: Larger Final Clarifier (left) and Smaller Final Clarifier (right)

### 3.5 FILTRATION



Figure 3-9: Gravity Sand Filters

There is a six-bed gravity sand filtration system located within the plant's control building shown in Figure 3-9. There are two steel structures that hold three beds each. The filters are currently not fully operational. Gravity sand filtration is an older technology that can be limiting in chemical phosphorus removal. For this unit Donohue has previously investigated rehabilitation versus disc filter replacement. Donohue had recommended replacing the sand filters with disc filters to meet future low phosphorus limits and to increase capacity through the filtration system at a lower cost.

- Steel Structure Sizing
  - 27' long by 11' wide by 9' deep (2)
- Bed Sizing
  - Total Surface Area for six beds: 594 sf
  - Total Capacity for six beds: 3.5 MGD

### 3.6 DISINFECTION



**Figure 3-10: Chlorine Contact Tanks**

There are two chlorine contact tanks utilized at the plant shown in Figure 3-10. Chlorine gas is used for disinfection and is stored in a designated room within the control building.

- Sizing
  - 40.5' x 8' x 7.7' SWD (2)
- Chlorine Storage
  - 8 tanks of Chlorine gas in storage at a time
  - 4 tanks in use and 4 tanks are used as reserve

### 3.7 EXCESS FLOW

When the plant is receiving above the 3.5 MGD DMF flow is transferred to the existing excess flow primary clarifiers shown in Figure 3-11. The rectangular excess flow clarifier is filled first as the circular excess flow clarifier is not in use and needs updated equipment.

- Circular: 40' diameter, 10' SWD
- Rectangular: 20' x 123' x 12' SWD



**Figure 3-11: Circular (left) and Rectangular (right) Excess Flow Clarifiers**

The rectangular excess flow clarifier was converted from an aerobic digester in 2012. When storm flows are low, flow cannot transfer from the old concentrator to the larger portion of the tank. The plant's staff have created a temporary pump set up to transfer the flow between the basins. This set up is shown in Figure 3-12, and Figure 3-13.



**Figure 3-12: PVC pipe used to pump storm water out of the old concentrator infrastructure**



**Figure 3-13: PVC Pipe used to discharge the pumped stormwater from the old concentrator to the larger portion of the tank**

## 3.8 SOLIDS HANDLING

The solids handling process includes two aerobic digesters, two sludge storage tanks and 15 sludge drying beds. The solids handling building holds a majority of the piping and pumps used in the solids handling process. The building is scheduled to be reroofed soon but material availability has delayed this. The plant staff have also expressed that the building has some masonry damage that may need to be repaired. The solids handling building, the aerobic digesters and the sludge storage tanks were added in 1996.

### 3.8.1 AEROBIC DIGESTION

There are two aerobic digesters used at the plant shown in Figure 3-14. The plant operator uses one basin until there is no more decantation occurring. The other digester will then start to be filled. In the winter usually just one digester is used as the transfer line tends to freeze. After the aerobic digesters sludge enters the sludge storage tanks.

- Sizing
  - 92' x 20' x 12' SWD (2)



Figure 3-14: Aerobic Digesters

### 3.8.2 SLUDGE STORAGE TANKS

There are two sludge storage tanks utilized at the plant shown in Figure 3-15.

- Sizing
  - 50' diameter, 28' SWD



Figure 3-15: Sludge Storage Tanks

### 3.8.3 SLUDGE DRYING BEDS

The plant has a total of 15 sludge drying beds, 10 located on the north portion of the plant and 5 located on the southwestern portion of the plant. The sludge drying beds are effective and useful. Sludge is hauled away about once a year around November to be land applied. The total storage space provided by the beds is 33,000 sf.



Figure 3-16: Southwest (left) and North (right) Sludge Drying Beds

## 4. DATA REVIEW

### 4.1 RAW INFLUENT

Table 4-1 outlines percentiles and averages of influent flow, BOD, TSS, and phosphorus based on data from January 2018 – May 2021. The current flow average of 1.561 MGD is above the design average flow of 1.15 MGD even with a drier year observed in 2020. BOD, TSS, and phosphorus loadings are typical for a plant of this size and service area but are slightly greater than the original design values. Influent loadings can easily be influenced if additional industry load is serviced by the plant. The average influent loadings were used later in the report when developing alternatives. Presentation slides from Workshops No. 2 and 3 presented flows and loadings of the plant and are attached in Appendix B.

**Table 4-1: Influent Flows, Concentrations and Loadings Summary**

Influent						
Percentile	Flow	BOD		TSS		Phosphorus
	MGD	mg/L	ppd	mg/L	ppd	mg/L
25	1.19	124	1,767	98	1,388	1.9
50	1.46	172	2,133	148	1,730	3.18
75	1.90	232	2,797	194	2,318	4.88
95	2.44	295	4,018	290.2	3,492	6.66
99	2.71	367.5	5,055	560.7	10,012	8.58
Average	1.561	175.8	2,255	155.1	1,995	3.37
Design Average	1.15	170	1,630	180	1,726	-

### 4.2 FINAL EFFLUENT

Table 4-2 outlines percentiles and averages of B01 effluent BOD, TSS, ammonia and phosphorus concentrations based on data from January 2018 – May 2021. Table 4-3 shows the percentiles and averages of B01 effluent BOD, TSS, ammonia and phosphorus loadings. The average effluent concentrations of BOD, TSS, and Ammonia are under the current B01 permit limits. Effluent phosphorus is not currently limited by the NPDES permit but potential future limits of 1.0, 0.5 or 0.1 mg/L are possible. The WPCC is showing good performance even without fully functional tertiary filters. The average effluent concentrations are expected to improve further when new filters are installed.

**Table 4-2: Effluent Concentrations Summary (B01)**

Effluent				
Percentile	BOD	TSS	Ammonia	Phosphorus
	mg/L	mg/L	mg/L	mg/L
25	3.0	6.0	0.13	1.2
50	4.2	7.4	0.19	2.0
75	5.9	8.7	0.26	2.9
95	7.9	11.8	0.41	4.1
99	10.9	12.5	0.76	-
Average	4.5	7.5	0.22	2.1
B01 Permit Limits:				
Monthly Average	10	12	1.5, 0.9, 2.9*	-
Daily Maximum	20	24	3.8, 4.4, 3.2*	-

\*March-May/Sept.-Oct., June-Aug., Nov.-Feb.

**Table 4-3 Effluent Loadings Summary (B01)**

Effluent				
Percentile	BOD	TSS	Ammonia	Phosphorus
	ppd	ppd	ppd	ppd
25	48.8	57.4	1.8	21.2
50	87.7	83.9	2.5	25.1
75	131	126	3.6	35.2
95	259	180	5.0	51.3
99	543	203	10.3	
Average	106	91.3	2.98	27.5
B01 DAF Permit Limits:				
Monthly Average	96	115	14, 8.6, 28*	-
Daily Maximum	192	230	36, 42, 31*	-

\*March-May/Sept.-Oct., June-Aug., Nov.-Feb.

### 4.3 SPECIAL SAMPLING

As requested by Donohue, a period of special sampling was conducted at the WPCC from July 14, 2021 to August 19, 2021 to examine and evaluate primary effluent levels of BOD, TSS, and NH<sub>3</sub>. The result of this sampling is outlined in Table 4-4. Primary effluent phosphorus concentrations were not recorded. The primary removal levels of BOD, TSS, and ammonia are very reasonable for an activated sludge treatment plant of this size and show that the primary clarifiers are performing at an appropriate level.

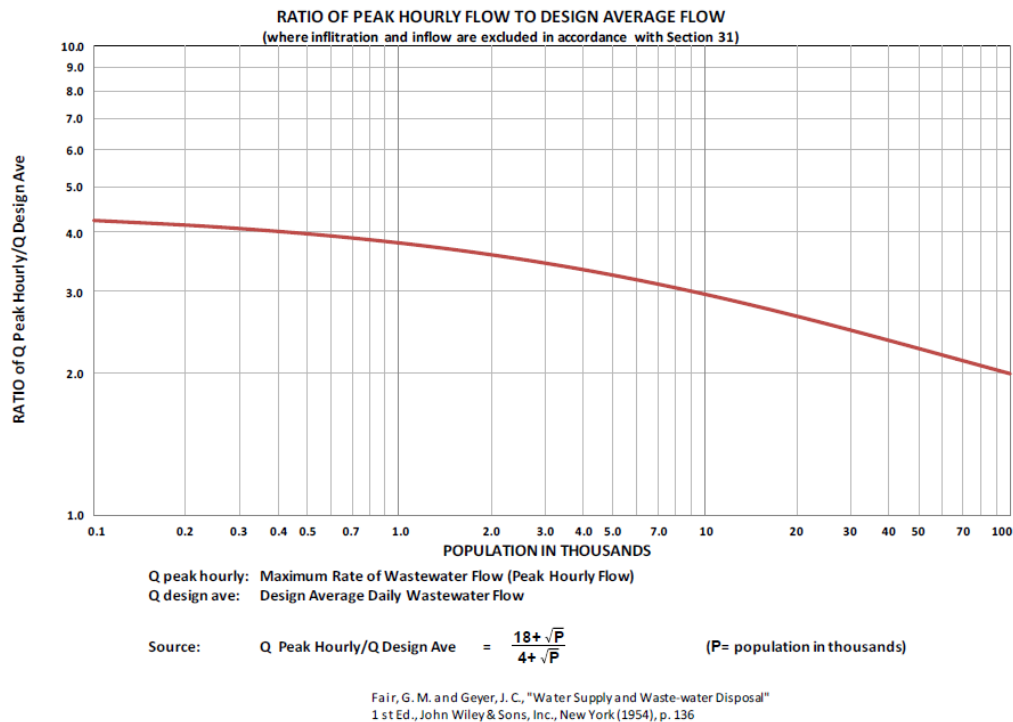
**Table 4-4 Special Sampling Results**

Date	Raw Influent			Primary Effluent				Final Effluent		
	BOD	TSS	P	Flow	BOD	TSS	Ammonia	BOD	TSS	Ammonia
	mg/L	mg/L	mg/L	MGD	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
7/14/21	222	177	5	1.17	118	51	25.2			
7/15/21				2.24	124	76	27.5			
7/16/21				1.77	81	66	27			
7/21/21	247	216	4.9					3.2	3.42	0.2
7/22/21				1.37	129	49	21.7			
7/29/21	157	166	3.2	1.23	98	53	18	4.81	5.63	0.36
8/3/21				1.13	130	55	24.6			
8/4/21	195	184	4.8					7.9	4.25	0.09
8/5/21				1.22	129	134	37			
8/10/21				1.03	134	69	27			
8/11/21	275	217	5.7					2.7	3.4	0.29
8/12/21				1.26	126	63	25			
8/18/21	316	282						4.12	2.75	0.33
8/19/21				0.94	188	68	34.5			
<b>Average</b>	<b>235</b>	<b>207</b>	<b>4.72</b>	<b>1.33</b>	<b>126</b>	<b>68.4</b>	<b>26.8</b>	<b>4.39</b>	<b>3.94</b>	<b>0.258</b>



## 5. PROCESS DESIGN CRITERIA REVIEW

The following sub-sections detail the unit process design criteria for the existing treatment system. Under 35 Ill. Adm. Code 370.310, a plant’s peak hourly flow is normally determined using a peaking factor that is equated to the population equivalent count. A population estimate of 10,000 was used to determine the peaking factor for flow estimates in the subsections below. Figure 5-1 below shows IEPA’s means of establishing the peaking factor, which establishes a current peaking factor of 2.95.



**Figure 5-1: Ratio of Peak Hourly Flow to DAF**

### 5.1 HEADWORKS

Headworks are comprised of a one 1” manual bar screen, an inactive mechanical bar screen, and two grit tanks. Without the mechanical bar screen in use the manual bar screen ahead of the raw sewage pumps is not fine enough to catch materials that could damage or clog pumps and get caught in processes downstream.

The two grit tanks have a surface overflow rate (SOR) of 6,956 gpd/sf at the DAF, 21,169 gpd/sf at the DMF and 9,442 gpd/sf at the current average flow. They also have a detention time of 12.4 minutes, 4.1 minutes, and 9.1 minutes at DAF, DMF and the current average flow, respectively. It is recommended that the detention time at peak flow is 3 to 5 minutes.

Based on the detention time recommendations, the current sizing of the grit chambers can tolerate a peak hourly flow of 4.75 MGD. Using the peaking factor mentioned previously, this equates to about a 1.61 MGD design average flow. The grit tanks are adequately sized for the design flow of 1.15 MGD and have available capacity for some future growth.

## 5.2 PRIMARY TREATMENT

Primary treatment is comprised of three rectangular primary clarifiers. The SOR for the primary clarifiers are 789 gpd/sf at the DAF, 2,402 gpd/sf at the DMF, and 1,071 gpd/sf at the current average flows. It is recommended that SORs do not exceed 1,500 gpd/sf at the DAF and are a maximum of 2,500 gpd/sf peak flows. Based on SOR recommendations, the primary clarifiers can tolerate a design average flow of 2.19 MGD and peak hourly flow of 3.64 MGD.

The detention time for the primary clarifiers is 102 minutes for DAF, 34 min for DMF, and 75 minutes for the current average flow. The recommended detention time for primary clarifiers at the DAF is at least 90 minutes. Based on the detention time recommendation, the primary clarifiers have a capacity of 1.3 MGD DAF.

The weir overflow rate (WOR) for the primary clarifiers are 8,745 gpd/ft, 26,616 gpd/ft, and 11,871 gpd/ft for the DAF, the DMF and the current average flow, respectively. It is recommended that the WOR does not exceed 30,000 gpd/ft at peak flows. Based on WOR recommendations, the primary clarifiers are able to tolerate a peak flow of 3.95 MGD. Using a population estimate of 7,664, calculated from influent BOD levels, this equates to a DAF value of 1.3 MGD. The detention time and the weir overflow rate become the limiting factors for the primary clarifiers translating to an ultimate capacity of 1.3 MGD DAF and 3.95 MGD DMF.

The three primary clarifiers have a side water depth (SWD) of 7.5 feet. To provide an adequate separation zone between the sludge blanket and overflow weirs the Ten State Standards recommends a minimum primary clarification SWD of 10 feet, IEPA Standards recommend a minimum depth of 7 ft. It should be noted that shallower clarifiers can have more difficulty achieving the expected removal rates.

## 5.3 ACTIVATED SLUDGE

The activated sludge treatment is made up of three aeration basins. The F:M ratios based on the average MLSS of 2,667 mg/L (from 2016) are 0.11 and 0.16 for DAF and current loadings respectively. An ideal F:M ratio for conventional step aeration complete mix, based on Ten State Standard Recommendations, is between 0.2 and 0.5. F:M can also be adjusted through the adjustment of RAS/WAS rates. A wasting calculator could be implemented to target ideal F:M and solids retention times (SRT) through the secondary system. Based on the minimum Ten State Standards recommended F:M ratio the aeration basins have a capacity of 3.1 MGD DAF.

When all basins are in operation the volumetric BOD loading rates are 12 lb/d/kcf at DAF, 36.4 lb/d/kcf at DMF and 16.8 lb/d/kcf at current average influent BOD loading. The recommended standard is 15 lb BOD/d/kcf for single stage nitrification. Donohue has seen plants able to perform well at BOD loading rates at or above 20 lb BOD/d/kcf. Based on Donohue's past performance experience a BOD loading rate of 26 lb BOD/d/kcf is recommended. Under this limit the aeration tanks are able to tolerate a DAF of 2.5 MGD.

The hydraulic retention times (HRTs) for the aeration basins are 13.83 hours at DAF, 4.54 hours at DMF and 10.17 hours at the current average flow. The minimum recommendation for HRT is 8 hours at the DAF. Based on this recommendation the aeration basins would be able to tolerate a design average flow of 1.98 MGD. The HRT becomes the limiting factor for the aeration basins translating to an ultimate capacity of 1.98 MGD DAF and 6.1 MGD DMF.

## 5.4 FINAL CLARIFICATION

Final clarification is completed with two small and two larger circular clarifiers. The collective SOR of the clarifiers is 245 gpd/sf at the DAF, 745 gpd/sf at the DMF, and 332 gpd/sf at the current average flow. The SORs are under the recommended 1,000 gpd/sf at peak hourly flow. Based on this recommendation the final clarifiers are able to tolerate a peak hourly flow of 4.70 MGD. Using a population estimate of 10,000 this equates to about a 1.59 DAF.

The WOR of the final clarifiers are 2,507 gpd/ft, 7,631 gpd/ft, and 3,403 gpd/ft for DAF, DMF and the current average flow, respectively. These values are well under the recommended maximum WOR of 30,000 gpd/ft at peak flows. Overall the final clarifiers are adequately sized and can accommodate future growth.

The final clarifiers also have a sludge loading rates (SLRs) of 9.2 lb/d/sf, 28 lb/d/sf, and 12.5 lb/d/sf at the DAF, DMF, and current conditions, respectively. The SLRs are under the recommended value of 40 lb/d/sf for single stage nitrification. Based on this recommendation, and the current operating MLSS concentrations, the final clarifiers are able to tolerate a DMF of 4.38 MGD. The sludge loading rate becomes the limiting factor for the final clarifiers translating to an ultimate capacity of 1.64 MGD DAF and 5 MGD DMF.

## 5.5 TERTIARY FILTERS

Tertiary filtration is completed through a six unit gravity sand filter. Filtration rates with one unit out of service are 1.61 gpm/sf at the DAF, 4.91 gpm/sf at DMF and 2.19 gpm/sf at the current average flow. It is recommended that the filtration rate should not exceed 5 gpm/sf at peak hourly flows thus the filters are adequately sized. However the sand filters are not fully operational and are in need of repair or replacement.

## 5.6 DISINFECTION

Disinfection is currently completed through chlorination using chlorine gas. The detention times are 46.74 minutes, 15.36 minutes and 34.43 minutes at the DAF, DMF, and current flows, respectively. The recommended detention time at peak hourly flows is at least 15 minutes. Based on this recommendation the maximum peak hourly flow the contact tanks can handle is 3.58 MGD. Using a population estimate of 10,000 this equates to a DAF of 1.21 MGD. The chlorine contact tanks are adequately sized for the current DAF of 1.15 MGD but this could not be extended much further.

## 5.7 EXCESS FLOW CLARIFICATION

During storm events (when flow exceeds 3.5 MGD) flow is diverted to the two excess flow clarifiers. One clarifier is circular and the other is rectangular. The excess flow system has a maximum capacity of 6.5 MGD. At this maximum capacity the SOR is 1,749 gpd/sf and the WOR is 25,060 gpd/ft. The excess flow clarifiers are adequately sized for the maximum excess flow capacity of 6.5 MGD.

## 5.8 SOLIDS HANDLING

Solids handling is completed with two aerobic digesters, two sludge storage tanks and 15 sludge drying beds. The aerobic digesters have a HRT of 17.26 days based on 2016 and 2021 solids flow data. The digesters also have an air requirement of 3,649 scfm. Total solids handling processes require a volume of approximately 80,000 cu. ft. assuming 80 days of storage, 7,664 population equivalent (PE), and a 0.13 cu.

ft./PE/day. The WPCC aerobic digesters and storage sludge tanks currently have a total storage volume of 167,406 cu. ft. as a result there is room for capacity up to 2.4 MGD in the current solids handling structures.

## 5.9 PROCESS CAPACITY SUMMARY

Table 5-1 summarizes the maximum flow capacity of each unit processes. Some units have multiple estimates that are predicted from different parameters. The limiting processes preventing the plant from increasing the current DAF are the chlorine contact tanks. The chlorine contact tanks have a capacity of 1.21 MGD limiting the plant from expanding past the current 1.15 MGD DAF. The primary clarifiers also limit the plant to 1.2-1.3 MGD.

**Table 5-1: Maximum Flow Capacity of Each Unit Processes**

Current DAF = 1.15 MGD				
Unit	Quantity	Maximum DAF for Unit	Parameter Based on	Limit of parameter
		MGD		
Grit Chambers	2	1.61	Detention Time	3 minutes
Primary Clarifiers	3	2.19	SOR @ DAF	1,500 gpd/sf
		1.23	SOR @ Peak Hourly Flow	2,500 gpd/sf
		1.29	WOR	30,000 gpd/ft
		1.31	Detention Time	90 minutes
Aeration Basins	3	2.50	BOD Loading	26 lb/d/kcf
		1.98	HRT	8 hours
Final Clarifiers	4	1.44	SLR	35 lb/d/kcf
		1.59	SOR	1,000 gpd/sf
Chlorine Contact Tanks	2	1.21	Detention Time	15 minutes

## 6. COMMON UPGRADES

Donohue has recognized necessary minor improvements for various process equipment at the plant. These improvements will be referred to as common upgrades that are mostly replacements. Annual costs for these upgrades are assumed to be similar to the existing O&M costs for the replaced equipment and processes and therefore have not been detailed in this report. Common upgrades identified are as follows:

- Ventilation, gas detection, and fire alarm system improvements in the pump & blower building and the screen building
- Replace excess flow clarifier equipment
- DO Probes and controls

The capital costs of the common upgrades are presented in Table 6-1 and are included in the scenarios presented in the next section of this report.

**Table 6-1 Common Upgrades Capital Costs**

Common Upgrade	Capital Cost
Ventilation and HVAC Improvements	\$359,000
Excess Flow Clarifier Equipment	\$515,000
DO Probes	\$9,900
<b>Total</b>	<b>\$884,000</b>

## 7. WPCP IMPROVEMENTS

### 7.1 ALTERNATIVE ANALYSIS

At the Manteno WPCP, improvements will be considered that update current processes and that can expand the capacity of the plant. The following areas of concern were identified by Donohue and AQUA:

- Ineffective Screening
- Raw Sewage pumps in need of replacement
- Tertiary filtration replacement with disc filters
- Capacity limiting processes: primary clarification and disinfection

A list of scenarios was developed to address present-day and future issues at the plant. Alternative options were originally presented in Workshop No. 4 and 5 of which the slides are attached in Appendix C. The baseline alternative, or 'Scenario 0', was developed to keep the plant capacity at 1.15 MGD DAF but upgrade current equipment and processes as needed. Scenario 1 aims to increase the average day flow to 2 MGD by maximizing flow capacity of current processes and equipment. Scenarios 2 and 3 were developed to expand capacity up to 3 and 4.2 MGD respectively by adding an MBR system to the plant's liquid treatment process.

Scenarios 4, 5, 6 were developed to include current agreements AQUA Illinois has with the City of Kankakee and the Village of Bourbonnais to offload 1 MGD of sanitary waste each into their sewer and treatment systems. Scenario 4 combines updates to the treatment plant in Scenario 1 and offloading 1 MGD to the City of Kankakee. Scenario 5 combines updates to the treatment plant in Scenario 1 and offloading 1 MGD to the Village of Bourbonnais. In accordance with the agreement with the City of Kankakee any scenario not offloading to Kankakee will include an annual \$150,000 lease fee.

A summary of the scenarios developed are found in Table 7-1. These scenarios are further detailed in sections below. All scenarios include the common upgrades outlined in the previous section. After Workshop No. 4 and 5 Scenarios 2 and 3 were not selected for further review and are crossed out in Table 7-1 due to high capital costs of the MBR equipment. During the planning level of this study a detailed electrical review was not conducted. The creation of cost estimates assumed that the current electrical system is sufficient to handle new or replaced equipment. An evaluation of the electrical system capacity should be completed during the design phase.

**Table 7-1 Scenario Summary**

Scenario	DAF	DMF	Notes
0	1.15 MGD	3.5 MGD	No Capacity Upgrades, Equipment Upgrades Only
1	2 MGD	5.3 MGD	Maximize Capacity with Current Equipment
<del>2</del>	<del>3 MGD</del>	<del>7.95 MGD</del>	<del>Add Processes to increase Capacity</del>
<del>3</del>	<del>4.2 MGD</del>	<del>11.1 MGD</del>	<del>Add Processes to increase Capacity</del>
4	2 MGD	5.3 MGD	Total Capacity 3 MGD: Scenario 1 + 1 MGD to Kankakee
5	2 MGD	5.3 MGD	Total Capacity 3 MGD: Scenario 1 + 1 MGD to Bourbonnais
6	1.15 MGD	3.5 MGD	Total Capacity 3 MGD: Scenario 0 + 1 MGD to Bourbonnais + 1 MGD to Kankakee

### 7.1.1 SCENARIO 0

Scenario 0 will target vital improvements to the WPC. The capacity of the plant under this scenario will remain at 1.15 MGD DAF and 3.5 MGD DMF. This scenario will target improvements in the headworks, tertiary filtration, activated sludge, and adding chemically enhanced primary treatment (CEPT). A generic aerial plan of the changes proposed in Scenario 0 is shown in Figure 7-1.



Figure 7-1 Scenario 0 General Plan

Scenario 0 upgrades include a new mechanical bar screen located ahead of the raw sewage pumps to replace the 1" manual bar screen. This screening update would change the initial flow path and protect the raw sewage pumps from debris. Installing non clog pumps will not be necessary. Cost estimates for the new screen include the construction of a small building to house the new equipment, however, the current screening building remains as an option to house this process. Scenario 0 also includes upgrading the two east pumps to a similar size (40 HP) of the existing west pumps to provide additional redundancy. These pumps can be used for future expansion of the plant or for offloading when future conditions are reevaluated.

The aeration basin membrane diffusers were installed 10 years ago and are reaching the end of their design life. Replacement of these diffusers are included in Scenario 0 upgrades.

There is a six-bed gravity sand filtration system located within the plant's control building. Gravity sand filtration is an older technology that can be limiting in chemical phosphorus removal. Donohue has

previously recommended replacing the sand filters with disc filters to meet future low phosphorus limits and to increase capacity through the filtration system at a lower cost. This filter evaluation report is attached in Appendix E. Scenario 0 includes replacing the gravity sand filtration with three-disc filters.

The WPCC has a DAF of 1.15 MGD but currently experiences an average flow of 1.56 MGD and regularly sees flows over 2 MGD during wet weather events. Chemically enhanced primary treatment (CEPT) is a technique that uses a coagulant (Alum, Ferric or PAC) to enable primary clarifiers to settle solids more quickly. This strategy can help the WPCC handle increases in flow without adding more process units.

Annual costs for this scenario include disc filter maintenance, filter electricity requirements, mechanical bar screen electricity requirements, CEPT chemical costs, and the annual lease fee to the City of Kankakee.

### 7.1.2 SCENARIO 1

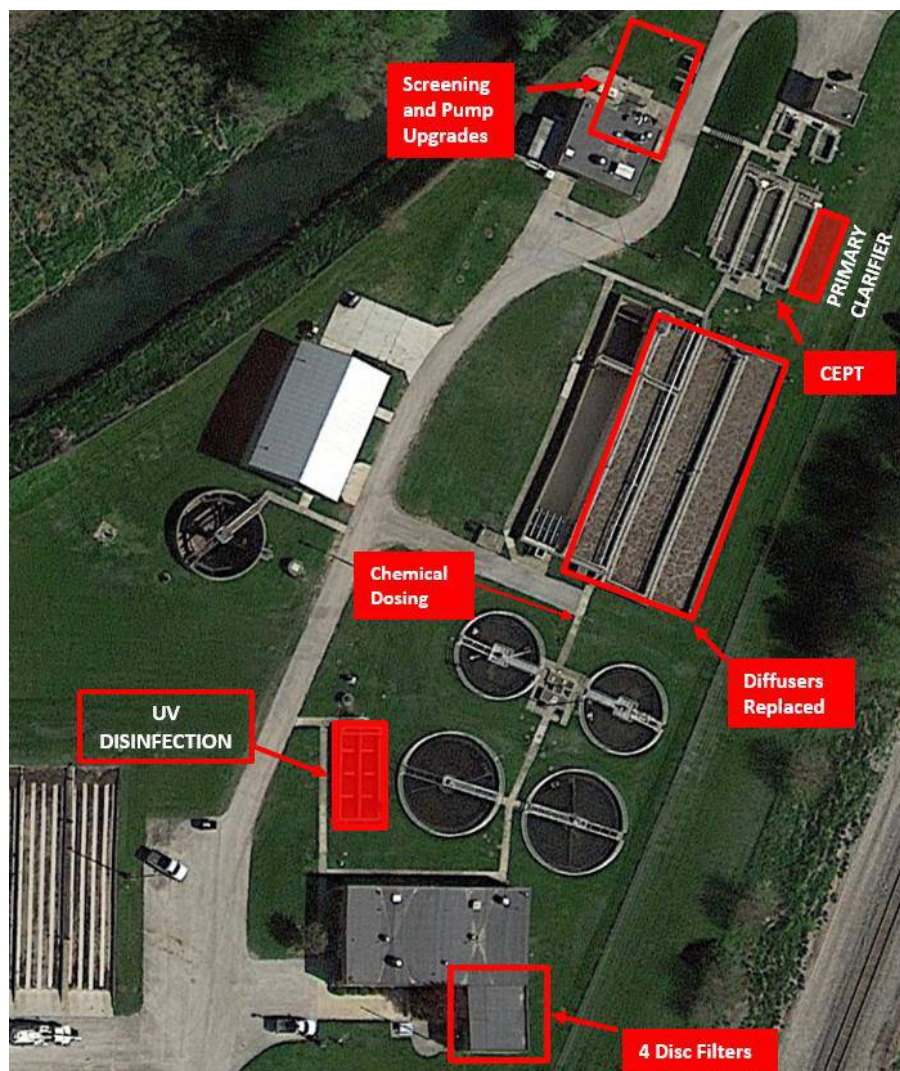


Figure 7-2 Scenario 1 General Plan

Scenario 1 will target necessary improvements to the WPCC while maximizing capacity of current processes. The capacity of the plant under this scenario will be 2.0 MGD DAF and 5.3 MGD DMF. This scenario will target improvements in the headworks, tertiary filtration, activated sludge, and chemical



dosing. Improvements to headworks, activated sludge, and chemical dosing are identical to those of Scenario 0. Under this design flow four-disc filters are recommended to replace gravity sand filtration. This Scenario includes alterations to disinfection and primary clarification to handle the higher design flow. A generic aerial plan of the changes proposed in Scenario 1 is shown in Figure 7-2.

As mentioned earlier in this report the current primary clarifiers have a limited capacity of 1.2 – 1.3 MGD DAF. An additional primary clarifier is necessary to increase the capacity to 2.0 MGD DAF and thus is included in this scenario. Under this scenario the chlorine contact tanks will be converted into UV disinfection units. UV disinfection will give the plant flexibility to expand further in the future as opposed to adding another chlorine contact chamber.

Annual costs for this scenario include disc filter and UV unit maintenance, filter, UV, and mechanical bar screen electricity requirement, CEPT chemical costs, and the annual lease fee to the City of Kankakee.

### 7.1.3 SCENARIO 4

Scenario 4 was developed to combine the improvements outlined in Scenario 1 (2 MGD DAF) and offloading 1 MGD to the city of Kankakee for a total flow of 3 MGD. This scenario uses the option to offload up to 1 MGD to the City of Kankakee via the IDC sewer system per a 2006 agreement with the city. This scenario includes costs developed by MG2A to reverse flow in an existing force main, constructing an additional force main, and costs covered in Scenario 1. Annual costs include those discussed for Scenario 1 and offloading costs to the City of Kankakee. The City of Kankakee agreement includes a \$150,000 lease fee and a use charge of \$2.90 per 1000 gallons. It was assumed that the full 1 MGD would be utilized and per the agreement, the \$150,000 lease fee is waived.

### 7.1.4 SCENARIO 5

Scenario 5 was developed to combine the improvements outlined in Scenario 1 (2 MGD DAF) and offloading 1 MGD to the Village of Bourbonnais for a total flow of 3 MGD. AQUA currently has an agreement with the Village of Bourbonnais to offload 1 MGD of sanitary waste which would be treated at KRMA. Scenario 5 includes costs estimated by MG2A to intercept flows at the WPCC and redirect flows to the Village of Bourbonnais Lift Station. Costs also include those discussed for Scenario 1. Annual costs include those discussed for Scenario 1, offloading costs to the Village of Bourbonnais, and the annual lease fee to the City of Kankakee. The agreement with the Village of Bourbonnais includes a \$2.90 per 1000 gallons use charge and an escalating service charge after 2 years.

### 7.1.5 SCENARIO 6

Scenario 6 was developed to combine the improvements outlined in Scenario 0, offloading 1 MGD to the city of Kankakee, and offloading 1 MGD to the Village of Bourbonnais for a total flow of 3 MGD. Costs for this Scenario include offloading fees and force main construction costs discussed for Scenarios 5 and 6 and costs discussed for Scenario 1.

## 7.2 INITIAL COST ESTIMATES

Planning level cost opinions for the capital investment, annual operating costs and 20-year future present worth were determined for the retained alternatives. The 20-year present worth represents the current dollars required to construct the improvements and operate them for 20 years in current dollars. A summary of the capital, annual and present worth costs for each evaluated scenario are shown in Table

7-2. The project cost per MGD of total flow in the system, including offloading flows for each scenario's capital and present worth cost are present in Table 7-3. Lifecycle costs were originally presented in Workshop No. 6 and those slides are shown in Appendix D.

**Table 7-2 Costs for Each Scenario**

Scenario	Offloading	Manteno WWTF		Total Flow	Capital Cost	Average Annual Cost	Total Present Worth	Total Project Capital Cost
	DAF	DAF	DMF	DAF				
0	-	1.15 MGD	3.5 MGD	1.15 MGD	\$5,405,000	\$182,000	\$8,870,000	\$6,289,000
1	-	2 MGD	5.3 MGD	2 MGD	\$8,128,000	\$214,000	\$12,065,000	\$9,012,000
4	1 MGD to Kankakee	2 MGD	5.3 MGD	3 MGD	\$8,358,000	\$1,180,000	\$25,816,000	\$9,242,000
5	1 MGD to Bourbonnais	2 MGD	5.3 MGD	3 MGD	\$11,188,000	\$1,348,000	\$31,929,000	\$12,072,000
6	1 MGD to Kankakee + 1MGD to Bourbonnais	1.15 MGD	3.5 MGD	3 MGD	\$8,695,000	\$2,282,000	\$42,485,000	\$9,579,000

**Table 7-3 Project Cost per MGD for each Scenario**

Scenario	Offloading	Manteno WWTF		Total Flow	Project Capital Cost per MGD	Total Present Worth Cost per MGD
	DAF	DAF	DMF	DAF		
0	-	1.15 MGD	3.5 MGD	1.15 MGD	\$5,469,000	\$7,713,000
1	-	2 MGD	5.3 MGD	2 MGD	\$4,506,000	\$6,033,000
4	1 MGD to Kankakee	2 MGD	5.3 MGD	3 MGD	\$3,081,000	\$8,605,000
5	1 MGD to Bourbonnais	2 MGD	5.3 MGD	3 MGD	\$4,024,000	\$10,643,000
6	1 MGD to Kankakee + 1MGD to Bourbonnais	1.15 MGD	3.5 MGD	3 MGD	\$3,193,000	\$14,162,000

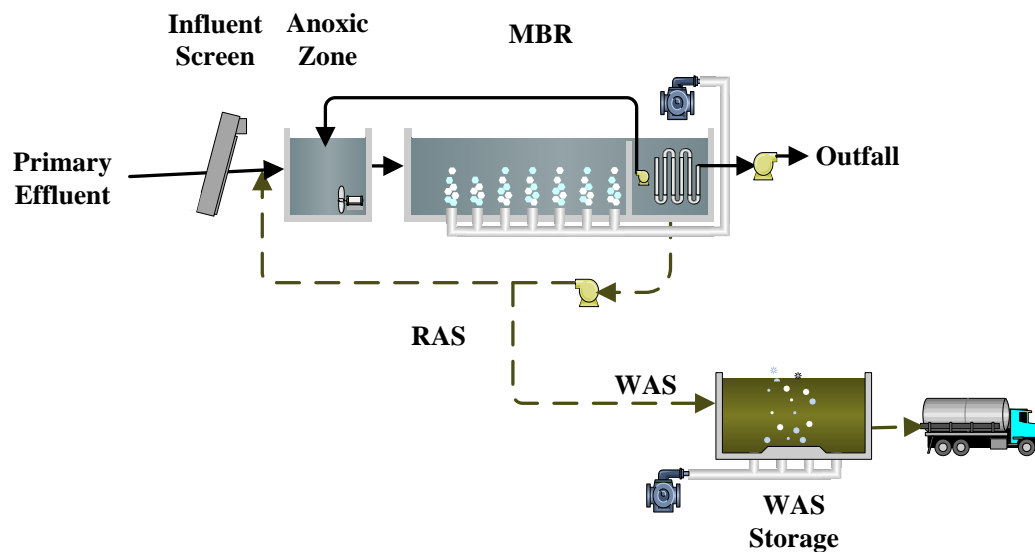
The various scenarios presented were compared using the project cost per MGD intercepted at the plant, including flow that would be offloaded to Kankakee or Bourbonnais. Scenarios 4, 5, and 6 have the lowest capital cost per MGD but have the highest 20-year present worth costs per MGD due to the high annual costs from offloading to Kankakee or Bourbonnais. Scenario 1 has the lowest 20-year present worth cost per MGD and a slightly higher capital cost per MGD to that of Scenarios 4, 5, and 6. Scenario 0 has the highest capital cost per MGD and the second lowest present worth cost per MGD which is about \$1.7 million over Scenario 1. The most cost effective options is Scenario 1 followed by Scenario 0.

Scenario 0 and 1 only achieve 1.15 and 2.0 MGD total treatment respectively, covering only a portion of the growth predicted by MG2A. After discussion with Aqua, Scenario 2 was added back for comparison to have an option for higher capacity at a lower present worth cost. This scenario and its associated costs are explored in the next sections of this report.

## 7.2.1 SCENARIO 2

Scenario 2 aims to increase the capacity of the plant by adding Membrane Bioreactor (MBR) technology to current processes. The capacity of the plant under Scenario 2 will be 3.0 MGD DAF and 7.95 MGD DMF. This scenario includes changes in the headworks, activated sludge, primary clarification, secondary clarification, disinfection, and aerobic digestion. Improvements to headworks and activated sludge are identical to those of Scenario 0. The conversion of disinfection to UV disinfection is identical to Scenario 1. Under this scenario another aerobic digester would be constructed to handle the higher solids production.

MBR is a secondary treatment activated sludge system that utilizes membranes instead of clarifiers to provide solids separation. This technique allows for the activated sludge system to run at much higher MLSS concentrations, as high as 8,000 – 10,000 mg/L. An example of a typical MBR layout is shown in Figure 7-3.



**Figure 7-3 Example of a MBR layout**

The use of the MBR system allows for a higher flow in a smaller space cutting down on construction needs to expand the plant compared to conventional activated sludge expansion. MBR membranes would be integrated into the biological process by placing them into the secondary clarifiers. The membrane filtration system would also eliminate the need for tertiary filtration.

In this scenario the primary clarifiers would be converted into selectors. Primary clarification is not explicitly needed for an MBR system and selectors would efficiently use the space of the primary clarifiers to enhance the effectiveness of the activated sludge process through biological nutrient removal for phosphorus and total nitrogen.

Annual costs for this scenario include UV unit maintenance, UV lamp replacement, digester air, MBR power and cleaning chemicals, and mechanical bar screen electricity requirements, MBR membrane replacement, and the annual lease fee to the City of Kankakee.

A generic aerial plan of the changes proposed in Scenario 2 is shown in Figure 7-4.

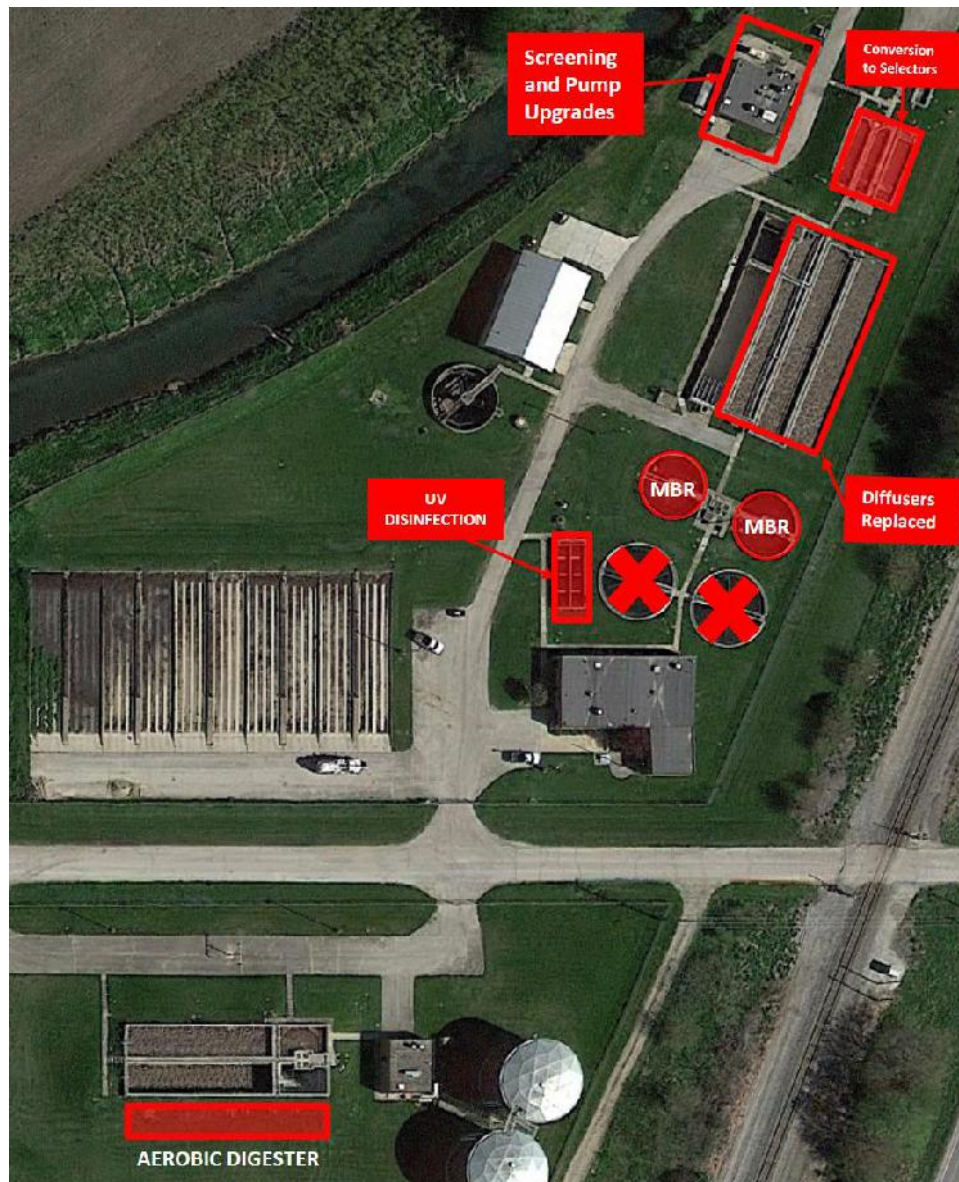


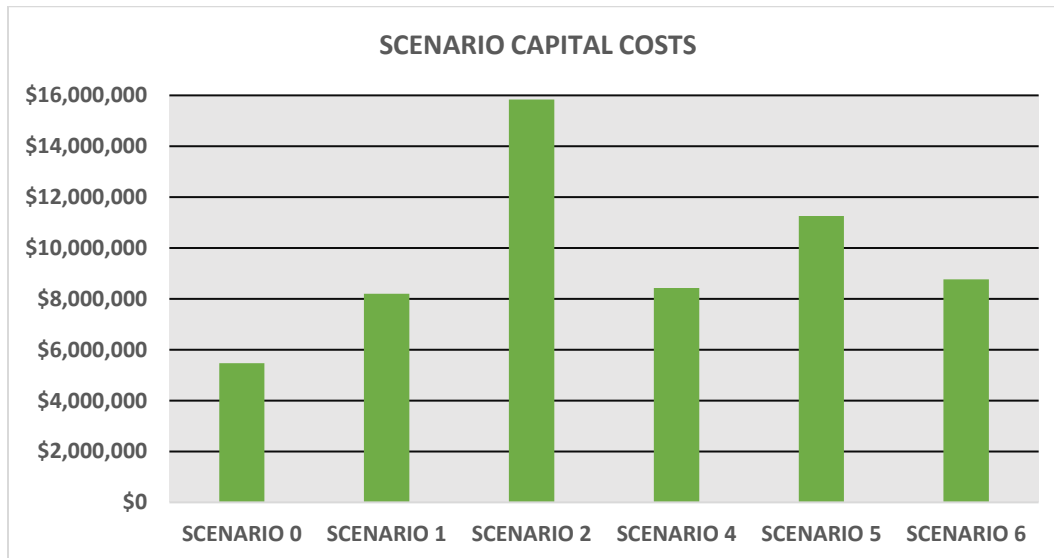
Figure 7-4 Scenario 2 General Plan

### 7.3 ALTERNATIVE EVALUATION

The results of the Scenarios' capital costs, annual costs, and present worth costs including the newly added Scenario 2 are presented in Table 7-4. The total project cost includes the common upgrades presented previously. A graphical comparison of capital costs and present worth costs are presented in Figure 7-5 and Figure 7-6, respectively. The results of the project cost per MGD of flow diverted to the Manteno WPCP including Scenario 2 are presented in Table 7-5.

**Table 7-4 Cost Estimates Including Scenario 2**

Scenario	Offloading	Manteno WWTF		Total Flow	Capital Cost	Annual Average Cost	Total Present Worth	Total Project Capital Cost
	DAF	DAF	DMF	DAF				
0	-	1.15 MGD	3.5 MGD	1.15 MGD	\$5,405,000	\$182,000	\$8,870,000	\$6,289,000
1	-	2 MGD	5.3 MGD	2 MGD	\$8,128,000	\$214,000	\$12,065,000	\$9,012,000
2	-	3 MGD	7.95 MGD	3 MGD	\$16,727,000	\$280,000	\$20,640,000	\$16,727,000
4	1 MGD to Kankakee	2 MGD	5.3 MGD	3 MGD	\$8,358,000	\$1,180,000	\$25,816,000	\$9,242,000
5	1 MGD to Bourbonnais	2 MGD	5.3 MGD	3 MGD	\$11,188,000	\$1,348,000	\$31,929,000	\$12,072,000
6	1 MGD to Kankakee + 1MGD to Bourbonnais	1.15 MGD	3.5 MGD	3 MGD	\$8,695,000	\$2,282,000	\$42,485,000	\$9,579,000



**Figure 7-5 Scenario Capital Costs**

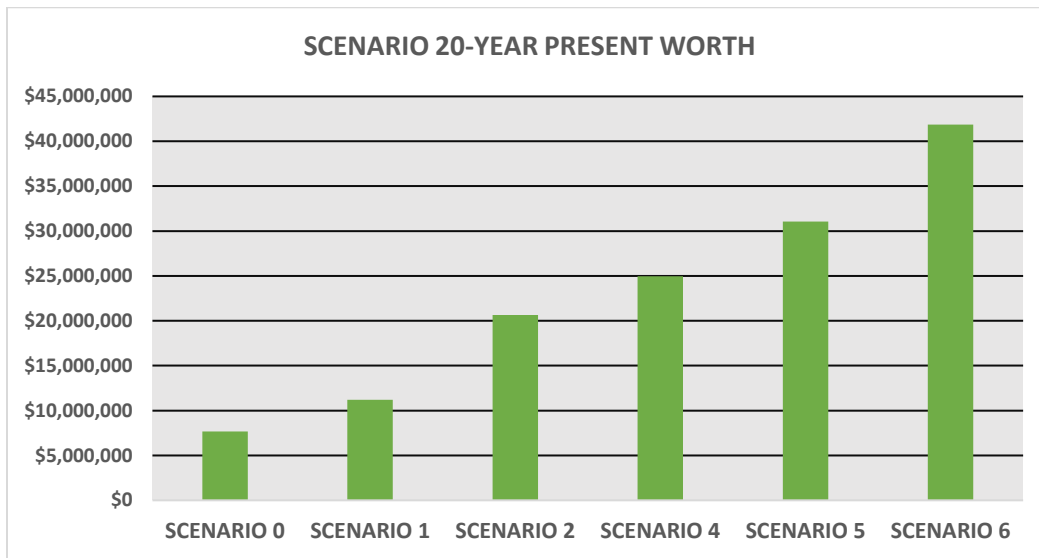


Figure 7-6 Scenario 20-year Present Worth Costs

Table 7-5 Project Cost per MGD for each Scenario, Including Scenario 2

Scenario	Offloading	Manteno WWTF		Total Flow	Project Capital Cost per MGD	Total Present Worth Cost per MGD
	DAF	DAF	DMF	DAF		
0	-	1.15 MGD	3.5 MGD	1.15 MGD	\$5,469,000	\$7,713,000
1	-	2 MGD	5.3 MGD	2 MGD	\$4,506,000	\$6,033,000
2	-	3 MGD	7.95 MGD	3 MGD	\$5,576,000	\$6,880,000
4	1 MGD to Kankakee	2 MGD	5.3 MGD	3 MGD	\$3,081,000	\$8,605,000
5	1 MGD to Bourbonnais	2 MGD	5.3 MGD	3 MGD	\$4,024,000	\$10,643,000
6	1 MGD to Kankakee + 1MGD to Bourbonnais	1.15 MGD	3.5 MGD	3 MGD	\$3,193,000	\$14,162,000

The addition of Scenario 2 for evaluation shows this alternative having the highest capital cost per MGD but, of the options reaching 3 MGD, it is the lowest 20-year present worth cost per MGD. This is due to lower annual costs compared to Scenarios 4, 5, and 6. Scenario 1 still has the lowest 20-year present worth cost per MGD and a slightly higher capital cost per MGD to that of Scenarios 4, 5, and 6. It is important to note that the disc filter portion of the cost estimates for Scenarios 0, 1, 4, 5, and 6 are based on Kruger disc filter costs. Aqua will evaluate disc filter manufacturer selection pending further design review. It is not expected that this will alter the outcome of the alternative evaluation as Scenario 2 has a significantly higher capital and present worth costs compared to Scenario 1.

## 7.4 RECOMMENDED ALTERNATIVE

Upon evaluation of the alternatives and input from Aqua, the upgrades presented in Scenario 1 are recommended. This includes improvements and expansion to the headworks, aeration basins, tertiary filtration, disinfection, primary clarification, and the addition of chemical phosphorus removal and CEPT. These improvements bring the plant’s treatment capacity up to 2.0 MGD DAF and 5.3 MGD DMF. This scenario has the lowest present worth cost estimate per MGD and the lowest capital cost estimate per MGD for those scenarios not offloading to Kankakee or Bourbonnais and allows for future expansion of the plant while being able to handle current flows and growth for the next 10-15 years.

## 8. RECOMMENDED PROJECT

### 8.1 DESCRIPTION

As noted above, Scenario 1 is recommended for implementation. This alternative will upgrade and expand the existing equipment and processes to handle a DAF of 2.0 MGD and a DMF of 5.3 MGD. Details of this proposed expansion are outlined below.

Under the recommended plant upgrades a new 1/2" mechanical bar screen will be installed ahead of the raw sewage pumps to replace the 1" manual bar screen. This screening update includes the addition of a washer compactor. A new building is included in this scenario for the added equipment. This installation will change the initial flow path and not require the installation of non-clog pumps as the raw sewage pumps will be more protected with the mechanical bar screen.

The three primary clarifiers are limited to a DAF of approximately 1.3 MGD. An addition of one primary clarifier of 42,700 gallons and 663 sq. ft. is required to increase the capacity to 2.0 MGD. The new primary clarifier will be placed east of the existing clarifiers as a majority of the plant's piping is located to the west of these clarifiers. A fence line located relatively close to the proposed location of this clarifier will require further investigation before final design. Another addition under this scenario is CEPT and chemical phosphorus removal with Alum, Ferric, or PAC. Recommended chemical dosing locations are upstream of the primary clarifiers and upstream of final clarification. Bench scale testing or full chemical trial testing is recommended before implementation to determine the most cost effective chemical.

Figure 8-1 presents the possible locations for screening updates and the additional primary clarifier. These changes are shown in red. The primary clarifier would be minimally invasive to the existing site piping while the screening updates would most likely cause changes to piping.

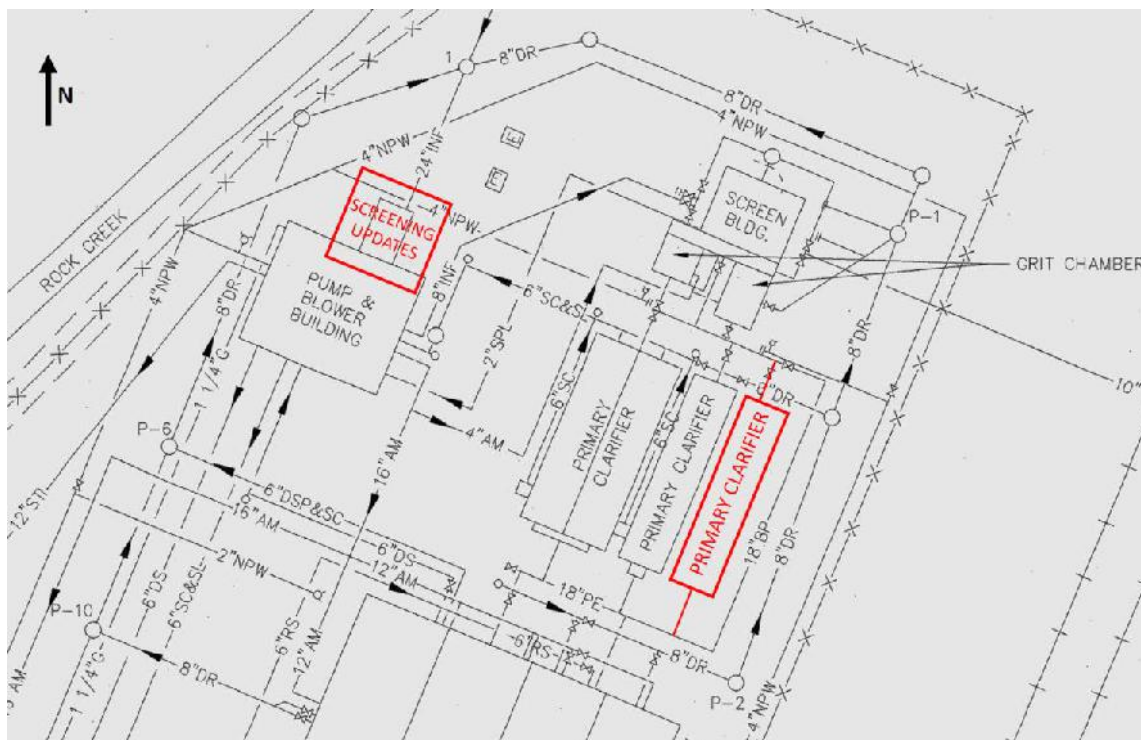
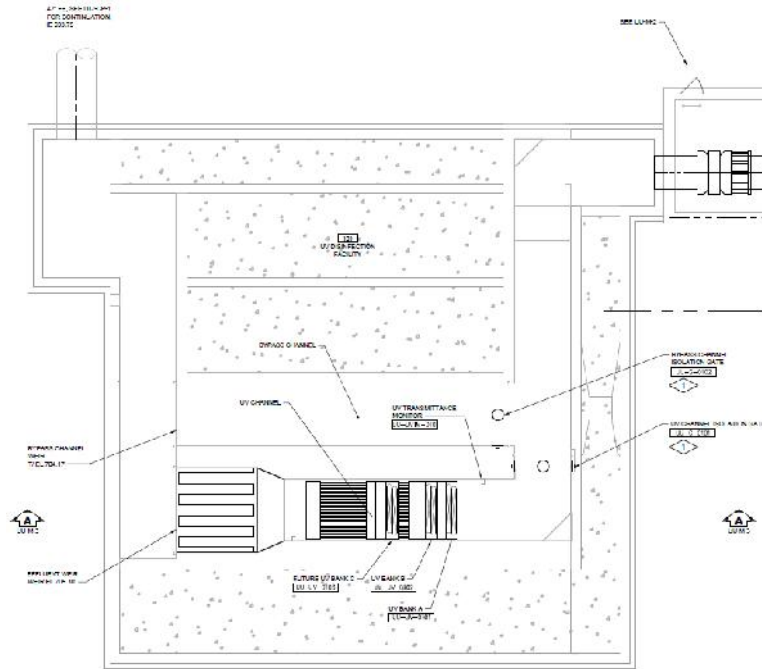


Figure 8-1 Proposed Changes to Screening and Primary Clarification on Existing Site Piping

This scenario includes the replacement of the membrane diffusers within the three aeration basins. The six-bed gravity sand filters within the control building will be overhauled and replaced by disc filters. These disc filters will be designed to fit into the 27' long x 11' wide x 9' deep steel structure. The two chlorine contact tanks will be converted to UV disinfection; no additional tanks construction will be required. An example of a chlorine contact converted to UV disinfection is shown in Figure 8-2.



**Figure 8-2 Example Chlorine Contact Tank Conversion to UV Disinfection**

## 8.2 FUTURE GROWTH

The recommended scenario does not include utilizing offloading to Kankakee or Bourbonnais. However, future projections made by MG2A predict 1.7 MGD to 5.2 MGD incoming flow to the plant within a 10- to 15-year period. The expansion of the plant to 2.0 MGD should be suitable for the serviced area until this growth is observed. Growth should continue to be monitored by Aqua and if needed, offloading to Kankakee observed in Scenario 4 is the most cost-effective alternative to handle growth while future expansion of the plant past 2.0 MGD is considered.

## 8.3 DESIGN BASIS

The full basis of design calculations for the recommended treatment plant upgrade are provided in Appendix F in the back of the report. Table 8-1 shows the major primary clarification design parameters adjusted for additional primary clarifier and new design flows proposed. The surface overflow rate, weir overflow rate and detention time are under the suggested limits by the ten states standards.



**Table 8-1 Primary Clarification Design Parameters**

Parameter	Units	DAF 2 MGD	DMF 5.3 MGD	Recommended limit of Parameter
Surface Overflow Rate	gpd/sq. ft.	942	2,496	1,500 @ DAF 2,500 @ Peak
Weir Overflow Rate	gpd/ft	11,236	29,775	30,000 @ Peak
Detention Time	minutes	89	34	15 minutes @ Peak

Table 8-2 shows the major aeration basin design parameters adjusted for the new design flows. The HRT of 7.95 hours is close to the suggested 8 hour minimum. The volumetric loading rate is well under the suggesting limit of 26 lb/d/kcf.

**Table 8-2 Aeration Basins Design Parameters**

Parameter	Units	DAF 2 MGD	DMF 5.3 MGD	Recommended limit of Parameter
HRT	Hours	7.95	3.0	8 hours @ DAF
Volumetric Loading Rate	lb/d/kcf	21.5	57.1	26 @ DAF

Table 8-3 shows the major secondary clarification design parameters adjusted for the new design flows. The solids loading rate at the DMF is slightly higher than the suggested limit of 35 lb/d/kcf. The surface overflow rate at the DMF is slightly higher than the suggested 1,000 gpd/sf.

**Table 8-3 Secondary Clarification Design Parameters**

Parameter	Units	DAF 2 MGD	DMF 5.3 MGD	Recommended limit of Parameter
Solids Loading Rate	lb/d/kcf	14.2	37.7	35 @ DMF
Surface Overflow Rate	gpd/sf	426	1,129	1,000 @ Peak

## 8.4 PROJECT COST

The initial capital cost for the recommended upgrades is shown in Table 8-4 and is forecasted to be \$9.01 million. See Appendix G for the detailed breakdown of this cost.

**Table 8-4 Total Project Cost**

	Capital Cost
Scenario 1	\$8,128,000
Common Upgrades	\$884,000
Total	\$9,012,000

## 8.5 IMPLEMENTATION SCHEDULE

The recommended improvements have been separated into multiple projects as shown in Table 8-5. It is Aqua's intent to begin with the installation of disk filters and the headworks reconfiguration outlined in project 1. Information related to the Aqua-Aerobic and Kruger disc filters are located in Appendix H and Appendix I respectively. Project 1 has an estimated cost of \$6.1 million. Project 2 and 3 will likely be

designed after the design and construction for project 1 is initiated. The cost estimate of each item is attached in Appendix J. It is important to note that the plant's capacity increases to 2.0 MGD after improvements in projects 2 and 3 are complete.

**Table 8-5 Improvements by Project**

	Item	Capital Cost
<b>Project 1 - Renewal 2022</b>	Headworks Screening and Pumping	\$1,861,000
	Disk Filtration	\$3,354,000
	Chemical phosphorus removal	\$534,000
	Ventilation (optional)	\$359,000
	<b>Subtotal</b>	<b>\$6,109,000</b>
<b>Project 2 - Disinfection</b>	Convert to UV Disinfection	\$1,070,000
	<b>Subtotal</b>	<b>\$1,070,000</b>
<b>Project 3 - Expansion</b>	Primary Clarifier Addition with CEPT	\$1,093,000
	Excess Flow Clarifiers	\$515,000
	Aeration Basins – Replace Diffusers/DO Probes	\$226,000
	<b>Subtotal</b>	<b>\$1,834,000</b>
	<b>Total</b>	<b>\$9,012,000</b>