National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Bowling Green Water Pollution Control (WPC)

Public Notice No.: 22-02-025
Public Notice Date: February 22, 2022
Comment Period Ends: March 25, 2022

Ohio EPA Permit No.: 2PD00009*TD
Application No.: OH0024139

Name and Address of Applicant:
City of Bowling Green
304 North Church Street
Bowling Green, OH 43402

Name and Address of Facility Where Discharge Occurs:
Bowling Green WPC
901 North Dunbridge Road
Bowling Green, OH 43402
Wood County

Receiving Water: Poe Ditch

Subsequent Stream Network: North Branch Portage River to Portage River to Lake Erie

INTRODUCTION

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (CFR), Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency (Ohio EPA), as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act (CWA) and Ohio Water Pollution Control Law (Ohio Revised Code [ORC] 6111). Decisions to award variances to Water Quality Standards (WQS) or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

Antidegradation provisions in Ohio Administrative Code (OAC) Chapter 3745-1 describe the conditions under which water quality may be lowered in surface waters. No antidegradation review was necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the CWA. Many of these have already been established by the United States Environmental Protection Agency (U.S. EPA) in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations (WLAs) are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the WLA for a pollutant to a measure of the effluent quality. The measure of effluent quality is called Projected Effluent Quality (PEQ). This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

SUMMARY OF PERMIT CONDITIONS

The effluent limits and/or monitoring requirements proposed for all parameters are the same as in the current permit, except those listed below.

New limits for bis(2-ethylhexyl) phthalate (B2EHP) and methyl blue activated substances (MBAS) are proposed due to reasonable potential to exceed the wasteload allocation. A 36-month compliance schedule is proposed for the permittee to attain compliance with the new limits.

Lower final effluent limits are proposed for ammonia (summer and winter), due to plant design limits not being protective of water quality standards. A 36-month compliance schedule is proposed for the permittee to attain compliance with the lower limits.

Annual chronic toxicity monitoring with the determination of acute endpoints for *Ceriodaphnia dubia* and *Pimephales promelas* is proposed for the life of the permit. This satisfies the minimum testing requirements of Ohio Administrative Code (OAC) 3754-33-07(B)(11) and will adequately characterize toxicity in the effluent.

Monitoring for *E. coli* at upstream station 801 and downstream station 901 is proposed to change from summer to June-August and from monthly to once per two weeks.

New monitoring for total phosphorus as station 901 is proposed to provide data for future water quality studies.

Monitoring for dissolved oxygen, pH, and temperature at station 801, as well as monitoring for dissolved oxygen at station 901, is proposed to be removed.

Monitoring for CBOD5 and TSS at CSO station 002 is proposed to be removed.

A new condition is proposed in Part II of the permit that requires continued compliance with the Long Term Control Plan level of control for combined sewer overflows.

In Part II of the permit, special conditions are included that address sanitary sewer overflow (SSO) reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; storm water compliance; pretreatment program requirements; plant performance evaluation (PPE); CSO public notification; and outfall signage.

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PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

Legal Records Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216-1049

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

The Ohio EPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the draft permit, contact Peggy Christie at 419-373-3006 or peggy.christie@epa.ohio.gov or David Brumbaugh at 614-644-2138 or david.brumbaugh@epa.ohio.gov.

INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

This draft permit may contain proposed water-quality-based effluent limits (WQBELs) for parameters that **are not** priority pollutants. (See the following link for a list of the priority pollutants: http://epa.ohio.gov/portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf .) In accordance with ORC 6111.03(J)(3), the Director established these WQBELs after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to conditions calculated to result from that action and their relation to benefits to the people of the state and to accomplishment of the purposes of this chapter. This determination was made based on data and information

available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

This public notice allows the permittee to provide to the Director for consideration during this public comment period additional site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness for achieving compliance with the proposed final effluent limitations for these parameters. The permittee shall deliver or mail this information to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, a written request for any additional time shall be sent to the above address no later than 30 days after the Public Notice Date on Page 1.

Should the applicant determine that compliance with the proposed WQBELs for parameters other than the priority pollutants is technically and/or economically unattainable, the permittee may submit an application for a variance to the applicable WQS used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in OAC 3745-33-07(D). The permittee shall submit this application to the above address no later than 30 days after the Public Notice Date.

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC 3745-1-39. The permittee shall submit written notification regarding their intent to develop site specific WQS for parameters that are not priority pollutants to the above address no later than 30 days after the Public Notice Date.

LOCATION OF DISCHARGE/RECEIVING WATER USE CLASSIFICATION

Bowling Green WPC discharges to Poe Ditch at River Mile 2.5. Figure 1 shows the approximate location of the facility.

This segment of the Poe Ditch is described by Ohio EPA River Code: 16-108, Hydrologic Unit Code: 04100010-03-01, County: Wood, Ecoregion: Huron-Erie Lake Plain. Poe Ditch is designated for the following uses under Ohio's WQS (OAC 3745-1-23): Limited Resource Water, Agricultural Water Supply, Industrial Water Supply, Secondary Contact Recreation.

A short distance downstream of Bowling Green WPC, Poe Ditch discharges to the North Branch of the Portage River at River Mile 8.56 (Ohio EPA River Code: 16-007). The North Branch of the Portage River is designated for the following uses under Ohio's WQS (OAC 3745-1-23): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreation. Water quality criteria associated with these uses are applied to Bowling Green WPC to be protective of this higher quality stream.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric WQS are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA goals because of human-caused conditions that cannot be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact Recreation) and wading only (Secondary Contact which are generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural water supply and industrial water supply.

FACILITY DESCRIPTION

Bowling Green WPC was constructed in 1982. The most recent facility upgrade was completed in 2021, when improvements to the aeration system were installed to improve control for biological nutrient removal. The average design flow is 10 million gallons per day (MGD) and the peak hydraulic capacity is 30 MGD. Bowling Green WPC serves the City of Bowling Green and the Villages of Portage and Rudolph, a total population of approximately 32,000. Bowling Green WPC has the following treatment processes (Figure 2):

- Bar, mechanical screen
- Grit, scum removal
- Primary sedimentation
- Secondary treatment - activated sludge
- Secondary clarification

- Tertiary filtration – cloth media
- Ultraviolet disinfection

Bowling Green WPC does not have any bypasses. The facility has a 4.0 MG equalization basin, which can store peak flows until influent flow rates subside. The City of Bowling Green has 60% separate sewers and 40% combined sewers in the collection system.

The City of Bowling Green has an approved pretreatment program which regulates six industrial users. The City has 2 categorical users that discharge 0.021 MGD of flow. The City also has 4 significant non-categorical users that discharge 0.093 MGD of flow.

Bowling Green WPC utilizes the following sewage sludge treatment processes (Figure 3):

- Aerobic digestion
- Centrifuge dewatering

Table 1 shows the last five years of sludge removed from Bowling Green WPC. Treated sludge is disposed of via distribution of exceptional quality biosolids, land application of Class B biosolids, transport to a landfill, or transfer to another NPDES permit holder.

The City of Bowling Green's Combined Sewer Overflow Long Term Control Plan (LTCP) was approved by Ohio EPA in March 2008. The City has completed implementation of its LTCP and submitted an LTCP Evaluation Report, which concluded that the City had attained compliance with LTCP level of control of four or fewer CSO events per typical year. A new condition is proposed to be added to the permit which requires the City to demonstrate continued compliance with the LTCP level of control. See Part II of the permit for details.

DESCRIPTION OF EXISTING DISCHARGE

Table 2 presents the effluent violations for Bowling Green WPC during the previous five years. Many of these violations are associated with the recent facility improvements (2020-21), during which the aeration treatment systems were operating at half capacity.

Table 3 presents the average annual effluent flow rate for Bowling Green WPC for the previous five years. Bowling Green WPC estimates there is an infiltration/inflow (I/I) rate to the collection system of 0.5 MGD but performs the following activities to minimize I/I: inspects for sources via smoke testing and televising sewers and laterals, and maintains a prioritized list of sources to remove or repair.

SSOs are reported at station 300. No SSOs were reported over the past five years.

Table 4 presents the number of combined sewer overflow (CSOs) reported by Bowling Green WPC during the previous five years. Bowling Green WPC has one combined sewer overflow outfall, reported under Outfall 002.

Table 5 presents data characterizing the annual total phosphorus load from Bowling Green WPC during the previous five years.

Table 6 presents chemical specific data compiled from data reported in annual pretreatment reports. Because this data is substantially identical to the application requirements in CFR 122.21(j), the Director has waived the requirement for submittal of supplemental effluent testing data as part of the NPDES renewal application.

Table 7 presents a summary of unaltered Discharge Monitoring Reports (DMRs). Data are presented for the period September 2016 through August 2021, and current permit limits are provided for comparison.

Table 8 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 9 summarizes the results of acute and chronic Whole Effluent Toxicity (WET) tests of the final effluent, using the water flea (*Ceriodaphnia dubia*) and fathead minnow (*Pimephales promelas*) as test organisms.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

Pursuant to Section 303(d) of the Clean Water Act, each state is required to develop and submit a list to US EPA of its impaired and threatened waters (e.g. stream/river segments, lakes). For each water on the list, the state identifies the pollutant(s) causing the impairment, when known. The North Branch Portage River watershed assessment unit, which includes Poe Ditch in the vicinity of Bowling Green WPC, is listed as impaired for aquatic life, recreation, and human health (fish tissue) use on Ohio's 303(d) list.

The Total Maximum Daily Load (TMDL) program focuses on identifying and restoring polluted rivers, streams, lakes and other surface water bodies. A TMDL is a written, quantitative assessment of water quality problems in a water body and contributing sources of pollution. It specifies the amount a pollutant needs to be reduced to meet water quality standards (WQS), allocates pollutant load reductions, and provides the basis for taking actions needed to restore a water body. A Total Daily Maximum Load (TMDL) report was approved for the Portage River basin in September 2011. The TMDL is based on data collected in 2008 and originally reported in the technical support document (TSD) *Biological and Water Quality Survey of the Portage River Basin, Select Maumee River Tributaries, and Select Lake Erie Tributaries, 2006 - 2008*.

An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

In evaluating this data, Ohio EPA attempts to link environmental stresses and measured pollutant exposure to the health and diversity of biological communities. Stresses can include pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Indicators of exposure to these stresses include whole effluent toxicity tests, fish tissue chemical data, and fish health biomarkers (for example, fish blood tests).

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-1). These criteria apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity and modified Index of Well-Being, which indicate the response of the fish community, and the Invertebrate Community Index, which indicates the response of the macroinvertebrate community. Numerical criteria are broken down by ecoregion, use designation, and stream or river size. Ohio has five ecoregions defined by common topography, land use, potential vegetation and soil type.

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 10) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location.

The North Branch Portage River is impaired for aquatic life use due to nutrient enrichment downstream of Bowling Green WPC. The TSD identified Bowling Green WPC as a source, showing significant spikes in nutrient concentrations downstream of the facility (Figure 4). The TMDL report assessed multiple scenarios for assigning phosphorus reductions but none resulted in reaching the in-stream target. As a result, the TMDL recommended an implementation strategy to address the identified nutrient impairment with a target effluent concentration of 0.5 mg/L for Bowling Green WPC but no formal wasteload allocation was approved. Based on best technical judgement and using the TMDL as guidance, the monthly average limit for total phosphorus was reduced from 1.0 to 0.7 mg/L in permit 2PD00009*SD.

Reducing phosphorus limits from 1.0 to 0.7 mg/L is an adaptive management approach that has been programmatically implemented in other areas of the state. Under this approach, the facility implements a significant reduction to meet the lower limits, then Ohio EPA resurveys the receiving stream to assess the impact of the load reduction and determine if the reduction was sufficient for attainment of the designated use or if further reductions are required. Bowling Green WPC has recently been upgraded to improve the biological nutrient removal process but Ohio EPA has not yet resurveyed the North Branch Portage River, therefore this permit proposes that the same phosphorus limits be continued under the adaptive management approach.

The aquatic life use in North Branch Portage River is also impaired due to siltation caused by channelization.

Impairments of the primary contact recreation use due to high *E. coli* levels were identified in Poe Ditch and on the North Branch Portage River up-and downstream of Poe Ditch. Home sewage treatment systems (HSTS), agriculture, and Bowling Green WPC were identified as sources of the impairment. To reduce bacteria loads to the receiving stream, the City has implemented its Long Term Control Plan to reduce untreated CSO discharges and has had only two violations of the *E. coli* effluent limits at the treatment facility in the last five years.

The human health use in North Branch Portage River is impaired due to high polychlorinated biphenyl (PCB) levels found in the tissue of sport fish.

The *Biological and Water Quality Survey of the Portage River Basin, Select Maumee River Tributaries, and Select Lake Erie Tributaries, 2006 – 2008* is available through the Ohio EPA, Division of Surface Water website at: https://epa.ohio.gov/static/Portals/35/documents/PortageLETribsMaumeeTribs2010.pdf

The 2020 Ohio Integrated Report is available through the Ohio EPA, Division of Surface Water website at: https://epa.ohio.gov/dsw/tmdl/OhioIntegratedReport

The Portage River TMDL is available through the Ohio EPA, Division of Surface Water website at: https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/portage-river-and-toussaint-river-watersheds

DEVELOPMENT OF WATER-QUALITY-BASED EFFLUENT LIMITS

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

Parameter Selection

Effluent data for the Bowling Green WPC were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA, DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	September 2016 through August 2021
Pretreatment data	2016-2021

Statistical Outliers and Other Non-representative Data

The data were examined and one value for whole effluent toxicity in fathead minnows (1.1 TUc, 4/15/18) was excluded due to errors in the sampling procedure. This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points (see Table 11). See Modeling Guidance #1 for more information on PEQ calculations, available through the Ohio EPA, Division of Surface Water website at: https://www.epa.ohio.gov/portals/35/guidance/model1.pdf

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 11).

Wasteload Allocation

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. For Bowling Green WPC, the receiving waterbody is considered to be the North Branch Portage River where Poe Ditch enters the stream. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not break down in the receiving water. For free flowing streams, WLAs using this method are calculated using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations. The applicable waterbody uses for this facility's discharge and the associated stream design flows are as follows:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Wildlife		Annual 90Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 16, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 11 and Table 12. The WLA results to maintain all applicable criteria are presented in Table 13.

Whole Effluent Toxicity Wasteload Allocation

WET is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

WQS for WET are expressed in Ohio's narrative "free from" WQS rule [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs as if they were water quality criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Bowling Green WPC, the WLA values are 0.3 TU_a and 1.0 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC_{25}):

$$TU_c = 100/IC_{25}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

TU_c = 100/geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC_{50}) for the most sensitive test species:

$$TU_a = 100/LC_{50}$$

This equation applies outside the mixing zone for all designated waters.

When the acute WLA is less than 1.0 TU_a, it may be defined as:

Downstream Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2	30
greater than 2 but less than 2.7	40
2.7 to 3.3	50

$$\text{Downstream Dilution Ratio} = \frac{\text{1Q10 + [WWTP flow rate]}}{\text{[WWTP flow rate]}} = \frac{0.285 \text{ cfs} + 15.472 \text{ cfs}}{15.472 \text{ cfs}} = 1.01$$

The acute WLA for Bowling Green WPC is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.01.

REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 13. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 8, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 14.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 15 presents the final effluent limits and monitoring requirements proposed for Bowling Green WPC outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Dissolved Oxygen, 5-day Carbonaceous Biochemical Oxygen Demand, Total Suspended Solids
The current limits for dissolved oxygen, total suspended solids, and 5-day carbonaceous biochemical oxygen demand (CBOD5) are all based on plant design criteria. These limits have been effective since 1988 and are more stringent than the Secondary Treatment Standards in 40 CFR Part 133. The current dissolved oxygen limit is protective of WQS.

Ammonia (Summer and Winter)
The current effluent limits for ammonia (summer and winter) based on plant design were evaluated using the WLA procedures and were not protective of WQS for ammonia toxicity. Lower limits based on the WLA are proposed. A review of recent data suggests that the facility is not able to comply with the proposed limits (eleven violations of the existing limits reported in the last three years), therefore a 36-month compliance schedule is proposed for the permittee to attain compliance with the new limits.

Oil & Grease, pH, *E. coli*
Limits proposed for oil and grease, pH, and *Escherichia coli* are based on WQS (OAC 3745-1-35 and 37). The E. coli limits are set to the Primary contact recreation *E. coli* standards which apply to the North Branch Portage River.

Bis(2-ethylhexyl) Phthalate, Mercury, and Methyl Blue Activated Substances (MBAS)
The Ohio EPA risk assessment (Table 14) places bis(2-ethylhexyl) phthalate (B2EHP), mercury, and Methyl Blue Activated Substances (MBAS) in group 5. This placement, as well as the data in Tables 7 and 8, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA (B2EHP and MBAS) or the PEQ is between 75 and 100 percent of the WLA and certain conditions exist that increase the risk to the environment (mercury). Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). New limits are proposed for B2EHP and MBAS, therefore a 36-month schedule is proposed for the permittee to attain compliance.

For B2EHP, monthly and daily limits are based on aquatic life average and maximum criteria, respectively. For mercury, monthly and daily limits are based on wildlife average and aquatic life maximum criteria, respectively. For MBAS, the daily limit is based on the aquatic life maximum criteria.

Total Filterable Residue
The Ohio EPA risk assessment (Table 14) places total filterable residue in group 4. This placement, as well as the data in Tables 7 and 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2).

Cadmium, Chromium, Copper, Dissolved Hexavalent Chromium, Free Cyanide, Lead, Nickel, and Zinc
The Ohio EPA risk assessment (Table 14) places cadmium, chromium, copper, dissolved hexavalent chromium, free cyanide, lead, nickel, and zinc in groups 2 and 3. This placement, as well as the data in Tables 7 and 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to document that these pollutants continue to remain at low levels.

Antimony, Arsenic, Molybdenum, and Selenium
The Ohio EPA risk assessment (Table 14) places antimony, arsenic, molybdenum, and selenium in groups 2 and 3. This placement, as well as the data in Tables 7 and 8, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed.

Flow Rate, Precipitation, Water Temperature
Monitoring for flow rate, precipitation, and water temperature parameters is proposed to continue in order to evaluate the performance of the treatment plant.

Nitrate plus Nitrite and Total Kjeldahl Nitrogen
The North Branch Portage River watershed is listed as impaired for aquatic life due to nutrient loading. As shown in Figure 4, Bowling Green WPC discharges a significant nutrient load to the river. Therefore, new monitoring for total Kjeldahl nitrogen and continued monitoring for nitrate plus nitrite is proposed. Continued monitoring for nitrate plus nitrite and total Kjeldahl nitrogen at the upstream and downstream stations also is proposed. Nitrate plus nitrite was evaluated using WLA procedures and does not have reasonable potential to exceed the WQS.

Total Phosphorus and Dissolved Orthophosphate
Effluent limits for total phosphorus are proposed to continue, based on best technical judgement (see page 9). Monitoring for dissolved orthophosphate (as P) is required by ORC 6111.03. This monitoring will further develop nutrient datasets that are used in stream and watershed assessments and studies. Because Ohio EPA monitoring, as well as other in-stream monitoring, for dissolved orthophosphate is taken by grab sample, grab samples are proposed for orthophosphate to maintain consistent data. The grab samples must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

Whole Effluent Toxicity Reasonable Potential
The acute and chronic toxicity results in Table 9 show that there have been no detections of toxicity for *Ceriodaphnia dubia* and *Pimephales promelas*. Under the provisions of 40 CFR Part 132, Appendix F, Procedure 6, no PEQ values can be calculated. Reasonable potential for toxicity is not demonstrated. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual chronic toxicity monitoring with the determination of acute endpoints is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11).

Whole effluent toxicity monitoring is proposed to be changed from April to September to better assess ammonia toxicity.

Additional Monitoring Requirements
Monitoring for *E. coli* at upstream monitoring station 801 and downstream monitoring station 901 is proposed to increase in frequency to once per two weeks for the months of June to August. This change will facilitate evaluation of designated use attainment.

New monitoring for total phosphorus as station 901 is proposed to provide data for future water quality studies.

Monitoring for dissolved oxygen, pH, and temperature at station 801, as well as monitoring for dissolved oxygen at station 901, is proposed to be removed.

Monitoring for CBOD5 and TSS at CSO station 002 is proposed to be removed.

Additional monitoring requirements proposed at the final effluent, influent and upstream/downstream stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

Sludge
Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: land application (station 581), exceptional quality biosolids removal (station 584), removal to a landfill (station 586), or transfer to another NPDES permit holder (station 588).

OTHER REQUIREMENTS

Compliance Schedule
Pretreatment Local Limits Review - A 6-month compliance schedule is proposed for the City to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. If revisions to local limits are required, the City must also submit a pretreatment program modification request. Details are in Part I.C of the permit.

Final Effluent Limits for Ammonia, B2EHP, and MBAS - A 36-month compliance schedule is proposed for the Bowling Green WPC to meet the lower effluent limits for ammonia (summer and winter), bis(2-ethylhexyl) phthalate (B2EHP), and methyl blue activated substances (MBAS). See Part I.C of the permit for details.

Phosphorus Optimization – An evaluation report must be completed and submitted as part of the next NPDES renewal application. Details are in Part I.C of the permit.

Sanitary Sewer Overflow Reporting
Provisions for reporting SSOs are again proposed in this permit. These provisions include: the reporting of the system-wide number of SSO occurrences on monthly operating reports; telephone notification of Ohio EPA and the local health department, and 5-day follow up written reports for certain high risk SSOs; and preparation of an annual report that is submitted to Ohio EPA and made available to the public. Many of these provisions were already required under the "Noncompliance Notification", "Records Retention", and "Facility Operation and Quality Control" general conditions in Part III of Ohio NPDES permits.

Operator Certification and Operator of Record
Operator certification requirements have been included in Part II of the permit in accordance with rules effective on August 15, 2018 (OAC 3745-7). These rules require the Bowling Green WPC to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works and sewerage system.

Low-Level Free Cyanide Testing
Currently there are three approved methods for free cyanide listed in 40 CFR 136 that have a quantification level lower than water quality-based effluent limits:

- ASTM D7237-10, OIA-1677-09, and ASTM D4282-02. (Note: The use of ASTM D4282-02 requires supporting documentation that it meets the requirement of a "sufficiently sensitive" test procedure as defined in 40 CFR 122.44(i)(1)(iv)).

These methods will allow Ohio EPA to make more reliable water quality-related decisions regarding free cyanide. Because the quantification levels are lower than any water quality-based effluent limits, it will also be possible to directly evaluate compliance with free cyanide limits.

CSO Level of Control
The City's 2015 LTCP Evaluation Report concluded that the City had attained compliance with the LTCP level of control of four or fewer CSO events per typical year. A new condition is proposed to be added to the permit which requires the permittee to demonstrate continued compliance with the LTCP level of control. See Part II for additional details.

CSO Public Notification
The rule for Public Notification Requirements for Combined Sewer Overflows to the Great Lakes Basin, i.e. 40 CFR 122.38, was finalized by U.S. EPA on December 17, 2017, published in the Federal Register on January 8, 2018, and became effective on Wednesday, February 7, 2018. This rule protects public health by ensuring timely notification to the public and to public health departments, public drinking water facilities, and other potentially affected public entities. This rule applies to CSO dischargers within Ohio's Lake Erie Basin. Under this rule, CSO dischargers are subject to the following requirements:

• A CSO Public Notification Plan must be developed and submitted to Ohio EPA on or prior to August 7, 2018. The City of Bowling Green's Public Notification Plan was approved by Ohio EPA on September 19, 2018.

• Implementation of the Public Notification Plan.

• An Annual Report of data pertaining to CSO activity must be published on or prior to May 1 of every year, beginning in 2019. Ohio EPA and U.S. EPA must be provided with instructions on how to access the Annual Report.

Part II of the permit includes requirements for public notification of CSOs and the posting of an annual CSO report.

Method Detection Limit Reporting
When submitting monitoring results in eDMR, the permittee must report all detected concentration values above the method detection limit (MDL), even if that value is below the quantification level, as indicated in Permit Guidance 9: *Limits below Quantification*. A detection above the MDL indicates the presence of a pollutant with strong confidence, which must be considered in reasonable potential analyses. Per OAC 3745-33-07(C)(2)(c), for the purpose of assessing compliance, any value reported below the quantification level shall be considered in compliance with an effluent limit.

Outfall Signage
Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the Poe Ditch providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Part III
Part III of the permit details standard conditions that include monitoring, reporting requirements, compliance responsibilities, and general requirements.

Storm Water Compliance
To comply with industrial storm water regulations, the permittee submitted a form for "No Exposure Certification" which was signed on January 12, 2022. The certification number is 2GRN00705*AG. Compliance with the industrial storm water regulations must be re-affirmed every five years. No later than January 12, 2027, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial storm water regulations.

Figure 1. Location of Bowling Green WPC

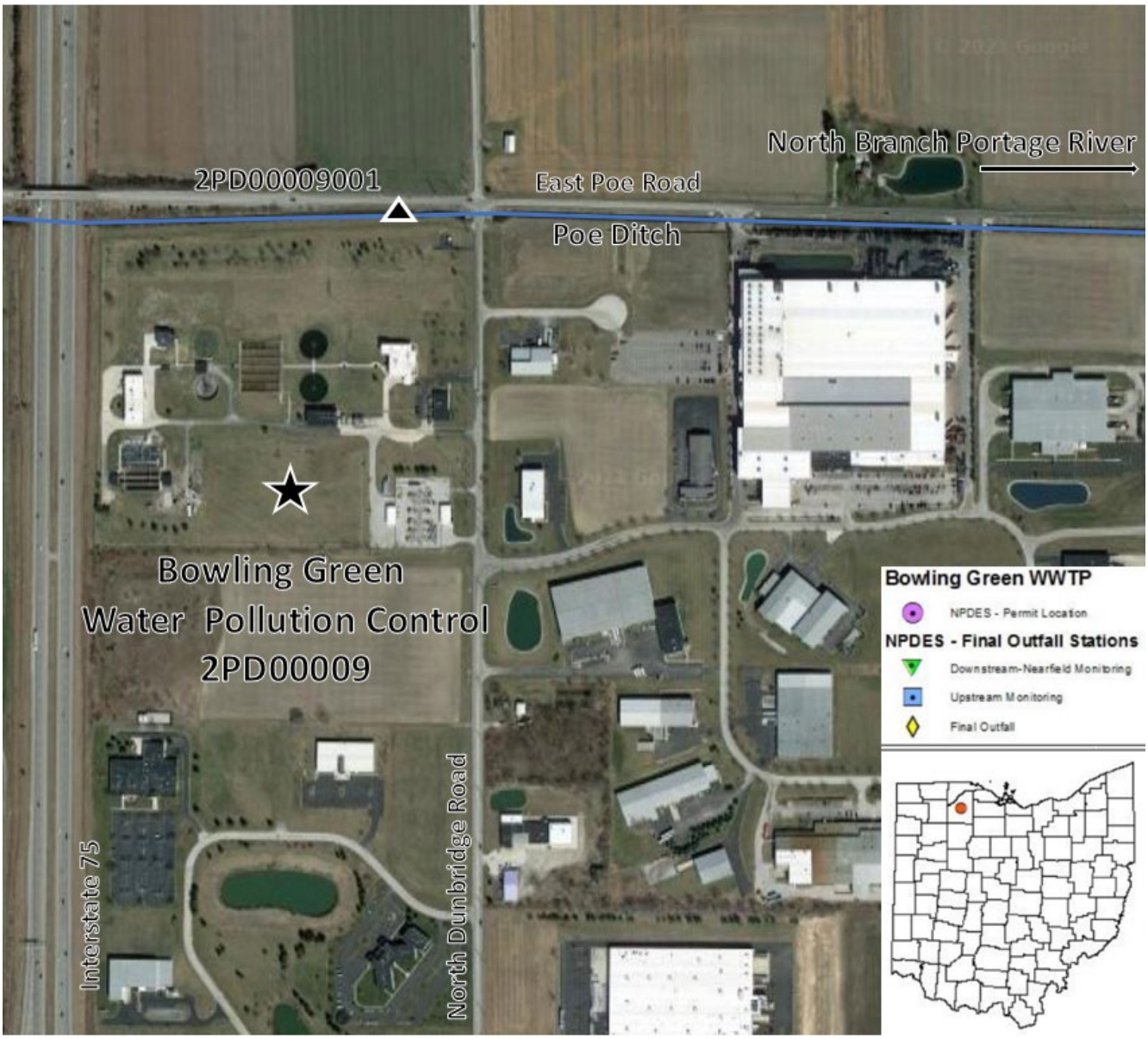


Figure 2. Diagram of Wastewater Treatment System

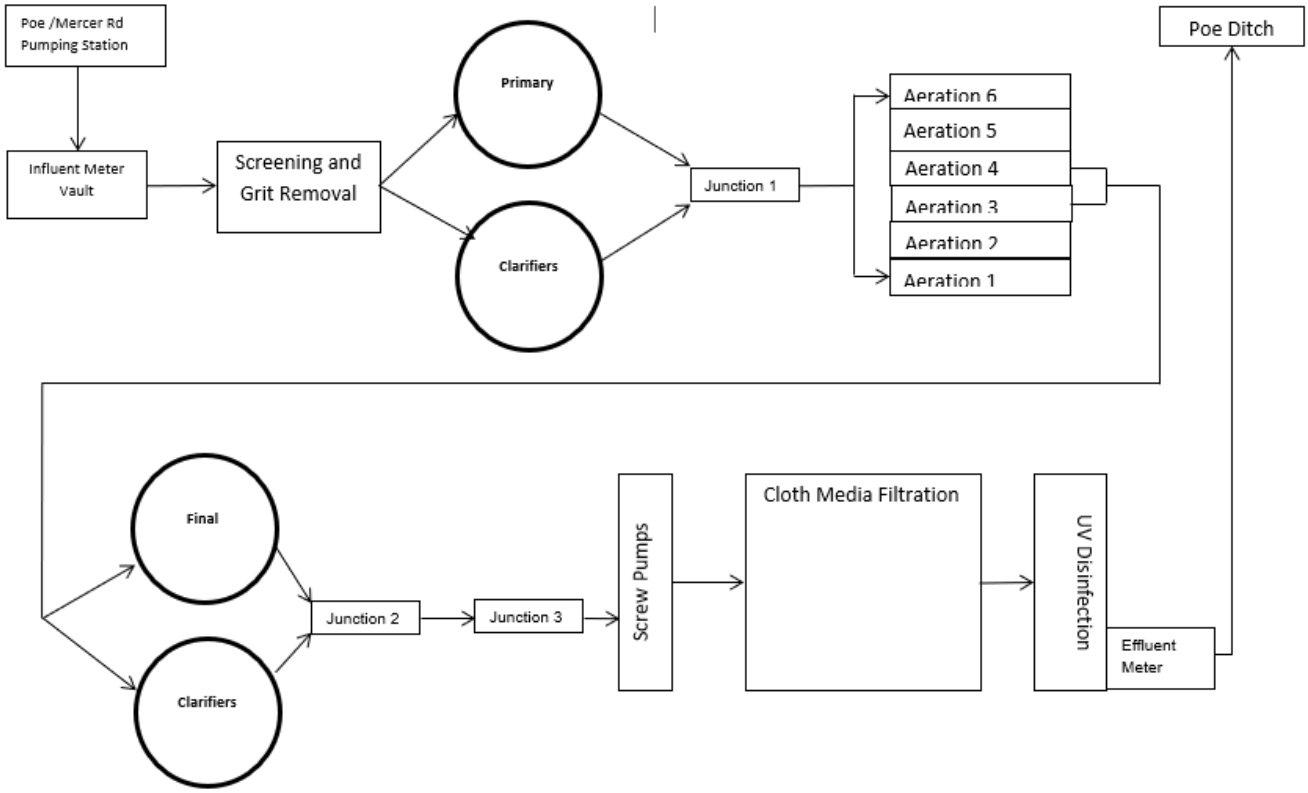


Figure 3. Diagram of Solids Treatment System

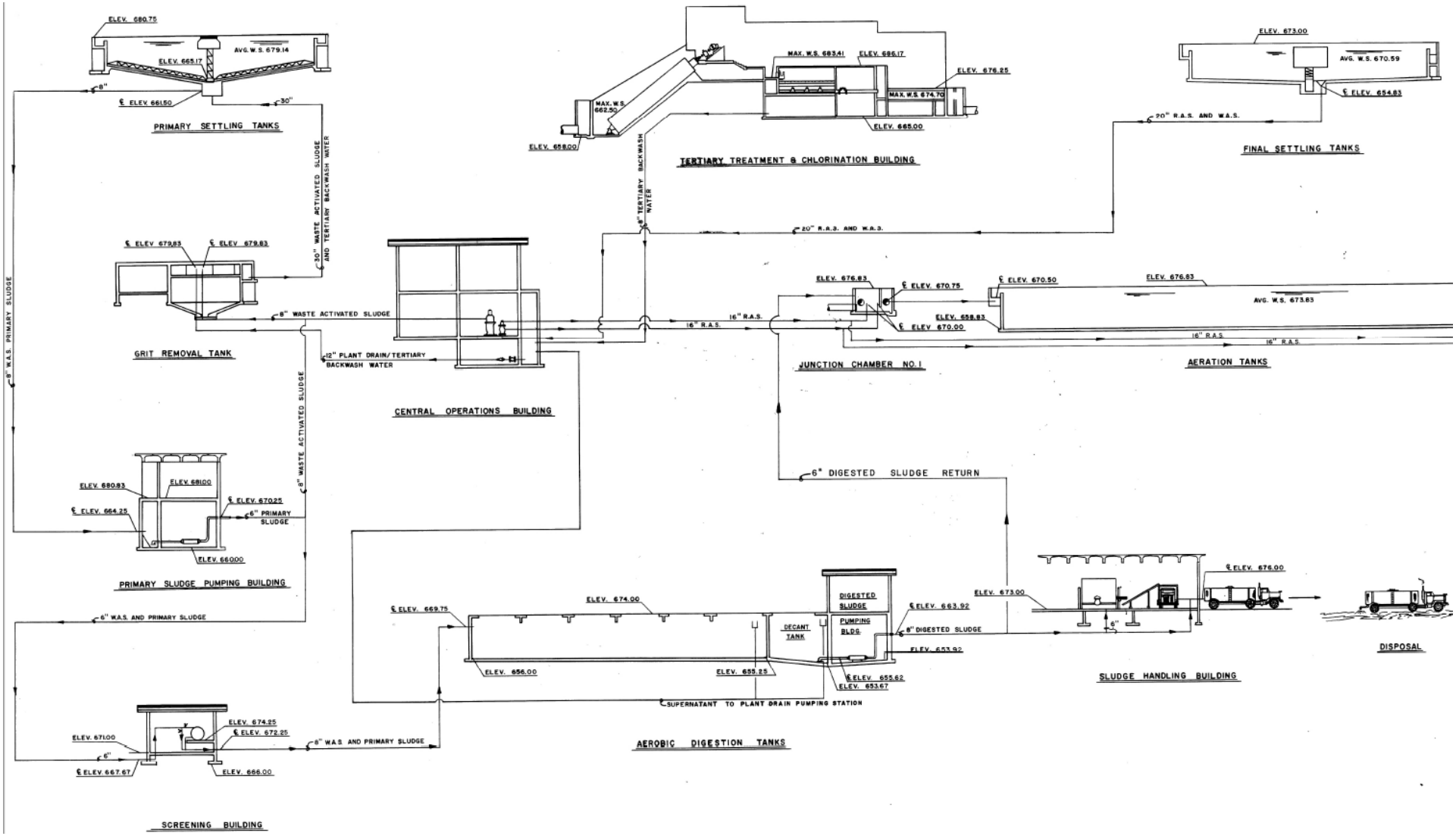
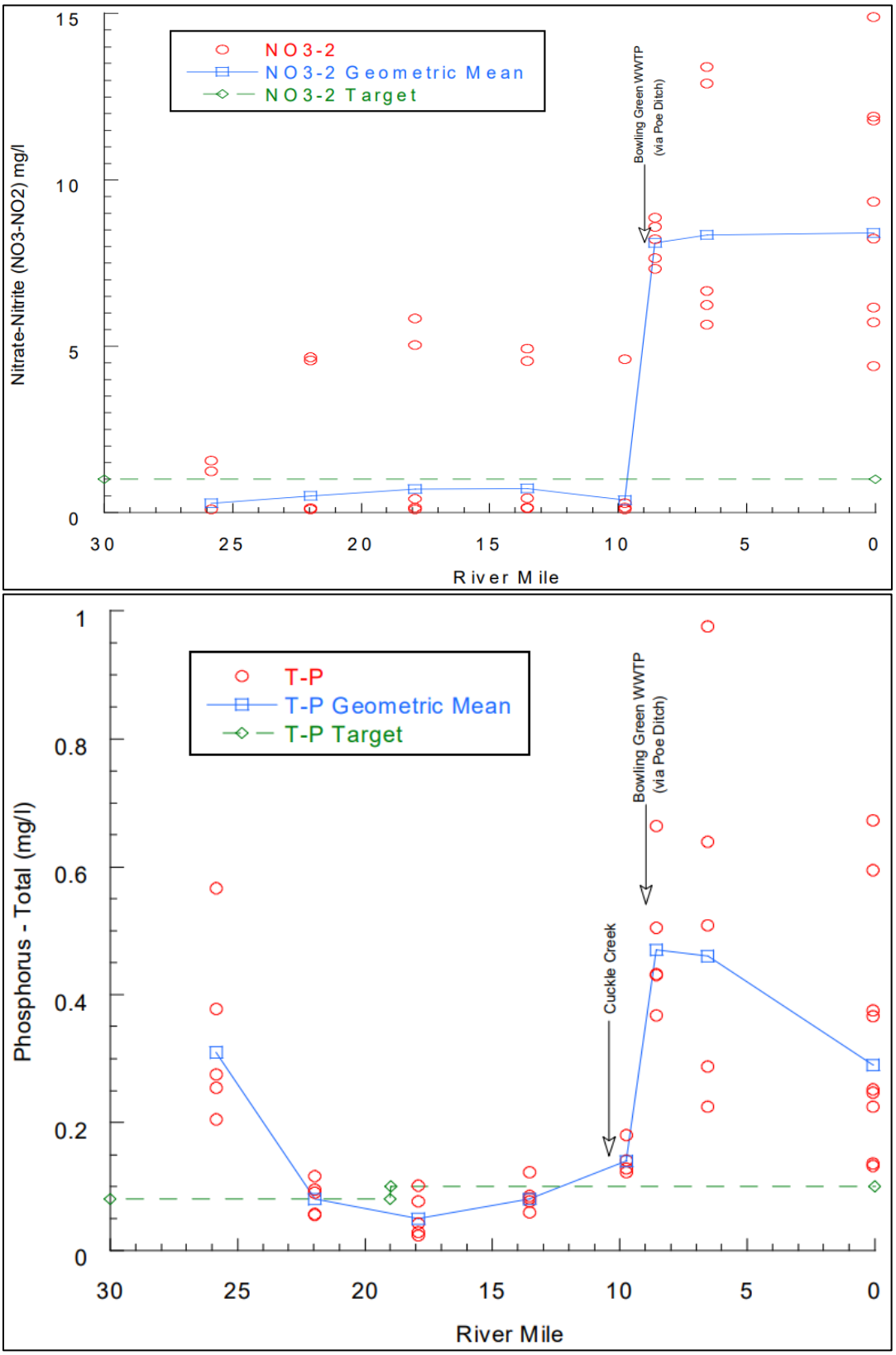


Figure 4. Concentrations for nitrate plus nitrite and total phosphorus in North Branch Portage River



From *Biological and Water Quality Survey of the Portage River Basin, Select Maumee River Tributaries, and Select Lake Erie Tributaries, 2006 – 2008*, Figures 31 and 32

Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2016[a]	314
2017	743
2018	710
2019	824
2020	1000
2021[b]	345

[a] Data from September through December only
[b] Data from January through August only

Table 2. Effluent Violations for Outfall 001

Parameter	2016[a]	2017	2018	2019	2020	2021[b]	Total
CBOD 5 day	0	1	1	1	5	1	**9**
E. coli	0	0	0	0	1	1	**2**
Mercury	0	0	2	1	0	0	**3**
Ammonia	0	0	0	3	3	5	**11**
Phosphorus	0	0	0	0	2	0	**2**
Total Suspended Solids	0	1	0	2	4	0	**7**
Fecal Coliform in Sludge	0	0	1	0	0	0	**1**
Total	**0**	**2**	**4**	**7**	**15**	**7**	**35**

[a] Data from September through December only
[b] Data from January through August only

Table 3. Average Annual Effluent Flow Rates

	Annual Flow (MGD)		
Year	50th Percentile	95th Percentile	Maximum
2016[a]	4.25	9.05	20.04
2017	5.21	15.49	29.35
2018	5.46	13.60	26.27
2019	5.71	14.88	27.08
2020	4.62	12.12	25.33
2021[b]	4.54	11.84	18.03

[a] Data from September through December only
[b] Data from January through August only
MGD = million gallons per day.

Table 4. Combined Sewer Overflow Discharges

Parameter	2016[a]	2017	2018	2019	2020	2021[b]
Outfall 002						
Occurrences	2	6	8	4	3	4
Volume (million gallons)	26.98	126.43	52.95	35.66	42.58	44.94

[a] Data from September through December only
[b] Data from January through August only

Table 5. Calculated Total Phosphorus Loadings

Year	n	Annual Median Concentration (mg/L)	Median Flow Rate (MGD)	Median Loading (kg/day)
2016[a]	8	0.65	4.25	10.45
2017	25	0.5	5.21	9.85
2018	24	0.4	5.46	8.26
2019	27	0.2	5.71	4.32
2020	43	0.3	4.62	5.24
2021[b]	24	0.4	4.54	6.87

[a] Data from September through December only
[b] Data from January through August only
MGD = million gallons per day
n = number of samples

Table 6. Effluent Characterization Using Pretreatment Data

Parameter	Units	10/11/2016	10/3/2017	10/9/2018	10/8/2019	10/13/2020
Antimony	µg/L	AA (5)	AA (5)	AA (5)	AA (5)	2.5
Arsenic	µg/L	AA (5)	AA (5)	AA (5)	AA (5)	0.8
Bis(2-ethylhexyl) phthalate	µg/L	AA (5)	AA (5)	5.8	AA (5)	AA (5)
Cadmium	µg/L	AA (3)	AA (3)	AA (3)	AA (3)	AA (0.1)
Chromium	µg/L	AA (7)	AA (7)	AA (7)	AA (7)	1.7
Copper	µg/L	AA (8)	AA (8)	AA (8)	AA (8)	2.6
Lead	µg/L	AA (10)	AA (10)	AA (10)	AA (10)	0.4
Mercury	ng/L	0.84	0.923	1.67	AA (0.5)	1.02
Molybdenum	µg/L	AA (20)	25	22	AA (20)	13
Nickel	µg/L	AA (8)	AA (8)	AA (8)	AA (8)	5.5
Selenium	µg/L	AA (4)	AA (4)	AA (4)	AA (4)	0.9
Zinc	µg/L	48	39	36	33	38

AA = not-detected (analytical method detection limit)

Table 7. Effluent Characterization Using Self-Reported Discharge Monitoring Reports (DMR)

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	°C	- - - - - Monitor - - - - -		1795	16.5	24.1	5.33 - 25.7
Total Precipitation	Annual	Inches	- - - - - Monitor - - - - -		1795	< .01	.633	0 - 3.2
Dissolved Oxygen	Annual	mg/L	--	5.0[m]	9.97	8.5**	6.31 - 12.7	0 - 6890
TSS	Annual	kg/day	455	682[w]	60.4	238	0 - 6890	0 - 104
TSS (2017-21)	Annual	mg/L	12	18[w]	677	3.2	7.52	0 - 104
TSS (2016)	Summer	mg/L	12.0	18.0[w]	48	3.6	8.26	0 - 12
Oil and Grease	Winter	mg/L	--	10.0	123	--	--	< 5
Ammonia	Summer	kg/day	68.2	103[w]	355	< 2.92	57.1	0 - 286
Ammonia	Summer	mg/L	1.8	2.7[w]	355	< .2	2.45	0 - 15.5
Ammonia	Winter	kg/day	182	277[w]	< 3.01	143	0 - 443	0 - 9.1
Ammonia	Winter	mg/L	4.8	7.3[w]	< .2	3.9	0 - 9.1	.42 - 19.4
Nitrite Plus Nitrate	Annual	mg/L	- - - - - Monitor - - - - -		63	8.14	14	.42 - 19.4
Phosphorus, Total	Annual	kg/day	37.9	56.8[w]	297	7.6	34.5	1.18 - 130
Phosphorus, Total	Annual	mg/L	1.0	1.5[w]	297	.4	1.42	.1 - 4.6
Orthophosphate, Dissolved	Annual	mg/L	- - - - - Monitor - - - - -		54	.2	1.47	.03 - 7.33
Free Cyanide	Annual	kg/day	0.208	0.984	4	--	--	< .0688
Free Cyanide (2016)	Annual	mg/L	0.0055	0.026	4	--	--	< .005
Free Cyanide (2019)	Annual	mg/L	- - - - - Monitor - - - - -		2	.00245	.00268	.0022 - .0027
Selenium, TR	Annual	µg/L	- - - - - Monitor - - - - -		4	--	--	< 1
Nickel, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	< 4	8	0 - 9
Zinc, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	44	84.9	21 - 174
Cadmium, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	--	--	< 1
Lead, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	< 5	< 5	0 - 12
Chromium, TR		µg/L	- - - - - Monitor - - - - -		63	< 4	< 4	0 - 5
Copper, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	< 4	6	0 - 10
Chromium, Dissolved Hexavalent	Annual	µg/L	- - - - - Monitor - - - - -		65	--	--	< 5
E. coli	Summer	#/100 mL	126	284[w]	353	18	788	1 - 2710
Methyl Blue Active Substances (MBAS)	Annual	mg/L	- - - - - Monitor - - - - -		244	.155	.45	0 - 2.3

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Bis(2-ethylhexyl) Phthalate	Annual	µg/L	- - - - - Monitor - - - - -		59	< 5	14.5	0 - 80
Flow Rate	Annual	MGD	- - - - - Monitor - - - - -		1795	5.05	13.4	1.59 - 29.4
Mercury (2016)	Annual	kg/day	0.000049	0.0644	5	.0000157	.0000273	.00000963 - .0000279
Mercury (2017-21)	Annual	kg/day	0.00005	0.0644	62	.0000142	.0000376	0 - .00015
Mercury	Annual	ng/L	1.3	1700	67	.61	1.47	0 - 1.77
Free Cyanide (Low-Level)	Annual	µg/L	- - - - - Monitor - - - - -		57	< .002	.00276	0 - .004
Acute Toxicity, *Ceriodaphnia dubia*	Annual	TUa	- - - - - Monitor - - - - -		5	--	--	< .2
Chronic Toxicity, *Ceriodaphnia dubia*	Annual	TUc	- - - - - Monitor - - - - -		5	--	--	< 1
Acute Toxicity, *Pimephales promelas*	Annual	TUa	- - - - - Monitor - - - - -		5	--	--	< .2
Chronic Toxicity, *Pimephales promelas*	Annual	TUc	- - - - - Monitor - - - - -		5	< 1	.88	0 - 1.1
pH, Maximum	Annual	S.U.	--	9.0	1795	7.7	7.9	7.2 - 8.5
pH, Minimum	Annual	S.U.	--	6.5[m]	1795	7.5	7.2*	6.9 - 7.9
Residue, Total Filterable	Annual	mg/L	- - - - - Monitor - - - - -		123	814	1090	372 - 1440
CBOD 5 day	Annual	kg/day	379	455[w]	715	64.7	315	0 - 2330
CBOD 5 day (2017-21)	Annual	mg/L	10	12[w]	667	3.3	9.44	0 - 32.6
CBOD 5 day (2016)	Annual	mg/L	10.0	12.0[w]	48	3.55	7.15	0 - 9
Station 581								
Ammonia (NH3) In Sludge		mg/kg	- - - - - Monitor - - - - -		2	9910	13100	6310 - 13500
Nitrogen Kjeldahl	Annual	mg/kg	- - - - - Monitor - - - - -		2	29200	32100	25900 - 32400
Phosphorus	Annual	mg/kg	- - - - - Monitor - - - - -		2	36600	40700	31900 - 41200
Potassium In Sludge	Annual	mg/kg	- - - - - Monitor - - - - -		2	6840	7520	6080 - 7600
Arsenic	Annual	mg/kg	--	75	2	8.35	8.76	7.9 - 8.8
Cadmium	Annual	mg/kg	--	85	2	.6	1.14	0 - 1.2
Copper	Annual	mg/kg	--	4300	2	408	477	330 - 485
Lead	Annual	mg/kg	--	840	2	75	83.4	65.7 - 84.3
Nickel	Annual	mg/kg	--	420	2	36.3	39.2	33 - 39.5
Zinc	Annual	mg/kg	--	7500	2	1010	1240	752 - 1270

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Selenium	Annual	mg/kg	--	100	2	6.15	6.2	6.1 - 6.2
Fecal Coliform in Sludge	Annual	MPN/G	--	2000000	2	2040	2260	1800 - 2280
Sludge Fee Weight	Annual	dry tons	- - - - - Monitor - - - - -		2	24.5	27.9	20.7 - 28.3
Sludge Weight	Annual	dry Tons	- - - - - Monitor - - - - -		2	24.5	27.9	20.7 - 28.3
Mercury	Annual	mg/kg	--	57	2	.865	1.08	.63 - 1.1
Molybdenum In Sludge	Annual	mg/kg	--	75	2	25	30.2	19.1 - 30.8
Station 584								
Ammonia (NH3) In Sludge	Annual	mg/kg	- - - - - Monitor - - - - -		24	17300	30200	410 - 36600
Nitrogen Kjeldahl	Annual	mg/kg	- - - - - Monitor - - - - -		25	33800	54300	0 - 501000
Phosphorus	Annual	mg/kg	- - - - - Monitor - - - - -		24	35100	42400	2700 - 42600
Potassium In Sludge	Annual	mg/kg	- - - - - Monitor - - - - -		24	6400	9820	1160 - 82000
Arsenic	Annual	mg/kg	41	75	24	7	9.09	4 - 9.3
Cadmium	Annual	mg/kg	39	85	24	1.2	1.59	0 - 4.16
Copper	Annual	mg/kg	1500	4300	24	327	624	52.3 - 1070
Lead	Annual	mg/kg	300	840	24	48.3	75.6	26.4 - 84.3
Nickel - All	Annual	mg/kg	--	420	5	33.6	38.9	29.7 - 39.5
Nickel - Quarterly	Annual	mg/kg	420	420	19	29.2	37.5	20.9 - 38.7
Selenium - All	Annual	mg/kg	2800	7500	24	749	1240	500 - 1560
Selenium - Quarterly	Annual	mg/kg			5	4.7	5.92	3 - 6.2
Fecal Coliform in Sludge	Annual	mg/kg			19	4.9	5.81	3.3 - 5.9
Sludge Fee Weight	Annual	MPN/G	- - - - - Monitor - - - - -		18	137	11500	18.5 - 73000
Sludge Weight	Annual	dry tons	- - - - - Monitor - - - - -		95	9.18	109	.32 - 212
Mercury	Annual	Dry Tons	17	57	95	9.18	109	.32 - 212
Molybdenum In Sludge - All	Annual	mg/kg	--	75	24	.89	1.61	0 - 1.99
Molybdenum In Sludge - Quarterly	Annual	mg/kg	75	75	5	30.6	31.6	17 - 31.8
Station 601								
Total Suspended Solids	Annual	mg/L	- - - - - Monitor - - - - -		733	152	320	40 - 5230
Phosphorus, Total	Annual	mg/L	- - - - - Monitor - - - - -		236	4.1	9.8	1.1 - 25.1
Cyanide, Total	Annual	mg/L	- - - - - Monitor - - - - -		63	< .005	.0079	0 - .009

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Nickel, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	6	12.9	0 - 40
Zinc, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	111	209	44 - 350
Cadmium, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	< 1	< 1	0 - 31
Lead, TR	Annual	µg/L	- - - - - Monitor - - - - -		64	< 5	12	0 - 15
Chromium, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	4	12	0 - 90
Copper, TR	Annual	µg/L	- - - - - Monitor - - - - -		63	44	96.4	18 - 152
Chromium, Dissolved Hexavalent	Annual	µg/L	- - - - - Monitor - - - - -		65	--	--	< 5
Methyl Blue Active Substances (MBAS)	Annual	mg/L	- - - - - Monitor - - - - -		244	1.67	8.02	0 - 44.8
Mercury, Total	Annual	ng/L	- - - - - Monitor - - - - -		59	36.7	88	12 - 302
pH, Maximum	Annual	S.U.	- - - - - Monitor - - - - -		1795	7.5	7.8	4.5 - 10
pH, Minimum	Annual	S.U.	- - - - - Monitor - - - - -		1795	7.2	6.9*	0 - 8.1
CBOD 5 day	Annual	mg/L	- - - - - Monitor - - - - -		707	140	284	29.8 - 525

* = For minimum pH, 5th percentile shown in place of 50th percentile.

** = For dissolved oxygen, 5th percentile shown in place of 95th percentile.

^{w} = weekly average.

^{m} = minimum limit

Table 8. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (summer)*	mg/L	246	91	3.44	4.71
Ammonia (winter)*	mg/L	181	78	4.93	6.68
Antimony	µg/L	5	1	8.395	11.5
Arsenic	µg/L	1	1	3.6208	4.96
Bis(2-ethylhexyl) phthalate	µg/L	65	8	20.79	28.48
Cadmium	µg/L	69	0	--	--
Chromium	µg/L	56	2	3.65	5
Dissolved Hexavalent Chromium	µg/L	66	0	--	--
Copper	µg/L	69	18	5.06	7.6
Free cyanide	µg/L	58	14	2.39	3.51
Lead	µg/L	69	2	8.76	12
Methyl Blue Activated Substances (MBAS) - foaming agents	mg/L	248	227	0.376	0.559
Mercury (BCC)	ng/L	73	52	1.26	1.8
Molybdenum	µg/L	5	3	41.975	57.5
Nickel	µg/L	69	31	6.54	8.91
Nitrate + Nitrite	mg/L	64	64	16.22	24.98
Selenium	µg/L	5	1	1.679	2.3
Total Filterable Residue	mg/L	125	125	995.8	1188.9
Zinc	µg/L	69	69	74.89	104.06

BCC = Bioaccumulative chemical of concern
MDL = analytical method detection limit
PEQ = projected effluent quality
* Per OAC 3745-2-04(E)(3), ammonia PEQ is based on data collected during the following months:
Summer – June through September
Winter – December through February

Table 9. Summary of Acute and Chronic Toxicity Results

Date	*Ceriodaphnia Dubia*		*Pimephales promelas*	
	TU_a	TU_c	TU_a	TU_c
4/14/2017	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
4/15/2018	AA (0.2)	AA (1.0)	AA (0.2)	1.1*
4/19/2019	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
4/17/2020	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
4/8/2021	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)

* Results were excluded from RP analysis due to an error in the sampling procedure
AA = non-detection; analytical method detection limit of 0.2 TU_a, 1.0 TU_c
TU_a = acute toxicity unit
TU_c = chronic toxicity unit

Table 10. Use Attainment Table

Location	RM	Station	Use	Status	Cause	Source
North Branch Portage River at Linwood Road	13.55	S01S11	WWH	PARTIAL	Siltation	Non-irrigated crop production Channelization
North Branch Portage River at State Route 105 (upstream of Poe Ditch)	8.60	S01K01	WWH	NON	Siltation	Non-irrigated crop production Channelization
North Branch Portage River at Silverwood Road	6.55	S01S10	WWH	PARTIAL	Nitrate plus nitrite (as N) Phosphorus (total) Siltation	Bowling Green WPC Non-irrigated crop production Channelization
North Branch Portage River at River Road	0.08	500520	WWH	Full		

Data gathered from *Biological and Water Quality Survey of the Portage River Basin, Select Maumee River Tributaries, and Select Lake Erie Tributaries, 2006 – 2008*
RM = River mile
WWH = warmwater habitat

Table 11. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Average				Maximum	
		Wildlife	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (summer)	mg/L	--	--	--	1.6	--	--
Ammonia (winter)	mg/L	--	--	--	3.8	--	--
Antimony	µg/L	--	780	--	190	900	1800
Arsenic	µg/L	--	580	100	150	340	680
Bis(2-ethylhexyl) Phthalate	µg/L	--	32[c]	--	8.4	1100	2100
Cadmium	µg/L	--	730	50	6.3	17	35
Chromium	µg/L	--	14000	100	230	4800	9600
Dissolved Hexavalent Chromium	µg/L	--	14000	--	11	16	31
Copper	µg/L	--	64000	500	26	43	86
Free Cyanide	µg/L	--	48000	--	5.2	22	44
Lead	µg/L	--	--	100	29	560	1100
MBAS (foaming agents)	mg/L	--	--	--	--	0.5	--
Mercury (BCC)	ng/L	1.3	3.1	10000	910	1700	3400
Molybdenum	µg/L	--	10000	--	20000	190000	370000
Nickel	µg/L	--	43000	200	140	1300	2600
Nitrate + Nitrite	mg/L	--	--	100	--	--	--
Selenium	µg/L	--	3100	50	5	62	120
Total Filterable Residue	mg/L	--	--	--	1500	--	--
Zinc	µg/L	--	35000	25000	330	330	660

[c] = carcinogen
BCC = Bioaccumulative chemical of concern

Table 12. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0.285	USGS Gage #04195500, 1951-97*
7Q10	cfs	annual	0.364	USGS Gage #04195500, 1951-97*
30Q10	cfs	summer	0.626	USGS Gage #04195500, 1951-97*
		winter	1.48	USGS Gage #04195500, 1951-97*
90Q10	cfs	annual	0.865	USGS Gage #04195500, 1951-97*
Harmonic Mean	cfs	annual	3.233	USGS Gage #04195500, 1951-97*
Mixing Assumption	%	average	25	
		max	100	
Hardness, OMZ	mg/L	annual	331	Station 901, 2016-21, n=63, median
Hardness, IMZ	mg/L	annual	331	Station 901, 2016-21, n=63, median
pH	S.U.	summer	7.8	Station 901, 2016-21, n=20, 75th percentile
		winter	7.93	Station 901, 2016-21, n=14, 75th percentile
Temperature	ºC	summer	22.72	Station 901, 2016-21, n=20, 75th percentile
		winter	3.77	Station 901, 2016-21, n=14, 75th percentile
Bowling Green WPC flow	cfs (MGD)	annual	15.47 (10)	NPDES Application Form 2A
Background Water Quality				
Ammonia	mg/L	summer	0	eDMR Station 801; 2016-21; n=20; 20<MDL
Ammonia	mg/L	winter	0	eDMR Station 801; 2016-21; n=12; 12<MDL
Antimony	µg/L	annual	0	No representative data available.
Arsenic	µg/L	annual	3.05	STORET Station S01S39; 2008; n=4; 1<MDL; mean
Bis(2-ethylhexyl) Phthalate	µg/L	annual	0	STORET Station S01S39; 2008; n=1; 1<MDL
Cadmium	µg/L	annual	0	STORET Station S01S39; 2008; n=4; 4<MDL
Chromium	µg/L	annual	0	STORET Station S01S39; 2008; n=4; 4<MDL
Dissolved Hexavalent Chromium	µg/L	annual	0	No representative data available.
Copper	µg/L	annual	2.725	STORET Station S01S39; 2008; n=4; 0<MDL; mean
Free Cyanide	µg/L	annual	0	No representative data available.
Lead	µg/L	annual	0	STORET Station S01S39; 2008; n=4; 4<MDL
MBAS (foaming agents)	mg/L	annual	0	No representative data available.
Mercury	ng/L	annual	0	STORET Station S01S39; 2008; n=4; 4<MDL
Molybdenum	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	4.475	STORET Station S01S39; 2008; n=4; 0<MDL; mean
Nitrate + Nitrite	mg/L	annual	4.41	eDMR Station 801; 2016-21; n=56; 8<MDL; median
Selenium	µg/L	annual	0	STORET Station S01S39; 2008; n=4; 4<MDL
Total Filterable Residue	mg/L	annual	734.5	STORET Station S01S39; 2008; n=4; 0<MDL; mean
Zinc	µg/L	annual	8	STORET Station S01S39; 2008; n=4; 0<MDL; mean

*Flow data from *Low-Flow Characteristics of Stream in Ohio through Water Year 1997* and adjusted for drainage area
MDL = analytical method detection limit
n = number of samples
eDMR = electronic Discharge Monitoring Report

Table 13. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Average				Maximum	
		Wildlife	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	--	1.66	--	--
Ammonia (Winter)	mg/L	--	--	--	4.16	--	--
Antimony	µg/L	--	821	--	191	917	1800
Arsenic	µg/L	--	610	105	151	346	680
Bis(2-ethylhexyl) phthalate	µg/L	--	34	--	8.4	1120	2100
Cadmium	µg/L	--	768	53	6.3	17	35
Chromium	µg/L	--	14731	105	231	4888	9600
Dissolved Hexavalent Chromium	µg/L	--	14731	--	11	16	31
Copper	µg/L	--	67343	526	26	44	86
Free cyanide	µg/L	--	50507	--	5.2	22	44
Lead	µg/L	--	--	105	29	570	1100
MBAS (foaming agents)	mg/L	--	--	--	--	0.51	--
Mercury	ng/L	1.3	3.1	10000	910	1700	3400
Molybdenum	µg/L	--	10522	--	20118	193500	370000
Nickel	µg/L	--	45246	210	141	1324	2600
Nitrate + Nitrite	mg/L	--	--	105	--	--	--
Selenium	µg/L	--	3262	53	5	63	120
Total Filterable Residue	mg/L	--	--	--	1505	--	--
Zinc	µg/L	--	36828	26306	332	336	660

[a] Allocation must not exceed the Inside Mixing Zone Maximum
[b] Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless requirements for an exception are met as listed in OAC 3745-2-05(A)(2)(e)(ii)

Table 14. Parameter Assessment

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

No parameters fit this category

Group 2: PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.

Antimony	Arsenic	Cadmium
Chromium	Dissolved Hexavalent Chromium	Copper
Molybdenum	Nickel	Nitrate + Nitrite

Group 3: PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL. No limit recommended; monitoring optional.

Free Cyanide	Lead	Selenium
Zinc		

Group 4: PEQmax >= 50 percent, but < 100 percent of the maximum PEL or PEQavg >= 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Total Filterable Residue

Group 5: Maximum PEQ >= 100 percent of the maximum PEL or average PEQ >= 100 percent of the average PEL, or either the average or maximum PEQ is between 75 and 100 percent of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits	
Parameter	*Units*	*Average*	*Maximum*
Ammonia (summer)	mg/L	1.7	--
Ammonia (winter)	mg/L	4.2	--
Bis(2-ethylhexyl) phthalate	µg/L	8.4	1120
MBAS (foaming agents)	mg/L	--	0.51
Mercury	ng/L	1.3	1700

Mercury becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)].
PEL = preliminary effluent limit
PEQ = projected effluent quality
WLA = wasteload allocation
WQS = water quality standard

Table 15. Final Effluent Limits for Outfall 001

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		Daily Maximum	30 Day Average	Daily Maximum	30 Day Average	
Water Temperature	°C	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Precipitation	Inches	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/L	5.0[m]	--	--	--	PD
Total Suspended Solids	mg/L	18 [d]	12	682	455	PD
Oil & Grease	mg/L	10	--	--	--	WQS
Ammonia (summer)	mg/L	2.5 [d]	1.7	94.7 [d]	64.4	WLA
Ammonia (winter)	mg/L	6.3 [d]	4.2	239 [d]	159	WLA
Total Kjeldahl Nitrogen	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				BTJ
Nitrate plus Nitrite	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				BTJ
Phosphorus	mg/L	1.1 [d]	0.7	41.7 [d]	26.5	PTS/ BPJ
Orthophosphate	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Nickel	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Zinc	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Cadmium	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Lead	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Chromium	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Copper	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Dissolved Hexavalent Chromium	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
E. coli	#/100 mL	284 [d]	126	--	--	WQS
Methyl Blue Active Substances (MBAS)		0.51	--	19.4	--	WLA
Bis(2-ethylhexyl) phthalate	µg/L	1120	8.4	42.4	0.318	WLA
Flow Rate	MGD	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Mercury	ng/L	1700	1.3	0.0644	0.00005	WLA
Free Cyanide	µg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Acute Toxicity, *Ceriodaphnia dubia*	TUa	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Chronic Toxicity, *Ceriodaphnia dubia*	TUc	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Acute Toxicity, *Pimephales promelas*	TUa	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Chronic Toxicity, *Pimephales promelas*	TUc	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Total Filterable Residue	mg/L	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
pH, maximum	SU	9.0	--	--	--	WQS
pH, minimum	SU	6.5[m]	--	--	--	WQS
CBOD5	mg/L	12 [d]	10	455[d]	379	PD

[a] Effluent loadings based on average design discharge flow of 10 MGD.

[b] Definitions: BTJ = Best Technical Judgment
M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary

Discharges
PD = Plant Design (OAC 3745-33-05(E))
PMR = Phosphorus monitoring requirements (ORC 6111.03)
PTS = Phosphorus Treatment Standards (OAC 3745-33-06 (C))
WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)]
WLA = Wasteload Allocation procedures (OAC 3745-2)
WQS = Ohio Water Quality Standards (OAC 3745-1)

[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.
[d] 7 day average limit.
[e] Seasonal average, calculated as the arithmetic average for all results collected May through October and reported once annually.
[m] minimum limit

Attachment 1. Acronyms

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CMOM	Capacity Management, Operation, and Maintenance
CONSWLA	Conservative substance wasteload allocation
CSO	Combined sewer overflow
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
IMZM	Inside mixing zone maximum
LTCP	Long-term Control Plan
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
PMP	Pollution Minimization Program
PPE	Plant performance evaluation
SSO	Sanitary sewer overflow
TMDL	Total Daily Maximum Load
TRE	Toxicity reduction evaluation
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WPCF	Water Pollution Control Facility
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater Treatment Plant