

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Alum Creek Water Reclamation Facility (WRF)

Public Notice No.: 215599
Public Notice Date: 10/22/2025
Comment Period Ends: 11/21/2025

Ohio EPA Permit No.: 4PK00003*HD
Application No.: OH0121380

Name and Address of Applicant:
Delaware County Board of Commissioners
50 Channing Street
Delaware, OH 43015

Name and Address of Facility Where
Discharge Occurs:
Alum Creek Water Reclamation Facility
7767 Walker Wood Boulevard
Lewis Center, OH 43035
Delaware County

Receiving Water: Alum Creek

Subsequent Stream Network: Big Walnut Creek to Scioto River to Ohio River

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.

Outfall 002 is proposed to be removed and all final effluent monitoring consolidated at Outfall 001.

Parts IV, V, and VI are proposed to be added to the permit to comply with stormwater regulations. The associated stormwater outfalls were added to Part II.

New effluent limits are proposed for bis(2-ethylhexyl) phthalate because effluent data show there is reasonable potential for this parameter to exceed the WQS. Current effluent data show that the new limits can be met without the need for a compliance schedule.

New monitoring is proposed for butyl benzyl phthalate and selenium because effluent data show there may be reasonable potential for these parameters to exceed WQS.

Limits are proposed to be removed for copper because new data show this parameter does not have reasonable potential to exceed the WQS. Monitoring is proposed to continue.

Increased monitoring is proposed for free cyanide based on best technical judgement. Current data show the presence of total cyanide in the plant's effluent. Increased monitoring will develop a dataset to assess the amount of free cyanide in the plant's effluent and its potential to exceed the WQS.

Increased monitoring is proposed for zinc because of a group 4 assignment in the reasonable potential analysis. Current effluent data show there may be reasonable potential for this parameter to exceed WQS.

Semi-annual chronic toxicity monitoring with the determination of acute endpoints is proposed for *Ceriodaphnia dubia* for the life of the permit. Current data show there may be chronic toxicity to *Ceriodaphnia dubia* in the plant's effluent. Annual chronic toxicity monitoring with the determination of acute endpoints is proposed to continue for *Pimephales promelas* for the life of this permit. This satisfies the minimum testing requirements of Ohio Administrative Code (OAC) 3754-33-07(B)(11) and will adequately characterize toxicity in the plant's effluent.

A compliance schedule is proposed in Part I,C of the permit for the submission of a Permit-to-Install application for the removal of the tertiary filtration system.

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; tracking of parameters; supplemental effluent data; 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 emailed to HClerk@epa.ohio.gov or mailed 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 by email to epa.dswcomments@epa.ohio.gov (preferred method) or delivered 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 Keith Cummings, keith.cummings@epa.ohio.gov, 614-728-3853.

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: https://epa.ohio.gov/static/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 email to epa.dswcomments@epa.ohio.gov (preferred method) or 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

Alum Creek Water Reclamation Facility (WRF) discharges to Alum Creek at River Mile 20.95. Figure 1 shows the approximate location of the facility.

This segment of Alum Creek is described by Ohio EPA River Code: 02-110, Watershed Assessment Unit Code: 050600001-16-01, County: Delaware, Ecoregion: Eastern Corn Belt Plains. Alum Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-09): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreation.

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

Alum Creek WRF was constructed in 2001 and last upgraded in 2021. The average design flow is 10.0 million gallons per day (MGD). Alum Creek WRF serves parts of Delaware and Franklin counties. Alum Creek WRF has the following treatment processes (Figure 2):

- Influent pumping and screening
- Conventional activated sludge
- Secondary clarification
- Tertiary filtration
- Chemical phosphorus removal
- Polymer addition
- Ultraviolet disinfection
- Post aeration

The tertiary filtration treatment units, chemical phosphorus removal, and polymer addition have been offline since October 2023. Reporting of events that bypass tertiary treatment – which is now all the flow – is proposed to be removed from the permit. The permittee must either restore functionality of the tertiary filters or submit a

permit-to-install application to permanently remove the filters from service, which includes a demonstration that Alum Creek WRF can comply with effluent limits without the filters. A compliance schedule is proposed in Part I,C of the permit.

The collection system tributary to the Alum Creek WRF has 100% separated sewers.

The Alum Creek WRF does not have an approved pretreatment program. The collection system does not have any industrial users.

Alum Creek WRF utilizes the following sewage sludge treatment processes (Figure 3):

- Gravity belt thickener
- Aerobic digestors
- Belt filter press

Table 1 shows the last five years of sludge removed from Alum Creek WRF. Treated sludge is disposed of in a municipal landfill or transferred to another NPDES permit holder.

DESCRIPTION OF EXISTING DISCHARGE

Table 2 presents the effluent violations for Alum Creek WRF during the previous five years. These violations were not caused by a known process error or upset condition

Table 3 presents the average annual effluent flow rate for Alum Creek WRF for the previous five years. Alum Creek WRF estimates there is an infiltration/inflow (I/I) rate to the collection system of 0.5 MGD. Alum Creek WRF performs the following activities to minimize I/I: implements a Capacity, Management, Operations and Maintenance (CMOM) program to prioritize inspections and repairs.

Table 4 presents the number of SSOs reported by Alum Creek WRF for the previous five years. SSOs are reported at station 300.

Table 5 presents data characterizing the annual total phosphorus load from Alum Creek WRF during the previous five years.

Table 6 presents chemical specific data compiled from supplemental effluent testing data submitted as part of the NPDES renewal application.

Table 7 presents chemical specific data compiled from data collected by Ohio EPA.

Table 8 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period December 2019 through November 2024, and current permit limits are provided for comparison.

Table 9 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 10 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.

Table 11 summarizes the screening results of Ohio EPA bioassay sampling of the final effluent.

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 Westerville Reservoir – Alum Creek watershed assessment unit, which includes Alum Creek in the vicinity of Alum Creek WRF discharge, is listed as impaired for Aquatic Life 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 for Alum Creek, dated August 2005, was approved by U.S. EPA on September 26, 2005. Subsequent modifications were approved in September 2021 and December 2024.

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 12) 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.

Alum Creek in the vicinity of Alum Creek WRF is impaired for aquatic life due to the following: siltation, organic enrichment, flow alteration, direct habitat alteration, ammonia, cadmium, and priority organics. The

assessment unit at the Alum Creek WRF outfall is attaining its primary contact recreation use. However, the downstream assessment unit is impaired for recreation due to bacteria. The data for the TMDL was collected in 2000 prior to the construction of the Alum Creek WRF. A biological and water quality survey of the Big Walnut Creek watershed, which includes Alum Creek, was conducted in 2023. Results of the survey are not yet available.

The 2024 Ohio Integrated Report is available through the Ohio EPA, Division of Surface Water website at: <https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/ohio-integrated-water-quality-monitoring-and-assessment-report>

The TMDL is available through the Ohio EPA, Division of Surface Water website at: https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/35/tmdl/TMDLreport_BigWalnutCreek.pdf.

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 Alum Creek WRF 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)	December 2019 through November 2024
NPDES renewal application data	2024
Ohio EPA bioassay sampling data	2024

Statistical Outliers and Other Non-representative Data

The data were examined and the following values were removed from the evaluation as non-representative data:

Nitrate + Nitrite – 0.83 mg/L, 07/02/2021, Statistical Outlier
Zinc – non-detect, 08/02/2023, Statistical Outlier
Mercury – 0 µg/L, 02/01/2024, Not measured with the correct low-level method
Mercury – 0 µg/L, 07/30/2024, Not measured with the correct low-level method
Mercury – 41 ng/L, 08/27/2024, Not measured with the correct low-level method
Mercury – 0 µg/L, 09/30/2024, Not measured with the correct low-level method
Free Cyanide – The following samples were incorrectly analyzed for total cyanide instead of free cyanide and are excluded as non-representative data: 12/5/2019 and 6/4/2020 through 6/6/2024.

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 9). 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 13).

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. 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. By rule, mixing zones are not authorized for pollutants, such as mercury, which have been designated as bioaccumulative chemicals of concern (BCCs). For BCCs, the WLA is set equal to the respective WQS value.

The methodology employed generally depends on whether the facility is considered a direct discharger to a (1) free-flowing receiving water/stream or (2) non-flowing receiving water/Lake.

For free-flowing streams, WLAs for both average and maximum criteria are performed using the following general equation:

$$\text{Discharger WLA} = (\text{Downstream Flow} \times \text{WQS}) - (\text{Upstream Flow} \times \text{Background Concentration}).$$

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
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 14, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 13 and Table 14. The WLA results to maintain all applicable criteria are presented in Table 15.

Whole Effluent Toxicity Wasteload Allocation

Whole effluent toxicity (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. WQC for WET are 0.3 TUa for acute toxicity and 1.0 TUC for chronic toxicity (OAC 3745-1-44).

There are two separate reasonable potential procedures in Ohio - one for the Lake Erie watershed and one for the Ohio River watershed. Dischargers in the Ohio River watershed are assessed using OAC 3745-33-07(B). Dischargers in the Lake Erie watershed are assessed in accordance with the “Great Lakes Water Quality Initiative Implementation Procedures” contained in 40 CFR Part 132, Appendix F, Procedure 6.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TUc) and 7Q10 flow for the average and the acute toxicity unit (TUa) and 1Q10 flow for the maximum. WET WLAs are based on meeting the values of 0.3 TUa and 1.0 TUc downstream of the discharge, and include any available dilution. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. WLAs for acute toxicity are capped at 1.0 TUa unless the discharger demonstrates that an Area-of-Initial-Mixing (AIM) exists under OAC 3745-1-06, or that one of the factors in OAC 3745-33-07(B)(5)-(9) allows a higher TUa limit to be granted. For the purposes of establishing WET limitations, the values of 1.0 TUa and 1.0 TUc are the most restrictive limitations that can be applied in NPDES permits [OAC 3745-33-07(B)(10)].

For Alum Creek Water Reclamation Facility, the WLA values for outfall 001 are 0.3 TUa and 1.0 TUc.

The chronic toxicity unit (TUc) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC25):

$$TUc = 100/IC25$$

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):

$TUc = 100/\text{geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration}$

The acute toxicity unit (TUa) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC50) for the most sensitive test species:

$$TUa = 100/LC50$$

This equation applies outside the mixing zone for all designated waters. Based on the above, a value of 1.0 TUa is the lowest value that can be calculated using the equation. TUa values between 0.2 and 1.0 are based on an interpolation of toxic effects where an LC50 cannot be identified.

When the acute WLA is less than 1.0 TUa, it may be defined as a ratio of the stream dilution to the effluent flow:

Acute Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

$$\text{Acute Dilution Ratio} = \frac{1Q10 + [WWTP \text{ flow rate}]}{[WWTP \text{ flow rate}]} = \frac{0 \text{ cfs} + 15.472 \text{ cfs}}{15.472 \text{ cfs}} = 1$$

The acute WLA for Alum Creek WRF can be expressed as 30 percent mortality in 100 percent effluent based on the dilution ratio of 1 to 1. If the acute dilution ratio is less than 3.3 to 1.0, and there is evidence that effluent values between 0.3 TUa and 1.0 TUa cause or contribute to violations of WQS, the permittee may be required to investigate and remediate toxicity in this range.

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 15. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 9, and the PEL_{max} is compared to the PEQ_{max} . Based on the calculated percentage of the allocated value [$(PEQ_{avg} \div PEL_{avg}) \times 100$, or $(PEQ_{max} \div PEL_{max}) \times 100$], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 16.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 17 presents the final effluent limits and monitoring requirements proposed for Alum Creek WRF outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Ammonia, dissolved oxygen, TSS, and CBOD₅

The limits proposed for dissolved oxygen (winter), total suspended solids, ammonia and 5-day carbonaceous biochemical oxygen demand are all based on plant design to meet best available demonstrated control technology requirements of the antidegradation rule when the plant was constructed. These limits are more restrictive than 40 CFR Part 133, Secondary Treatment Regulations. Dissolved oxygen (summer) limit is based on plant design. The ammonia and dissolved oxygen limits are protective of WQS as well.

Oil and grease, pH, and *E. coli*

Limits proposed for oil and grease, pH, and *Escherichia coli* are based on WQS (OAC 3745-1-35 and 37). Primary contact recreation *E. coli* standards apply to Alum Creek.

Bis(2-ethylhexyl) phthalate

The Ohio EPA risk assessment (Table 16) places bis(2-ethylhexyl) phthalate in group 5. This placement, as well as the data in Table 8 and Table 9, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The thirty-day average concentration limit and thirty-day average loading limit for bis(2-ethylhexyl) phthalate are based on human health. The daily maximum concentration limit and daily maximum loading limit for bis(2-ethylhexyl) phthalate is based on aquatic life. Based on an assessments of the plant's DMR data, a compliance schedule is not needed to meet these limits.

Butyl benzyl phthalate

The Ohio EPA risk assessment (Table 16) places butyl benzyl phthalate in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for this parameter. The PEQ values calculated for butyl benzyl phthalate (Table 9) may not be representative of its actual levels in the plant effluent since they were based on one data point. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

In addition, the butyl benzyl phthalate actual value falls within 75 percent of the WLA. Parameters from small data sets with values greater than 75 percent of the WLA need a tracking requirement in the permit that specifies reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II of the permit.

Copper, selenium, and zinc

The Ohio EPA risk assessment (Table 16) places copper, selenium, and zinc in group 4. This placement, as well as the data in Table 8 and Table 9, 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). Limits for copper are proposed to be removed but monitoring will continue at the same frequency. Increased monitoring for zinc is proposed based on its placement in Group 4.

Cadmium, chromium, dissolved hexavalent chromium, lead, mercury, nickel, and total dissolved solids (filterable residue)

The Ohio EPA risk assessment (Table 16) places cadmium, chromium, dissolved hexavalent chromium, lead, mercury, nickel, and total dissolved solids (filterable residue) in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, 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 at a low frequency is proposed to document that these pollutants continue to remain at low levels.

Antimony, arsenic, barium, chloroform, iron, strontium, toluene, and 2-butanone (methyl ethyl ketone)

The Ohio EPA risk assessment (Table 16) places antimony, arsenic, barium, chloroform, iron, strontium, toluene, and 2-butanone (methyl ethyl ketone) in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, 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. Data for future reasonable potential analyses will be available through priority pollutant scan submission with the next NPDES permit renewal.

Free cyanide

Although the Ohio EPA risk assessment (Table 16) lists free cyanide as Group 2, indicating no reasonable potential to contribute to WQS exceedances, this group placement only occurred after eliminating most of the data collected during the evaluation period. Nearly all cyanide samples taken over the previous five years were analyzed for total cyanide rather than free cyanide. As such, these data were eliminated from the reasonable potential analysis since there is no WQS for total cyanide. Increased monitoring frequency is proposed, based on best technical judgement that cyanide is present in the effluent and there is a need to develop a dataset to determine the amount of cyanide in free forms for assessing the reasonable potential to contribute to WQS exceedances in the next permit.

Flow rate and temperature

Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment plant.

Nitrate-Nitrite

Monitoring for nitrate-nitrite is proposed to continue based on best technical judgment. The purpose of the monitoring is to maintain a nutrient data set for use in the future total maximum daily load (TMDL) study.

Dissolved orthophosphate and total phosphorus

Monitoring for dissolved orthophosphate (as P) and total phosphorus 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

Based on evaluating the WET data presented in Table 10, Table 11, Attachment 1, and other pertinent data under the provisions of OAC 3745-33-07(B), the Alum Creek WRF is placed in Category 3 with respect to WET for *Ceriodaphnia dubia*. No limits are proposed, but increased testing for WET is proposed for

Ceriodaphnia dubia for the duration of the permit. Semiannual chronic toxicity monitoring with the determination of acute endpoints for *Ceriodaphnia dubia* is proposed to better assess the toxicity of the plant's effluent to *Ceriodaphnia dubia*.

Based on evaluating the WET data presented in Table 10, Table 11, Attachment 1, and other pertinent data under the provisions of OAC 3745-33-07(B), the Alum Creek WRF is placed in Category 4 with respect to WET for *Pimephales promela*. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements in OAC 3754-33-07(B)(11). Annual chronic toxicity monitoring with the determination of acute endpoints for *Pimephales promela* is proposed for the life of the permit. The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Additional Monitoring Requirements

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.

Outfall 002 is proposed to be removed, as there is no expected difference in effluent quality between the physical locations of Outfalls 001 and 002.

Sludge

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: removal to sanitary landfill or transfer to another facility with an NPDES permit.

OTHER REQUIREMENTS

Schedule of Compliance - Tertiary Filtration – A 12-month compliance schedule is proposed for the permittee to submit either a plan to restore functionality of the tertiary filtration units or submit a permit-to-install application to permanently remove the filters from service. See Part I,C of the permit for details.

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 July 3, 2025 (OAC 3745-7). These rules require the Alum Creek WRF 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.

Sufficiently Sensitive Data / Method Detection Limits

The permittee shall use analytical procedures approved under 40 CFR 136 with sufficiently sensitive method detection limits (MDLs) that are capable of detecting and measuring the pollutants at, or below, the respective

water quality criteria or existing permit effluent limits. All detected concentrations values above the MDL must be reported.

Outfall Signage

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

NPDES Renewal Application Supplemental Effluent Data

The permittee must submit supplemental effluent data as part of the next NPDES permit renewal application. A minimum of three samples must be tested for 101 parameters, each collected within four and one-half years of the application submission date. The complete list of parameters to be analyzed is contained in Table 2 of "Appendix J to Part 122 - NPDES Permit Testing Requirements for Publicly Owned Treatment Works (§122.21(j))." Existing effluent data may be used, if available, in lieu of sampling performed solely for the purpose of the renewal application. See Part II of the permit for details.

Part III

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

Stormwater Compliance

Parts IV, V, and VI were added to this NPDES permit to ensure that any stormwater flows from the facility site are properly regulated and managed.

Figure 1. Location of Alum Creek WRF

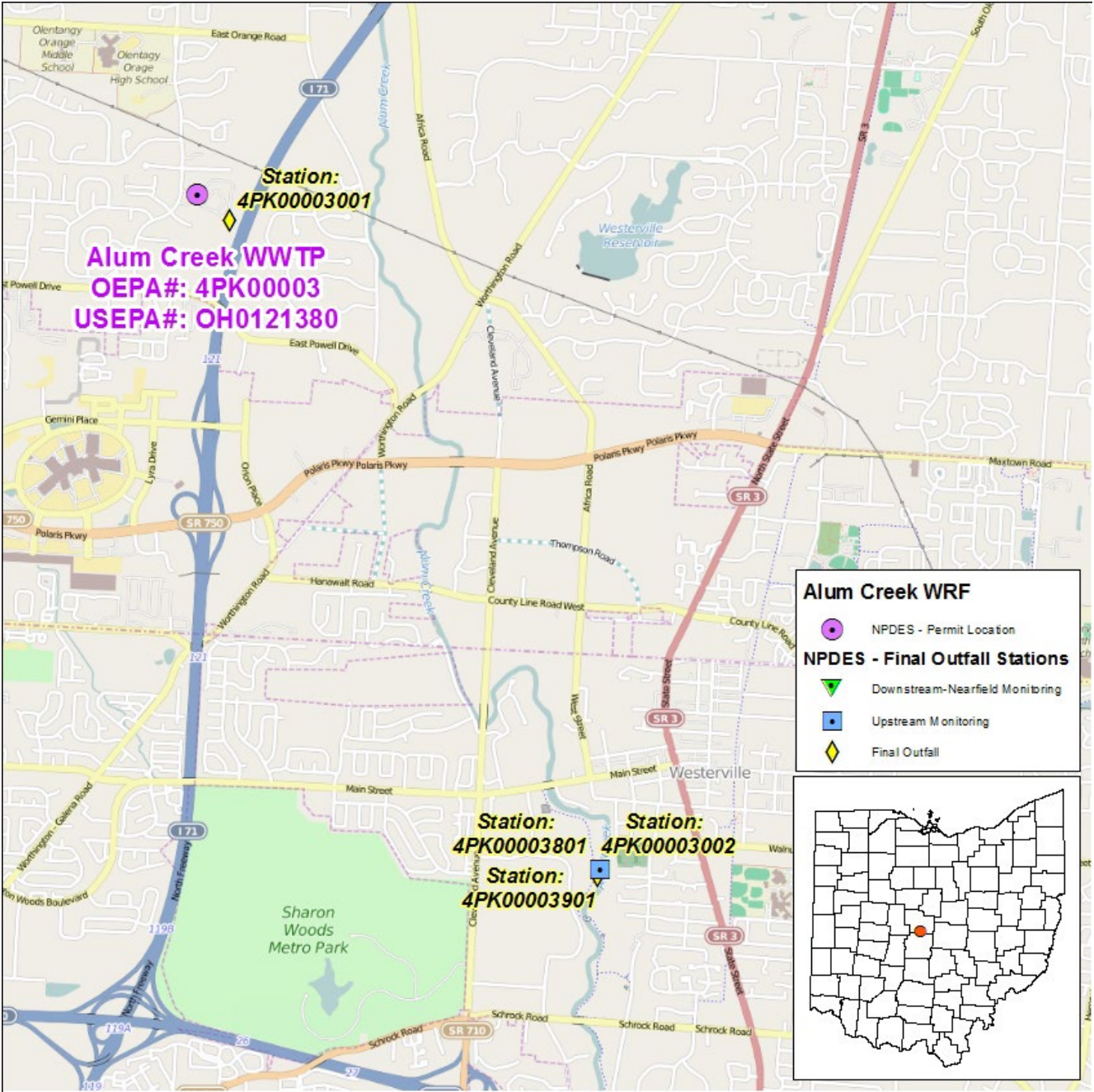


Figure 2. Diagram of Wastewater Treatment System

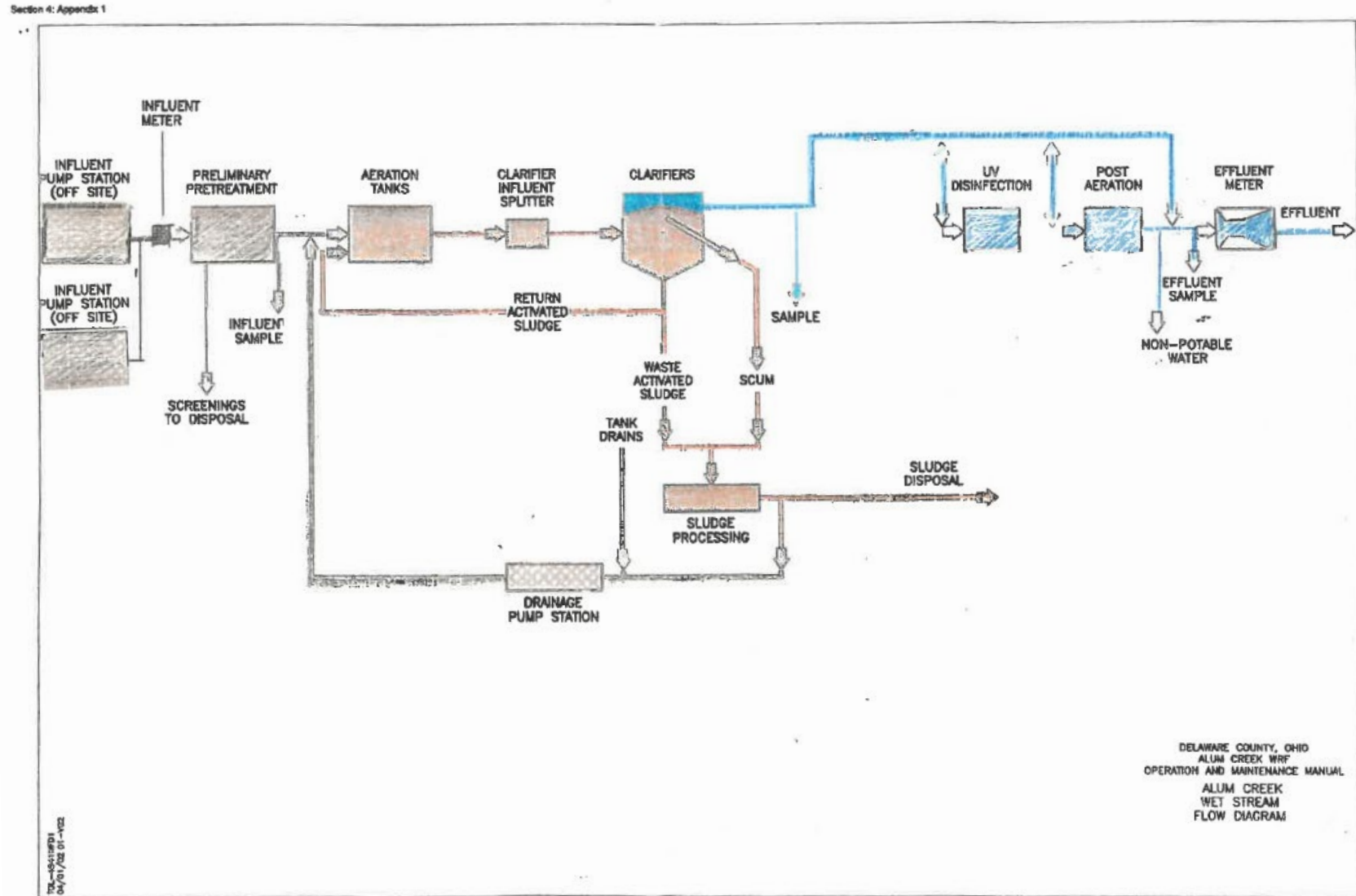


Figure 3. Diagram of Sludge Treatment System

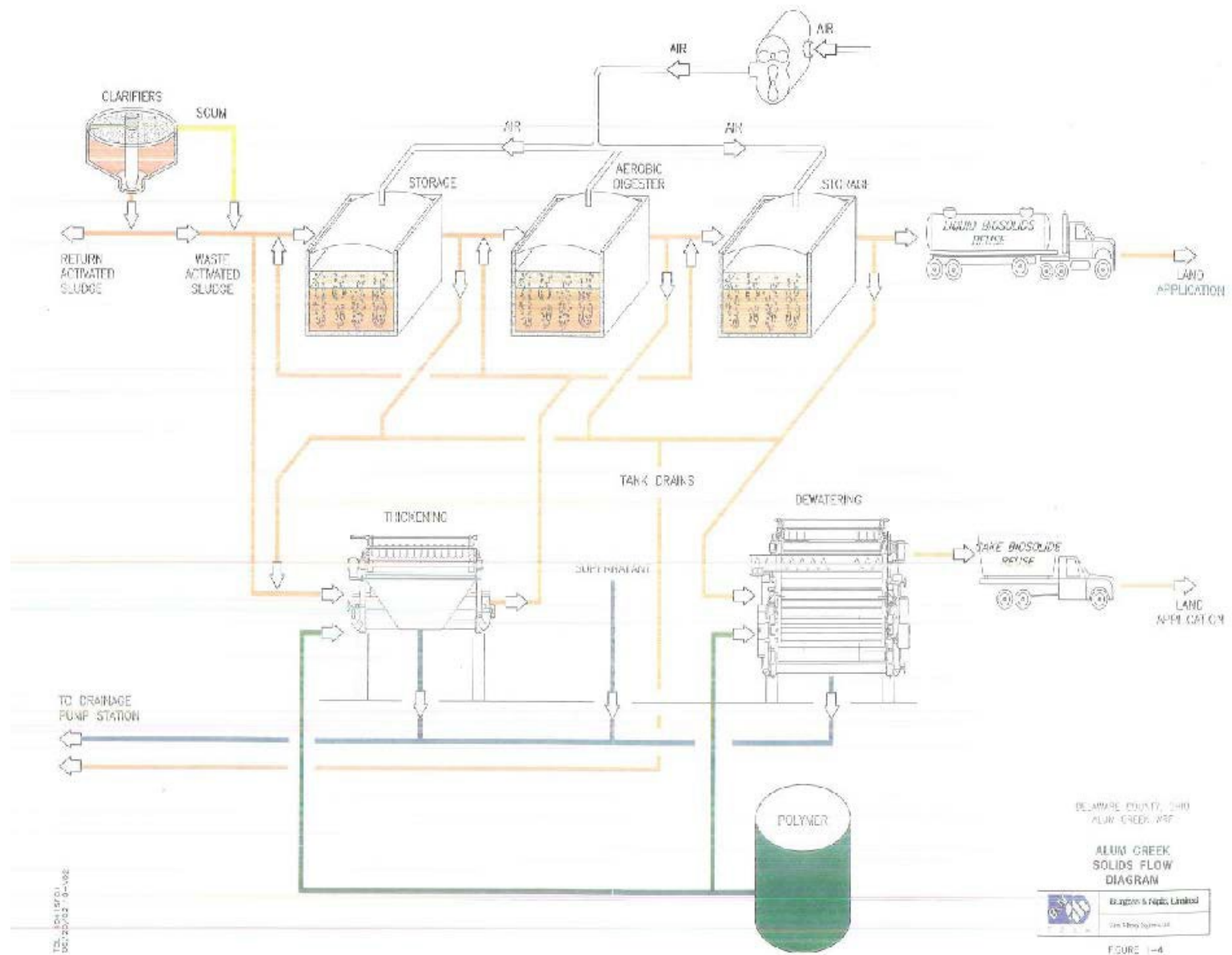


Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2019	1290
2020	1477
2021	1528
2022	1513
2023	1640

Table 2. Effluent Violations for Outfall 001

Parameter	2019	2020	2021	2022	2023	2024	Total
Copper	0	0	1	0	0	0	1
Dissolved Oxygen	0	3	0	1	0	0	4
Ammonia	0	0	1	0	0	0	1
Oil & Grease	0	1	0	0	0	1	2
Total Suspended Solids	0	0	0	3	0	0	3
Total	0	4	2	4	0	1	11

^a = data set begins on 12/01/2019

^b = data set ends on 11/30/2024

Table 3. Average Annual Effluent Flow Rates

Year	Annual Flow (MGD)		
	50th Percentile	95th Percentile	Maximum
2019	5.06	6.80	7.85
2020	5.38	7.45	13.51
2021	5.36	7.35	9.75
2022	5.33	7.81	10.58
2023	5.32	7.29	10.29
2024	4.96	7.16	12.27

MGD = million gallons per day.

Table 4. Sanitary Sewer Overflows Discharges

Year	Occurrences
2019	0
2020	2
2021	3
2022	0
2023	0
2024	1

Table 5. Calculated Total Phosphorus Loadings for May – October

Year	n	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2020	48	0.345	5.06	6.55
2021	48	0.84	5.275	17.3
2022	48	0.815	5.12	14.7
2023	48	0.565	5.32	11.4
2024	49	0.75	4.8	13.5

MGD = million gallons per day

n = number of samples

Table 6. Effluent Characterization Using Supplemental Effluent Data

Parameter	Units	7/30/2024	8/27/2024	9/30/2024
Antimony	µg/L	AA (2)	AA (2)	1
Arsenic	µg/L	1	1	1
Bis(2-ethylhexyl) Phthalate	µg/L	14	AA (1.6)	AA (1.6)
Butyl Benzyl Phthalate	µg/L	AA (1.63)	AA (1.63)	AA (1.63)
Cadmium	µg/L	AA (0.1)	AA (0.1)	AA (0.1)
Chloroform	µg/L	AA (0.3)	AA (0.3)	AA (0.3)
Chromium	µg/L	AA (2.5)	AA (2.5)	AA (0.4)
Copper	µg/L	AA (4.3)	8	3
Cyanide	µg/L	AA (2)	AA (2)	AA (2)
Lead	µg/L	AA (2.1)	AA (2.1)	AA (0.2)
Mercury	µg/L	AA (0.03)	0.041	AA (0.2)
Nickel	µg/L	AA (3.3)	AA (3.3)	1
Phenolic	mg/L	0.015	AA (0.01)	AA (0.01)
Selenium	µg/L	AA (1.4)	AA (1.4)	1
Toluene	µg/L	AA (0.3)	AA (0.3)	AA (0.3)
Zinc	µg/L	56	60	37

AA = not-detected (analytical method detection limit)

Table 7. Effluent Characterization Using Ohio EPA data

Parameter	Units	2/1/2024
2-Butanone	µg/L	1.41
Aluminum	µg/L	15.2
Antimony	µg/L	0.418
Arsenic	µg/L	0.875
Barium	µg/L	30.1
Bis(2-ethylhexyl) Phthalate	µg/L	2.75
Butyl Benzyl Phthalate	µg/L	1.17
Cadmium	µg/L	AA (0.0194)
Chloroform	µg/L	0.637
Chromium	µg/L	AA (0.228)
Copper	µg/L	4.94
Iron	µg/L	44.6
Lead	µg/L	0.103
Manganese	µg/L	29.9
Mercury	µg/L	AA (0.134)
Nickel	µg/L	2.78
Nitrate+nitrite	mg/L	12.4
Phenolics	µg/L	4.22
Selenium	µg/L	0.594
Strontium	µg/L	466.0
Toluene	µg/L	0.326
Total Filterable Residue	mg/L	590
Zinc	µg/L	54.7

AA = not detected (analytical method detection limit)

Table 8. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	°C	----- Monitor -----		1827	19.0	23.1	12.7 - 25.0
Dissolved Oxygen - Summer	Summer	mg/L	--	7.0 ^b	920	8.18	7.53**	6.17 - 10.1
Dissolved Oxygen - Winter	Winter	mg/L	--	6.0 ^b	907	9.22	8.05**	6.53 - 11.2
Total Suspended Solids	Annual	kg/day	454	681 ^a	963	106	262	16.4 - 469
Total Suspended Solids	Annual	mg/L	12	18 ^a	963	5.20	13.0	1.00 - 22.0
Oil and Grease	Annual	mg/L	--	10	243	< 5.00	3.07	0 - 27.0
Nitrogen, Ammonia - Summer	Summer	kg/day	38	57 ^a	611	4.66	19.1	0 - 104
Nitrogen, Ammonia - Summer	Summer	mg/L	1.0	1.5 ^a	611	0.240	0.945	0 - 3.27
Nitrogen, Ammonia - Winter	Winter	kg/day	114	170 ^a	634	5.09	30.9	0 - 87.5
Nitrogen, Ammonia - Winter	Winter	mg/L	3.0	4.5 ^a	634	0.240	1.36	0 - 3.94
Nitrite Plus Nitrate, Total	Annual	mg/L	----- Monitor -----		122	13.6	19.5	0.830 - 21.3
Phosphorus, Total	Annual	mg/L	----- Monitor -----		481	0.330	2.13	0 - 4.05
Orthophosphate, Dissolved	Annual	mg/L	----- Monitor -----		65	0.150	2.64	0 - 3.39
Cyanide, Free	Annual	mg/L	----- Monitor -----		1	--	--	< 0.00500
Nickel, TR	Annual	µg/L	----- Monitor -----		20	--	--	< 10.0
Zinc, TR	Annual	µg/L	----- Monitor -----		20	55.5	81.6	0 - 150
Cadmium, TR	Annual	µg/L	----- Monitor -----		20	--	--	< 0.500
Lead, TR	Annual	µg/L	----- Monitor -----		20	< 2.00	3.70	0 - 5.60
Chromium, TR	Annual	µg/L	----- Monitor -----		20	--	--	< 10.0
Copper, TR - 2020-2024	Annual	µg/L	16	26	57	< 10.0	2.00	0 - 18.0
Copper, TR - 2019-2020	Annual	µg/L	19	30	2	--	--	< 10.0

Table 8. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Copper, TR - 2020-2024	Annual	kg/day	0.61	0.99	57	< 0.196	0.0381	0 - 0.406
Copper, TR - 2019-2020	Annual	kg/day	0.72	1.14	2	--	--	< 0.182
Chromium, Dissolved Hexavalent - 2019-2020	Annual	µg/L	11	16	1	--	--	< 4.00
Chromium, Dissolved Hexavalent - 2020-2024	Annual	µg/L	----- Monitor -----		19	--	--	< 4.00
Chromium, Dissolved Hexavalent - 2019-2020	Annual	kg/day	0.417	0.606	1	--	--	< 0.0721
E. coli	Annual	#/100 mL	126	284 ^a	917	22.0	56.0	0 - 800
Bis(2-ethylhexyl) Phthalate	Annual	µg/L	----- Monitor -----		58	< 5.00	< 5.00	0 - 0.400
Flow Rate	Annual	MGD	----- Monitor -----		1827	5.25	7.46	3.02 - 13.5
Mercury, Total	Annual	ng/L	----- Monitor -----		20	0.261	1.83	0 - 2.46
Cyanide, Free (Low-Level)	Annual	µg/L	----- Monitor -----		5	--	--	< 5
Bypass Volume	Annual	MGAL	----- Monitor -----		1723	4.19	6.21	0 - 12.3
pH, Maximum	Annual	S.U.	--	9.0	1827	7.68	8.09	7.00 - 8.90
pH, Minimum	Annual	S.U.	--	6.5 ^b	1827	7.26	6.97*	6.55 - 8.74
Residue, Total Filterable	Annual	mg/L	----- Monitor -----		61	502	594	394 - 985
CBOD 5 day	Annual	kg/day	379	568 ^a	954	74.6	155	0 - 260
CBOD 5 day	Annual	mg/L	10	15 ^a	954	3.59	7.50	0 - 11.0
Outfall 002								
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa	----- Monitor -----		5	< 0.200	0.160	0 - 0.200
Chronic Toxicity, Ceriodaphnia dubia	Annual	TUc	----- Monitor -----		5	< 1.00	1.16	0 - 1.20
Acute Toxicity, Pimephales promelas	Annual	TUa	----- Monitor -----		5	< 0.200	0.160	0 - 0.200

Table 8. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Chronic Toxicity, Pimephales promelas	Annual	TUc	----- Monitor -----		5	< 1.00	0.800	0 - 1.00

* = For minimum pH, 5th percentile shown in place of 95th percentile.

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

^a = weekly average.

^b = minimum limit

Table 9. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Aluminum	µg/L	1	1	68.7952	94.24
Ammonia-S	mg/L	408	407	0.48221	0.97006
Ammonia-W	mg/L	328	311	0.63177	1.4925
Antimony	µg/L	2	2	2.774	3.8
Arsenic - TR	µg/L	4	4	1.898	2.6
Barium	µg/L	1	1	136.2326	186.62
Bis(2-ethylhexyl) phthalate	µg/L	62	2	10.22	14
2-Butanone (Methyl ethyl ketone)	µg/L	1	1	6.38166	8.742
Butyl benzyl phthalate	µg/L	4	1	3.09374	4.238
Cadmium - TR	µg/L	24	0	0	0
Chloroform (Trichloromethane)	µg/L	4	1	1.209026	1.6562
Chromium - TR	µg/L	24	0	0	0
Hexavalent Chromium (Dissolved)	µg/L	20	0	0	0
Copper - TR	µg/L	63	6	10.163	11.173
Cyanide - free (wwh,ewh,mwh)	µg/L	5	0	0	0
Total Filterable Residue	mg/L	62	62	588.99	672.33
Iron - TR	µg/L	1	1	201.8596	276.52
Lead - TR	µg/L	24	6	5.3144	7.28
Manganese - TR	µg/L	1	1	135.3274	185.38
Mercury - TR (BCC)	ng/L	20	10	1.6944	2.9807
Nickel - TR	µg/L	24	2	2.63822	3.614
Nitrate-N + Nitrite-N	mg/L	122	122	12.4392	17.04
Phenolics	µg/L	4	2	8.00956	10.972
Selenium - TR	µg/L	4	2	2.6572	3.64
Strontium	µg/L	1	1	2109.116	2889.2
Toluene	µg/L	4	1	0.618748	0.8476
Zinc - TR	µg/L	23	23	83.033	110.1

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 10. Summary of Acute and Chronic Toxicity Results

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales promelas</i>	
	TU _a	TU _c	TU _a	TU _c
9/22/2020	AA	1.2	AA	AA
9/7/2021	0.2	1.0	0.2	1.0
9/27/2022	AA	AA	AA	AA
9/18/2023	AA	AA	--	--
9/19/2023	--	--	AA	AA
9/13/2024	AA	AA	AA	AA

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 11. Ohio EPA Toxicity Screening Results for Outfall 002

Date	<i>Pimephales promelas</i> %M		<i>Ceriodaphnia dubia</i> %M	
	24 hours	48 hours	24 hours	48 hours
1/31/2024 - 2/1/2024 ^a	0	0	10	10

^a = 24-hour composite sample

%M = percent mortality in 100% effluent

Table 12. Use Attainment Table

Location	RM	Use	Status	Cause	Source
Alum Creek (Alum Creek Dam to Columbus Boundary)	26.7	WWH	Full		
Alum Creek (Columbus Boundary to Big Walnut Creek)	19.9	WWH	Partial	Siltation Organic enrichment Flow alteration Direct habitat alteration Ammonia Cadmium Priority organics Pathogens	Land development Urban runoff Impoundment Channelization Storm sewers
Big Walnut Creek (Alum/Blacklick Creek To Scioto River)	15.3	EWH	Full		

Data gathered from 2005 TMDL for the Big Walnut Creek Watershed

RM = River mile

WWH = warmwater habitat

EWH = exceptional warmwater habitat

Table 13. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Aluminum	µg/L	--	--	--	--	--
Ammonia-S	mg/L	--	--	1.9	--	--
Ammonia-W	mg/L	--	--	4	--	--
Antimony	µg/L	640	--	190	900	1800
Arsenic - TR	µg/L	--	100	150	340	680
Barium	µg/L	--	--	1100	4600	9200
Bis(2-ethylhexyl) phthalate	µg/L	3.7c	--	8.4	1100	2100
2-Butanone (Methyl ethyl ketone)	µg/L	--	--	22000	200000	400000
Butyl benzyl phthalate	µg/L	1	--	23	130	260
Cadmium - TR	µg/L	--	50	3.9	8.8	18
Chloroform (Trichloromethane)	µg/L	20000c	--	140	1300	2600
Chromium - TR	µg/L	--	100	140	2900	5800
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper - TR	µg/L	--	500	15	24	49
Cyanide - free	µg/L	400	--	12	46	92
Total Filterable Residue	mg/L	--	--	1500	--	--
Iron - TR	µg/L	--	5000	--	--	--
Lead - TR	µg/L	--	100	14	260	520
Manganese - TR	µg/L	--	--	--	--	--
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Nickel - TR	µg/L	4600	200	86	770	1500
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Phenolics	µg/L	--	--	--	--	--
Selenium - TR	µg/L	4200	50	5	62	120
Strontium	µg/L	--	--	45000	120000	240000
Toluene	µg/L	520	--	62	560	1100
Zinc - TR	µg/L	26000	25000	200	200	390

^c = carcinogen

Table 14. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0	USGS gage 03228805 and Westerville WTP intake rate
7Q10	cfs	annual	0	USGS gage 03228805 and Westerville WTP intake rate
30Q10	cfs	summer	0	USGS gage 03228805 and Westerville WTP intake rate
		winter	1.1	USGS gage 03228805 and Westerville WTP intake rate
Harmonic Mean	cfs	annual	10	USGS Gauge 03228805 10/1/1963-9/30/15
Mixing Assumption	%	average	100	
		maximum	100	
Hardness, OMZ	mg/L	annual	180	Outfall 901 data; 61 obs.; 12/2019 - 11/2024
Hardness, IMZ	mg/L	annual	180	Outfall 901 data; 61 obs.; 12/2019 - 11/2024
pH	S.U.	summer	7.6	Outfall 901 data; 21 obs.; 6/2020 - 12/2024
		winter	7.9	Outfall 901 data; 15 obs.; 12/2019 - 11/2024
Temperature	°C	summer	22	Outfall 901 data; 21 obs.; 6/2020 - 12/2024
		winter	7	Outfall 901 data; 15 obs.; 12/2019 - 11/2024
Alum Creek WRF flow	cfs	annual	15.472	NPDES Application Form 2A
Background Water Quality				
Aluminum	µg/L		100	EA3; 2013-2024; n=19; 11<MDL; EA3 Station 203388; median
Ammonia (Summer)	mg/L		0.105	801; 6/20-11-24; n=20; 2<MDL; Outfall 801; median
Ammonia (Winter)	mg/L		0.05	801; 12/19-11/24; n=15; 4<MDL; Outfall 801; median
Antimony	µg/L			No representative data available.
Arsenic - TR	µg/L		1	EA3; 2013-2024; n=19; 9<MDL; EA3 Station 203388; median
Barium	µg/L		42	EA3; 2013-2024; n=19; 0<MDL; EA3 Station 203388; median
Bis(2-ethylhexyl) phthalate	µg/L		0.305	EA3; 2013-2014; n=7; 6<MDL; EA3 Station 203388; mean
2-Butanone (Methyl ethyl ketone)	µg/L			No representative data available.
Butyl benzyl phthalate	µg/L		0	EA3; 2013; n=1; 1<MDL; EA3 Station 203388
Cadmium - TR	µg/L		0.1	EA3; 2013-2024; n=19; 17<MDL; EA3 Station 203388; median
Chloroform (Trichloromethane)	µg/L			No representative data available.

Parameter	Units	Season	Value	Basis
Chromium - TR	µg/L		1	EA3; 2013-2024; n=19; 15<MDL; EA3 Station 203388; median
Hexavalent Chromium (Dissolved)	µg/L			No representative data available.
Copper - TR	µg/L		2.08	EA3; 2013-2024; n=19; 3<MDL; EA3 Station 203388; median
Cyanide, Free	µg/L			No representative data available.
Total Filterable Residue	mg/L		293	EA3; 2000-2023; n=10; 0<MDL; EA3 Station V05W25; median
Iron - TR	µg/L		124	EA3; 2013-2024; n=19; 1<MDL; EA3 Station 203388; median
Lead - TR	µg/L		1	EA3; 2013-2024; n=19; 16<MDL; EA3 Station 203388; median
Manganese - TR	µg/L		22	EA3; 2013-2024; n=19; 2<MDL; EA3 Station 203388; median
Mercury	ng/L		0	EA3; 2000; n=5; 5<MDL; EA3 Station V05W25
Nickel - TR	µg/L		2.7	EA3; 2013-2024; n=19; 0<MDL; EA3 Station 203388; median
Nitrate-N + Nitrite-N	mg/L		0.56	801; 12/19/-11/24; n=61; 8<MDL; Outfall 801; median
Phenolics	µg/L		1	EA3; 2013; n=1; 0<MDL; EA3 Station 203388
Selenium - TR	µg/L		1	EA3; 2013-2024; n=19; 17<MDL; EA3 Station 203388; median
Strontium	µg/L		323	EA3; 2013-2024; n=19; 0<MDL; EA3 Station 203388; median
Toluene	µg/L			No representative data available.
Zinc - TR	µg/L		5	EA3; 2013-2024; n=19; 17<MDL; EA3 Station 203388; median

MDL = analytical method detection limit

n = number of samples

obs = observations

NPDES = National Pollutant Discharge Elimination System

Ohio EPA = Ohio Environmental Protection Agency

Table 15. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Aluminum	µg/L	--	--	--	--	--
Ammonia-S	mg/L	--	--	1.9	--	--
Ammonia-W	mg/L	--	--	4.28	--	--
Antimony	µg/L	1054	--	190	900	1800
Arsenic - TR	µg/L	--	164	150	340	680
Barium	µg/L	--	--	1100	4600	9200
Bis(2-ethylhexyl) phthalate	µg/L	5.9 ^c	--	8.4	1100	2100
2-Butanone (Methyl ethyl ketone)	µg/L	--	--	22000	200000	400000
Butyl benzyl phthalate	µg/L	1.6	--	23	130	260
Cadmium - TR	µg/L	--	82	3.9	8.8	18
Chloroform (Trichloromethane)	µg/L	32927 ^c	--	140	1300	2600
Chromium - TR	µg/L	--	164	140	2900	5800
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper - TR	µg/L	--	822	15	24	49
Cyanide - free (wwh,ewh,mwh)	µg/L	659	--	12	46	92
Total Filterable Residue	mg/L	--	--	1500	--	--
Iron - TR	µg/L	--	8151	--	--	--
Lead - TR	µg/L	--	164	14	260	520
Manganese - TR	µg/L	--	--	--	--	--
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Nickel - TR	µg/L	7571	328	86	770	1500
Nitrate-N + Nitrite-N	mg/L	--	164	--	--	--
Phenolics	µg/L	--	--	--	--	--
Selenium - TR	µg/L	6914	82	5	62	120
Strontium	µg/L	--	--	45000	120000	240000
Toluene	µg/L	856	--	62	560	1100
Zinc - TR	µg/L	42801	41155	200	200	390

^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)

^C = carcinogen

Table 16. Parameter Assessment

Group 1:	Due to a lack of criteria, the following parameters could not be evaluated at this time.		
	Aluminum	Manganese - TR	Phenolics
Group 2:	PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.		
	Antimony	Arsenic - TR	Barium
	2-Butanone (Methyl ethyl ketone)	Cadmium - TR	Chloroform (Trichloromethane)
	Chromium - TR	Hexavalent Chromium (Dissolved)	Cyanide, Free ^a
	Iron – TR	Mercury	Nickel – TR
	Nitrate-N + Nitrite-N	Strontium	Toluene
Group 3:	PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL. No limit recommended; monitoring optional.		
	Dissolved Solids	Lead – TR	
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.		
	Copper – TR	Selenium – TR	Zinc – TR
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.		
	<u>Limits to Protect Numeric Water Quality Criteria</u>		
	<i>Parameter</i>	<i>Units</i>	<i>Recommended Effluent Limits</i>
			<i>Average</i>
			<i>Maximum</i>
	Bis(2-ethylhexyl) phthalate	µg/L	5.9
	Butyl benzyl phthalate ^b	µg/L	1.6
			1100
			130

^a = See reasonable potential discussion, pg. 14

^b = See reasonable potential discussion, pg. 13

PEL = preliminary effluent limit

PEQ = projected effluent quality

WLA = wasteload allocation

WQS = water quality standard

Table 17. 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	
Outfall 4PK00003001						
Water Temperature	°C	----- Monitor -----				M ^c
Dissolved Oxygen (summer)	mg/L	7.0 ^m	--	--	--	PD
Dissolved Oxygen (winter)	mg/L	6.0 ^m	--	--	--	BADCT
Total Suspended Solids	mg/L	18 ^d	12	681 ^d	454	BADCT
Oil & Grease	mg/L	10	--	--	--	WQS
Ammonia (summer)	mg/L	1.5 ^d	1	57 ^d	38	BADCT
Ammonia (winter)	mg/L	4.5 ^d	3	170 ^d	114	BADCT
Nitrate plus Nitrite	mg/L	----- Monitor -----				M
Phosphorus	mg/L	----- Monitor -----				PMR
Orthophosphate	mg/L	----- Monitor -----				PMR
Selenium	µg/L	----- Monitor -----				RP
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, RP
Dissolved Hexavalent Chromium	µg/L	----- Monitor -----				M
<i>E. coli</i>	#/100 mL	284 ^d	126	--	--	WQS
Butyl Benzyl Phthalate	µg/L	----- Monitor -----				RP
Bis(2-ethylhexyl) Phthalate	µg/L	1100	5.9	42	0.22	RP
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury (low level)	ng/L	----- Monitor -----				M
Free Cyanide (low level)	µg/L	----- Monitor -----				BTJ
Acute Toxicity, <i>Ceriodaphnia dubia</i>	TUa	----- Monitor -----				WET
Chronic Toxicity, <i>Ceriodaphnia dubia</i>	TUc	----- Monitor -----				WET
Acute Toxicity, <i>Pimephales promelas</i>	TUa	----- Monitor -----				WET
Chronic Toxicity, <i>Pimephales promelas</i>	TUc	----- Monitor -----				WET
pH, maximum	SU	9.0	--	--	--	WQS
pH, minimum	SU	6.5 ^m	--	--	--	WQS
Total Filterable Residue	mg/L	----- Monitor -----				M
CBOD5	mg/L	15 ^d	10	568 ^d	379	BADCT

^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

NPDES = National Pollutant Discharge Elimination System

OAC = Ohio Administrative Code

PD = Plant Design (OAC 3745-33-05(E))

PMR = Phosphorus monitoring requirements (ORC 6111.03)

RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))

WQS = Ohio Water Quality Standards (OAC 3745-1)

WET = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)] OR Reasonable potential for requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [OAC 3745-33-07(B)]

^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.

^m minimum limit

Attachment 1. Whole Effluent Toxicity Reasonable Potential Analysis

The reasonable potential analyses in Table A below were performed for *Ceriodaphnia dubia* and *Pimephales promelas* acute (TUa Cd/Pp) and chronic toxicity (TUc Cd/Pp).

Hazard Category Summary

	<i>Ceriodaphnia dubia</i>		<i>Pimephales promelas</i>	
	Acute	Chronic	Acute	Chronic
Effluent Toxicity (Table A)	4	3	4	4
	3		4	

Hazard Categories: 1: Toxicity adequately documented 3: Toxicity possible
2: Toxicity strongly suspected 4: No toxicity

Table A. Effluent Toxicity

	<i>Ceriodaphnia dubia</i>		<i>Pimephales promelas</i>	
	Acute	Chronic	Acute	Chronic
WLA	0.3	1.00	0.3	1.00
# of tests	6	5	6	5
Maximum value	0.2	1.2	0.2	1.0
Percent of tests >WLA	0	20	0	0
Geometric mean	0.28	1.03	0.28	1.00
Average Exceedance (Geomean * Percent of tests >WLA)	0	0.21	0	0
Average Exceedance / WLA	0	0.21	0	0

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Minimum number of tests	3 TUc Cd TUa Cd TUa Pp TUc Pp	1	0 or 1	0 or 1
(2) Percent of tests >WLA	>30	20 to 30	10 to 20 TUc Cd	10 TUa Cd TUa Pp TUc Pp
(3) Average Exceedance/WLA ¹				
(a) Acute ²	> 0.3	≥ 0.3	≥ 0.2	< 0.2 TUa Cd TUa Pp
(b) Chronic	> 0.3	≥ 0.3	≥ 0.2 TUc Cd	< 0.2 TUc Pp
(4) Maximum TU value	≥(3xWLA)	≥WLA	≥WLA TUc Cd	<WLA TUa Cd TUa Pp TUc Pp

¹ Compare (per cent exceedances x geometric mean TU) to table factor.

² Use 0.3 x WLA for situations where AIM exists.

Addendum 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