

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Willard Water Pollution Control Plant (WPCP)

Public Notice No.: 21-03-034
Public Notice Date: March 29, 2021
Comment Period Ends: April 29, 2021

Ohio EPA Permit No.: 2PD00005*OD
Application No.: OH0028118

Name and Address of Applicant:

City of Willard
631 South Myrtle Avenue
P. O. Box 367
Willard, OH 44890

Name and Address of Facility Where

Discharge Occurs:
Willard WPCP
7 B&O Pike East
Willard, OH 44890
Huron County

Receiving Water: West Branch Jacobs Creek

Subsequent Stream Network: Jacobs Creek, West Branch Huron River, Huron River, 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.

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

New effluent limits are proposed for copper and pentachlorophenol because of reasonable potential to exceed WQS. A 36-month compliance schedule is proposed for the plant to meet the limits. Details are in Part I, C of the permit.

Lower effluent limits are proposed for ammonia because the existing plant design limits are not protective of WQS.

A lower monthly average effluent limit is proposed for mercury based on the approved mercury variance.

New monitoring is proposed for dioxin toxicity equivalent because of the presence of pentachlorophenol in Ohio EPA's April 29, 2019 bioassay sample.

Increased monitoring is proposed for total filterable residue because of reasonable potential to exceed WQS.

Decreased monitoring is proposed for free cyanide and dissolved hexavalent chromium because effluent data does not demonstrate reasonable potential to exceed WQS.

Monitoring requirements are proposed to be removed for bis (2-ethylhexyl) phthalate, selenium, and silver because effluent data does not demonstrate reasonable potential to exceed WQS.

For *Ceriodaphnia dubia*, annual chronic toxicity monitoring with the determination of acute endpoints 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 plant's effluent. The existing limit is proposed to be removed and monitoring will be decreased.

In accordance with Ohio Administrative Code (OAC) 3745-33-07, it has been determined that the effluent from the Willard WPCP shows acute and chronic toxicity to *Pimephales promelas*. Limits of 0.3 TUa and 1.0 TUC are proposed and the monitoring frequency is proposed to increase. A 36-month compliance schedule is proposed for the plant to meet the limits. Details are in Part I, C of the permit.

New monitoring is proposed for pentachlorophenol at influent monitoring station 601 because effluent data indicates reasonable potential to exceed WQS.

Bis (2-ethylhexyl) phthalate, selenium, and silver are being removed from influent monitoring station 601 because monitoring is no longer required at the final outfall.

Monitoring for total cyanide and dissolved hexavalent chromium at influent monitoring station 601 is proposed to decrease to be consistent with the monitoring requirements for Outfall 001.

The monitoring requirement for pH at influent monitoring station 601 is proposed to change from “Grab” to “Multiple Grab.”

Toxicity monitoring is proposed to increase for *Pimephales promelas* and decrease for *Ceriodaphnia dubia* at upstream station 801 to be consistent with the monitoring requirements for Outfall 001.

Monitoring for *E. coli* at upstream station 801 and downstream station 901 is proposed to increase to be consistent with Permit Guidance 1. In addition, the monitoring period is proposed to change to June – August.

Monitoring for temperature, dissolved oxygen, and pH at upstream station 801 is proposed to be removed because this data is not used in permitting determinations for this or future renewals.

New sludge monitoring for nitrate plus nitrite is proposed for station 581 based on Ohio EPA guidance for facilities utilizing aeration for treatment.

A condition has been added to Part II of the permit for the transfer of sewage sludge to another NPDES facility in emergency situations.

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; CSO notification; whole effluent toxicity (WET) testing; storm water compliance; mercury variance; pretreatment program requirements; 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 Chris Monroe, (614) 644-2007, Christopher.monroe@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

Willard WPCP discharges to West Branch of Jacobs Creek at River Mile (RM) 0.08. **Error! Reference source not found.** shows the approximate location of the facility.

This segment of the West Branch of Jacobs Creek is described by Ohio EPA River Code: 12-211, Hydrologic Unit Code: 04100012-04-04, County: Huron, Ecoregion: Eastern Corn Belt Plains. The West Branch of Jacobs Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-19): 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

The Willard WPCP was constructed in 1991 and last upgraded in 2015. The average design flow is 4.5 million gallons per day (MGD) and the peak hydraulic capacity is 7.2 MGD. The Willard WPCP serves the City of Willard and a small unincorporated area outside of the city. The Willard WPCP has the following treatment processes which are shown on Figure 2:

- Influent pumping
- Mechanical bar screening
- Grit removal
- Activated sludge aeration using four vertical loop reactors
- Biological phosphorus removal
- Secondary clarification
- Ultraviolet disinfection
- Post aeration

The Willard WPCP has no bypass. Flows that exceed the facility's capacity are diverted to a 17.6-million-gallon retention lagoon. When the lagoon is full, excess flows are discharged via combined sewer overflows (CSOs).

The City of Willard has 70% separated sewers and 30% combined sewers in the collection system. Historically, Ohio EPA has made the determination to not require the City to develop and implement a CSO Long Term Control Plan, based on reported annual CSO activity of four or less occurrences per year (the prescribed level of control for the presumption approach in USEPA's 1994 CSO Policy). Based on the CSO data from the previous five years, Ohio EPA proposes to continue this approach. If CSO activity increases, installation of additional controls may be required in the future.

The City of Willard has an approved pretreatment program. The City of Willard has one categorical user that discharges 0.056 MGD of flow. The City of Willard has four significant non-categorical users that discharge 0.551 MGD of flow.

The City of Willard's potable water comes from the municipal water supply.

The Willard WPCP utilizes the following sewage sludge treatment processes (Figure 2):

- Aerobic Digestion
- Chemical Addition
- Belt Press Dewatering
- Air Drying
- Land Application

Treated sludge is land applied. Table 1 shows the last five years of sludge removed from the Willard WPCP.

DESCRIPTION OF EXISTING DISCHARGE

The Willard WPCP had four effluent violations which are shown on Table 2. These violations were caused by excessive influent flows and treatment system maintenance. These violations have been addressed by the permittee.

The Willard WPCP estimates there is an infiltration/inflow (I/I) rate to the collection system of 0.675 MGD. The average annual effluent flow rate for the Willard WPCP for the previous five years is presented on Table 3. The Willard WPCP recently completed a GPS mapping project, which will help the City identify problem areas within the collection system. The Willard WPCP plans to initiate the following additional activities to minimize I/I: large diameter sewer cleaning, televising, and lagoon expansion/cleaning.

The Willard WPCP reports SSOs at station 300. No SSOs were reported over the past five years.

The Willard WPCP has three CSOs at the retention lagoon. Outfall 008 is a drain valve that has been manually closed for several years. The number of CSOs is presented on Table 4.

Table 6 presents chemical specific data compiled from data reported in annual pretreatment reports.

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 October 2015 to September 2020, 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 WET tests of the final effluent.

Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information through the submission of annual pretreatment program reports and/or from Ohio EPA effluent testing conducted.

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 Holiday Lake watershed assessment unit, which includes the West Branch of Jacobs Creek in the vicinity of the Willard WPCP, is listed as impaired for aquatic life and recreation 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 Huron River in September 2005.

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 (Table 11) 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.

Specific water quality data has not been collected for Jacobs Creek since 1998. The TMDL is based on this data for Jacobs Creek. The 1998 data indicates an impairment upstream of the Willard WPCP, with the source identified as CSOs. The facility has very infrequent CSOs and is likely no longer a significant source of this impairment. Additionally, the TMDL recommends a monthly average phosphorus limit of 1.0 mg/L for all Huron River watershed dischargers because it was determined to be a source of impairment. The Willard WPCP NPDES permit already has phosphorus limits in place that are protective of this recommendation.

A biological study for the Huron River basin was published in 2016, which included some data for the Holiday Lake assessment unit. The Holiday Lake watershed is impaired for aquatic life use due to the impoundment downstream of the Willard WPCP and recreation use due to household sewage system discharges and biosolids. This indicates that the Willard WPCP is not contributing to the impairments in the watershed.

The TMDL is available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/portals/35/tmdl/Huron_Final_Report_080905.pdf.

The most recent biological and water quality study of the Huron River basin is available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/Portals/35/tmdl/TSD/Huron%20River%20Watershed%202016/2016_Huron%20River_TSD_Final_Web.pdf?ver=2020-01-10-120642-633.

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 Willard WPCP 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)	October 2015 through September 2020
Pretreatment data	2016 – 2020
Ohio EPA bioassay sampling data	2019

Statistical Outliers and Other Non-representative Data

The data were examined and the following values were removed from the evaluation as non-representative data: nitrite plus nitrate – 233, 6/1/16, uncharacteristically high value; nitrite plus nitrate – 0.25, 9/7/16, uncharacteristically low value.

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).

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 14).

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. For free flowing streams, WLAs using this method are done 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 13, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 6, Table 7, and Table 8. The WLA results to maintain all applicable criteria are presented in Table 14.

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 the Willard WPCP, 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 (IC₂₅):

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

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):

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

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:

<u>Dilution Ratio</u> <u>(downstream flow to discharger flow)</u>	<u>Allowable Effluent Toxicity</u> <u>(percent effects in 100% effluent)</u>
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

$$\text{Stream Dilution Ratio} = \frac{1Q10 + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{0 \text{ cfs} + 6.96 \text{ cfs}}{6.96 \text{ cfs}} = 1.0$$

The acute WLA for the Willard WPCP is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1 to 1.

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 14. 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 15.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 16 presents the final effluent limits and monitoring requirements proposed for the Willard WPCP Outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

CBOD5, Dissolved Oxygen, and Total Suspended Solids

The limits proposed for 5-day carbonaceous biochemical oxygen demand, dissolved oxygen, and total suspended solids are all based on plant design criteria. The TSS and CBOD limits meet the secondary treatment standards located in 40 CFR 133.

E. coli, Oil and Grease, and pH

Limits proposed for oil and grease, pH, and *Escherichia coli* are based on WQS (OAC 3745-1-35 and 37).

Total Phosphorus

Phosphorus is limited based on provisions of OAC 3745-33-06(C).

Ammonia

The current plant design ammonia limits have been evaluated using the WLA procedures and the limits are not protective of WQS. These limits have been lowered based on WQS. Data collected during the previous five years suggest that the permittee is able to meet the new limits, therefore no compliance schedule is needed.

Copper and Pentachlorophenol

The Ohio EPA risk assessment (Table 15) places copper and pentachlorophenol in group 5. This placement, as well as the data in Table 9 and Table 14, 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. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The thirty-day average concentration limits for copper and pentachlorophenol are based on the WLA. The daily maximum concentration limits for copper are based on the WLA. All loading limits are based on the concentration limits and the average daily design flow of the plant.

Dioxin Toxicity Equivalents

Due to the detection of pentachlorophenol in the effluent discharge at outfall 001, toxicity equivalents with no limits are proposed to be monitored quarterly in accordance with OAC 3745-33-07(A)(4). Monitoring is proposed for three years to meet the requirement in rule. Based on monitoring results, Ohio EPA may require the City to continue monitoring for this parameter after the 36th month of this permit.

Total Filterable Residue

The Ohio EPA risk assessment (Table 15) places total filterable residue in group 4. This placement, as well as the data in Table 9 and Table 14, support that this parameter does 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). Monitoring will continue at an increased frequency of once per two weeks.

Cadmium, Chromium, Free Cyanide, Dissolved Hexavalent Chromium, Lead, Nickel, Nitrate plus Nitrite, and Zinc

The Ohio EPA risk assessment (Table 15) places cadmium, chromium, free cyanide, dissolved hexavalent chromium, lead, nickel, nitrate plus nitrite, and zinc in groups 2 and 3. This placement, as well as the data in Table 9 and Table 14, 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.

Aluminum, Antimony, Arsenic, Barium, Bis (2-ethylhexyl) Phthalate, Iron, Manganese, Methyl Ethyl Ketone, Molybdenum, Selenium, Silver, and Strontium

The Ohio EPA risk assessment (Table 15) places aluminum, antimony, arsenic, barium, bis (2-ethylhexyl) phthalate, iron, manganese, methyl ethyl ketone, molybdenum, selenium, silver, and strontium in groups 2 and 3. This placement, as well as the data in Table 9 and Table 14, 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. Monitoring for bis (2-ethylhexyl) phthalate, silver, and selenium is proposed to be removed. Annual pretreatment effluent scans will provide data for future reasonable potential determinations on these parameters.

Flow Rate and Temperature

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

Dissolved Orthophosphate

Monitoring for dissolved orthophosphate (as P) is required by Ohio Senate Bill 1 (ORC 6111.03), which was signed by the Governor on April 2, 2015. Monitoring for orthophosphate will further develop nutrient datasets for dissolved reactive phosphorus that are used in stream and watershed assessments and studies. Because Ohio EPA monitoring, as well as other in-stream monitoring, 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.

Total Kjeldahl Nitrogen

Monitoring for total Kjeldahl nitrogen (TKN) is proposed in accordance with Ohio EPA guidance. The Willard WPCP discharges a nutrient load and continued monitoring will allow Ohio EPA to adequately characterize the influence of the treatment plant on the receiving water. Additionally, monitoring will ensure that a nutrient data set is maintained for use in future studies.

Mercury Variance

The Ohio EPA risk assessment (Table 16) places mercury in group 5. This placement, as well as the data in Table 9 and Table 14, 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 for mercury is the PEQ average value and is based on the mercury variance. The daily maximum limit is based on the WLA. All loading limits are based on the concentration limits and the average daily design flow of the plant.

The Willard WPCP permit was renewed on 1/25/16 to include a mercury variance, and variance-based limits for mercury. Based on the monitoring results from October 2015 to September 2020, and the new application information (Attachment 1), the Willard WPCP has determined that the facility will not meet the 30-day average permit limit of 1.3 ng/l. However, the effluent data shows that the permittee can meet the mercury annual average value of 12 ng/l. The permittee's application has also demonstrated to the satisfaction of Ohio EPA that there is no readily apparent means of complying with the WQBEL without constructing prohibitively expensive end-of-pipe controls for mercury. Based upon these demonstrations, the Willard WPCP is eligible for the mercury variance under OAC 3745-1-38(J).

Willard WPCP submitted information supporting the renewal of the variance. The permittee identified potential sources within the collection area and performed outreach to industries, businesses, and residential customers to reduce the amount of mercury being discharged. The calculation of the PEQ_{avg} value from October 2015 to September 2020 compared to the PEQ_{avg} calculated at the time the original variance was issued shows a reduction from 9.9 ng/L to 5.3 ng/L. The Pollutant Minimization Program (PMP) schedule developed from the original variance continues to be implemented, and further reductions in mercury may be possible.

Ohio EPA has reviewed the mercury variance application and has determined that it meets the requirements of the OAC. A condition in Part II of the NPDES permit lists the provisions of the mercury variance, and includes the following requirements:

- A variance-based monthly average effluent limit of 5.3 ng/L, which was developed from sampling data submitted by the permittee;
- A requirement that the permittee make reasonable progress to meet the WQBEL for mercury by implementing the plan of study, which has been developed as part of the PMP;
- Low-level mercury monitoring of the plant's influent and effluent;

- A requirement that the annual average mercury effluent concentration is less than or equal to 12 ng/L as specified in the plan of study;
- A summary of the elements of the plan of study;
- A requirement to submit an annual report on implementation of the PMP; and
- A requirement for submittal of a certification stating that all permit conditions related to implementing the plan of study and the PMP have been satisfied, but that compliance with the monthly average WQBEL for mercury has not been achieved.

Whole Effluent Toxicity Reasonable Potential

Evaluating the acute and chronic toxicity results in Table 10 under the provisions of 40 CFR Part 132, Appendix F, Procedure 6, gives an acute PEQ value of 2.9 TU_a and a chronic PEQ of 4.6 TU_c for *Pimephales promelas*. Reasonable potential for toxicity is demonstrated since these values exceed the WLA values of 0.3 TU_a and 1.0 TU_c. Consistent with Procedure 6 and OAC 3745-33-07(B), a monthly average limit of 1.0 TU_c and a daily maximum limit of 0.3 TU_a are proposed. It is proposed that the final effluent limits for toxicity become effective 36 months from the effective date of the permit.

The acute and chronic toxicity results in Table 10 show that there have been no detections of toxicity for *Ceriodaphnia dubia*. 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 toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). Annual chronic toxicity monitoring with the determination of acute endpoints and annual acute toxicity monitoring is proposed for the life of the permit. The proposed monitoring will adequately characterize toxicity in the plant's effluent. The existing limit is proposed to be removed.

Additional Monitoring Requirements

New monitoring for pentachlorophenol is being proposed influent monitoring station 601 because of reasonable potential to exceed WQS at the final outfall.

Monitoring for *E. coli* at upstream monitoring station 801 and downstream monitoring station 901 is proposed to change from summer to June-August and from monthly to once every two weeks. The higher frequency over a shorter period will facilitate impairment assessments in the receiving stream.

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.

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.

New Limits - A 36-month compliance schedule is proposed for the Willard WPCP to meet the new concentration and loading limits for copper, pentachlorophenol, and WET. 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 Willard WPCP to have a Class III 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.

Renewal NPDES permits no longer authorize the use of method 4500 CN-I from Standard Methods for free cyanide testing.

Great Lakes Basin CSO Public Notification

To comply with the Great Lakes Basin CSO Public Notification rule, the permittee submitted a “CSO/SSP Public Notification Plan on September 5, 2018. The plan was approved by Ohio EPA on September 12, 2018. See Part II, Item F for more details.

Outfall Signage

Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the West Branch of Jacobs Creek 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 November 24, 2020. The certification number is 2GR00394. Compliance

with the industrial storm water regulations must be re-affirmed every five years. No later than November 24, 2025, 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 Willard WPCP

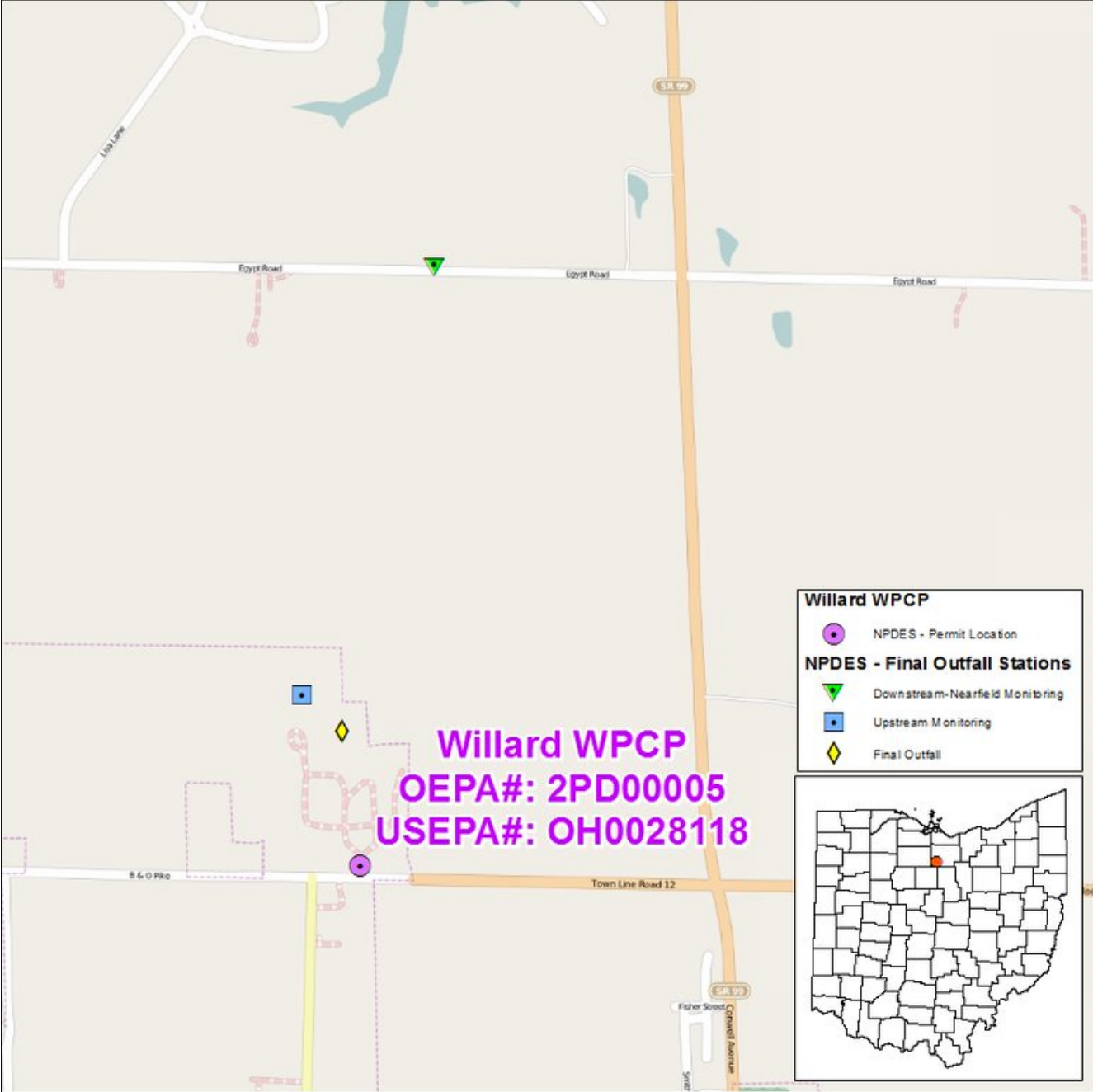


Figure 2. Diagram of Wastewater Treatment System

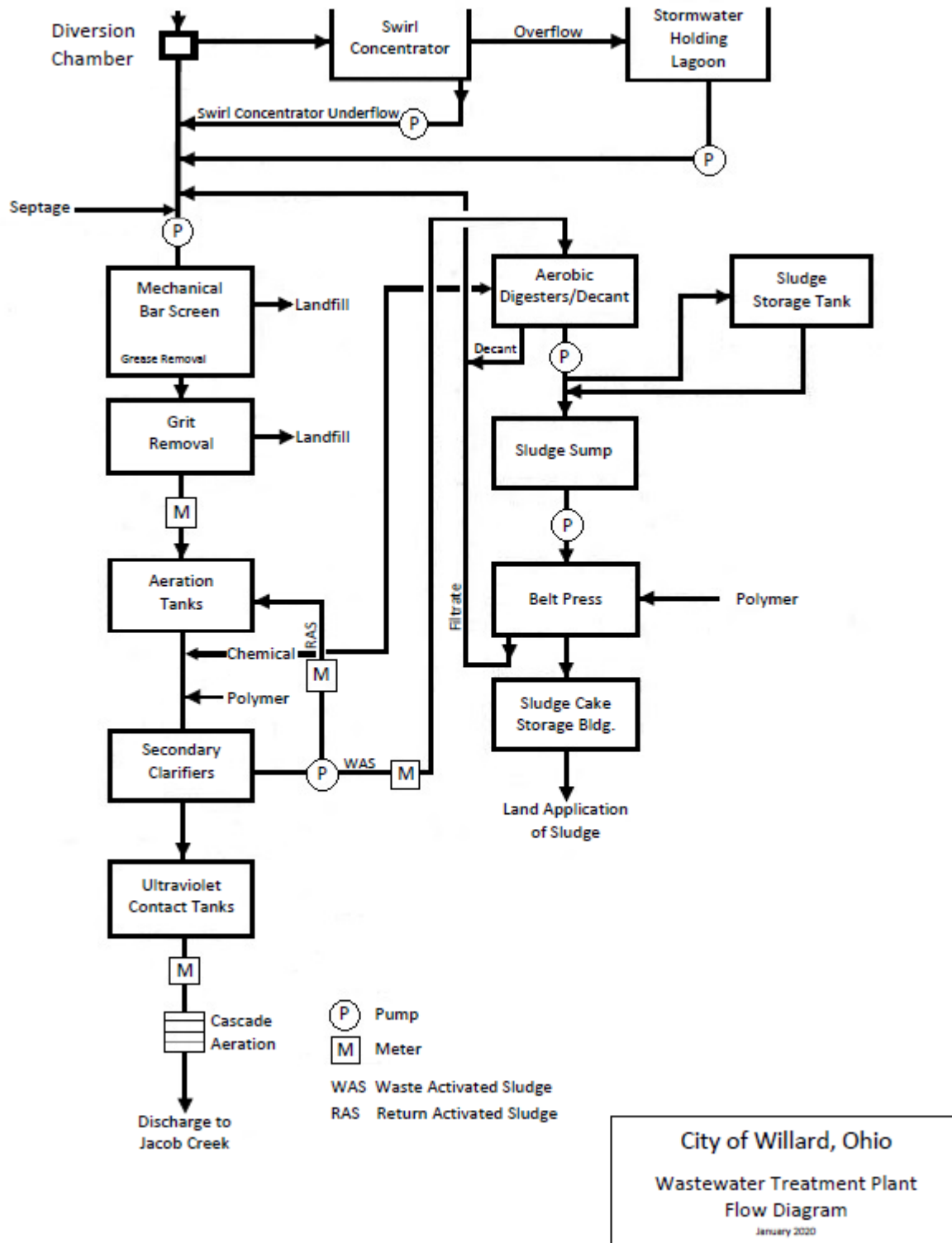


Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2015	52
2016	330
2017	326
2018	230
2019	263

Table 2. Effluent Violations for Outfall 001

Parameter	2015	2016	2017	2018	2019	2020	Total
Mercury, Total (Low Level)	0	0	2	0	0	0	2
Total Suspended Solids	0	0	0	2	0	0	2
Total	0	0	2	2	0	0	4

Data collected October 2015 – September 2020

Table 3. Average Annual Effluent Flow Rates

Flow Rate (Million Gallons per Day)					
Year	# obs	Average	Median	95th Percentile	Maximum
2015	92	1.91	1.40	5.37	7.46
2016	366	2.03	1.45	5.16	8.09
2017	365	2.15	1.58	5.25	7.51
2018	365	2.19	1.65	5.85	7.2
2019	365	2.05	1.48	4.88	7.34
2020	274	2.24	1.84	5.03	7.36

Data collected October 2015 – September 2020

MGD = million gallons per day.

Table 4. Combined Sewer Overflow Discharges

Station	Date	# Of CSOs	Total (Million Gallons)
007	5/19/2020	1	4.24
009	11/1/2018	1	6.37

Data collected October 2015 – September 2020

Table 5. Calculated Phosphorus Loadings from 2015 - 2020

Year	Obs.	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2015	1	0.39	1.17	1.73
2016	24	0.20	1.28	0.94
2017	23	0.26	1.27	1.44
2018	24	0.34	1.16	1.32
2019	25	0.27	1.38	1.32
2020	16	0.14	1.31	0.70

Data collected October 2015 – September 2020

MGD = million gallons per day

Table 6. Effluent Characterization Using Pretreatment Data

Parameter (µg/L)	9/7/2016	9/6/2017	9/5/2018	9/4/2019	9/2/2020
Antimony	AA (5)	AA (5)	AA (5)	AA (5)	AA (5)
Arsenic	AA (5)	AA (5)	AA (5)	AA (5)	AA (5)
Bis(2-ethylhexyl) Phthalate	AA (5)	AA (5)	AA (5)	AA (5)	AA (5)
Cadmium	AA (3)	AA (3)	AA (3)	AA (3)	AA (3)
Chromium	AA (7)	AA (7)	AA (7)	AA (7)	AA (7)
Copper	AA (8)	AA (8)	AA (8)	AA (8)	AA (8)
Lead	AA (10)	AA (10)	AA (10)	AA (10)	AA (10)
Mercury (ng/L)	AA (0.2)	1.8	1.1	1.1	AA (0.005)
Molybdenum	AA (20)	AA (20)	21	AA (20)	AA (20)
Nickel	AA (8)	AA (8)	AA (8)	AA (8)	AA (8)
Pentachlorophenol	AA (50)	AA (50)	AA (50)	AA (50)	AA (50)
Selenium	AA (4)	AA (4)	AA (4)	AA (4)	AA (4)
Silver	AA (5)	AA (5)	AA (5)	AA (5)	AA (5)
Zinc	39	20	17	15	17

AA = not-detected (analytical method detection limit)

Table 7. Effluent Characterization Using Ohio EPA data

Parameter	Units	4/29/19	5/20/19
Acetone	µg/L	3.69	1.71
Aluminum	µg/L	304	303
Ammonia	mg/L	0.317	0.067
Antimony	µg/L	0.544	0.649
Arsenic	µg/L	0.849	0.961
Barium	µg/L	25.7	20.9
Bis(2-ethylhexyl) Phthalate	µg/L	AA (2.04)	AA (2.07)
Cadmium	µg/L	AA (0.061)	AA (0.061)
Chloride	mg/L	94.7	130
Chromium	µg/L	0.569	0.53
Copper	µg/L	3.76	3.04
Cyanide, Free	µg/L	AA (2.54)	3.25
Iron	µg/L	434	332
Lead	µg/L	0.29	0.416
Manganese	µg/L	33.1	31.6
Methyl Ethyl Ketone	µg/L	0.755	AA (0.51)
Nickel	µg/L	3.7	4.32
Nitrate + Nitrite	mg/L	6.61	13.8
Pentachlorophenol	µg/L	16.8	AA (2.74)
Selenium	µg/L	1.23	1.11
Silver	µg/L	AA (0.036)	AA (0.036)
Strontium	µg/L	320	365
Total Filterable Residue	mg/L	500	664
Zinc	µg/L	23.6	43.1

AA = not detected (analytical method detection limit)

Table 8. Effluent Characterization Using Self-Monitoring Data

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Water Temperature	°C	Monitoring Only		1797	15	28	6 - 28
Dissolved Oxygen	mg/L	--	5.0 ^m	1797	8.3	7.1*	6.1 - 11.5
Residue, Total Dissolved	mg/L	Monitoring Only		5	619	673	534 - 682
Total Suspended Solids - Summer - 2015-2015	kg/day	204	306.0 ^w	12	51.2	161	14.5 - 269
Total Suspended Solids - Summer - 2016-2020	kg/day	204	306 ^w	336	32.6	135	4.19 - 292
Total Suspended Solids - Summer	mg/L	12.0	18.0 ^w	348	6.75	13.2	1 - 31.5
Total Suspended Solids - Winter - 2016-2020	kg/day	340	511 ^w	312	71.1	309	17.9 - 695
Total Suspended Solids - Winter - 2015-2016	kg/day	340.0	511.0 ^w	50	83.8	258	32.6 - 509
Total Suspended Solids - Winter	mg/L	20.0	30.0 ^w	362	11	20	2.8 - 29
Oil and Grease	mg/L	--	10	59	< 5	< 5	0 - 5.3
Nitrogen, Ammonia - Summer	kg/day	21.0	32.0 ^w	348	< 2.56	7.68	0 - 29.8
Nitrogen, Ammonia - Summer	mg/L	1.2	1.8 ^w	348	< .2	.793	0 - 2.99
Nitrogen, Ammonia - Winter	kg/day	56.0	84.0 ^w	360	< 2.11	15.7	0 - 51.5
Nitrogen, Ammonia - Winter	mg/L	3.3	5.0 ^w	360	< .5	1.45	0 - 3.01
Nitrogen Kjeldahl, Total	mg/L	Monitoring Only		54	1	2.83	0 - 8120
Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		59	9.73	15.8	.25 - 233
Phosphorus, Total	kg/day	17.0	26.0 ^w	222	1.36	5.08	0 - 10.2
Phosphorus, Total	mg/L	1.0	1.5 ^w	222	.24	.48	0 - .86
Orthophosphate, Dissolved	mg/L	Monitoring Only		54	< .5	.366	0 - 233
Selenium, TR	kg/day	0.085	--	5	--	--	< .0136
Selenium, TR - 2015-2016	µg/L	5.0	--	5	--	--	< 3
Selenium, TR - 2016-2020	µg/L	Monitoring Only		54	--	--	< 3
Nickel, TR	µg/L	Monitoring Only		20	--	--	< 10
Silver, TR	kg/day	0.0222	0.24	1	--	--	< .026

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Silver, TR - 2015-2015	µg/L	1.3	14	1	--	--	< 5
Silver, TR - 2016-2020	µg/L	Monitoring Only		19	--	--	< .5
Zinc, TR	µg/L	Monitoring Only		20	24.5	52.4	0 - 59
Cadmium, TR	µg/L	Monitoring Only		20	--	--	< .5
Lead, TR	µg/L	Monitoring Only		20	< 2	2.05	0 - 2.9
Chromium, TR	µg/L	Monitoring Only		20	--	--	< 10
Copper, TR	kg/day	0.46	0.78 ^w	5	< .0453	.0835	0 - .0901
Copper, TR - 2015-2016	µg/L	27.0	46	5	< 10	11	0 - 11
Copper, TR - 2016-2020	µg/L	Monitoring Only		54	< 10	< 10	0 - 30
Chromium, Dissolved Hexavalent	µg/L	Monitoring Only		54	--	--	< 500
Antimony, TR	µg/L	Monitoring Only		1	--	--	< 3
E. coli	#/100 mL	126	284 ^w	353	3.1	77.8	0 - 603
Bis(2-ethylhexyl) Phthalate	kg/day	0.144	18.8	5	--	--	< .00952
Bis(2-ethylhexyl) Phthalate - 2015-2016	µg/L	8.4	1100	5	--	--	< 2
Bis(2-ethylhexyl) Phthalate - 2016-2020	µg/L	Monitoring Only		54	--	--	< 5
Flow Rate	MGD	Monitoring Only		1797	1.55	5.42	.345 - 8.09
Mercury, Total - 2016-2020	kg/day	0.000152	0.029	54	.0000128	.0000561	0 - .000163
Mercury, Total - 2015-2016	kg/day	0.000169	0.029	5	.0000204	.0000444	.0000168 - .0000463
Mercury, Total - 2016-2020	ng/L	8.9	1700	54	2.42	7.13	0 - 10
Mercury, Total - 2015-2016	ng/L	9.9	1700	5	3.72	4.39	2.96 - 4.5
Cyanide, Free (Low-Level)	µg/L	Monitoring Only		54	< .003	< .003	0 - 3
Acute Toxicity, Ceriodaphnia dubia	TUa	Monitoring Only		9	--	--	< .2
Chronic Toxicity, Ceriodaphnia dubia - Semi-annual	TUc	--	1.0	9	--	--	< 1
Acute Toxicity, Pimephales promelas	TUa	Monitoring Only		5	< .2	1	0 - 1.25
Chronic Toxicity, Pimephales promelas	TUc	Monitoring Only		5	< 1	1.59	0 - 1.99
pH, Maximum	S.U.	--	9.0	1797	7.54	7.8	6.8 - 8.2

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
pH, Minimum	S.U.	--	6.5 ^m	1797	7.5	7.1*	6.8 - 7.9
Residue, Total Filterable	mg/L	Monitoring Only		54	659	878	5.28 - 989
CBOD 5 day - Summer - 2016-2020	kg/day	170	255 ^w	336	9.33	38.4	0 - 62.6
CBOD 5 day - Summer - 2015-2015	kg/day	170.0	255 ^w	12	9.07	26.2	5.81 - 38.1
CBOD 5 day - Summer	mg/L	10.0	15.0 ^w	348	2	3.27	0 - 5
CBOD 5 day - Winter - 2015-2016	kg/day	255	392.0 ^w	48	13.3	46.2	6.73 - 121
CBOD 5 day - Winter - 2016-2020	kg/day	255	392 ^w	312	19.3	81.1	0 - 165
CBOD 5 day - Winter	mg/L	15.0	23.0 ^w	360	3.1	5.4	0 - 7.6

Data collected October 2015 – September 2020

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

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

^a = weekly average.

Table 9. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Aluminum	µg/L	3	3	665.76	912
Ammonia (Summer)	mg/L	240	41	0.51117	0.88509
Ammonia (Winter)	mg/L	180	60	0.75121	1.635
Antimony	µg/L	8	2	0.900163	1.2331
Arsenic - TR	µg/L	7	2	1.40306	1.922
Barium	µg/L	2	2	71.2918	97.66
Bis(2-ethylhexyl) Phthalate	µg/L	62	0	--	--
Cadmium - TR	µg/L	27	0	--	--
Chlorides	mg/L	2	2	360.62	494
Chromium - TR	µg/L	27	2	0.498444	0.6828
Chromium, Dissolved Hexavalent	µg/L	55	0	--	--
Copper - TR	µg/L	65	5	21.9	30
Cyanide - free	µg/L	55	2	2.3725	3.25
Iron - TR	µg/L	1	1	1185.812	1624.4
Lead - TR	µg/L	22	4	2.7521	3.77
Manganese - TR	µg/L	2	2	91.8194	125.78
Mercury	ng/L	60	58	5.2979	8.1836
Methyl ethyl ketone	µg/L	2	1	2.09437	2.869
Molybdenum	µg/L	5	1	35.259	48.3
Nickel - TR	µg/L	27	2	8.76	12
Nitrate-N + Nitrite-N	mg/L	60	60	14.195	18.995
Pentachlorophenol	µg/L	7	1	24.528	33.6
Selenium - TR	µg/L	46	2	2.409	3.3
Silver	µg/L	27	0	--	--
Strontium	µg/L	3	3	799.35	1095
Total Filterable Residue	mg/L	61	61	786.05	928.75
Zinc - TR	µg/L	27	26	46.527	70.854

MDL = analytical method detection limit

PEQ = projected effluent quality

Table 10. Summary of Acute and Chronic Toxicity Results

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales Promelas</i>	
	Acute (TU _a)	Chronic (TU _c)	Acute (TU _a)	Chronic (TU _c)
6/20/2016	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
12/9/2016	AA (0.2)	AA (1.0)	--	--
6/19/2017	AA (0.20)	AA (1.0)	AA (0.2)	AA (1.0)
12/4/2017	AA (0.2)	AA (1.0)	--	--
6/18/2018	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
12/10/2018	AA (0.2)	AA (1.0)	--	--
6/10/2019	AA (0.2)	AA (1.0)	1.25	1.99
12/2/2019	AA (0.2)	AA (1.0)	--	--
6/8/2020	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)

Data collected October 2015 – September 2020

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. Aquatic Life Use Attainment Table based on 1998 Ohio EPA Biological Survey

River Mile Fish/Invertebrate	IBI	ICI	QHEI	Attainment Status	Location	Causes of Impairment**	Sources of Impairment**
West Branch Jacobs Creek (1998) - ECBP Ecoregion - WWH existing						Organic enrichment	Municipal point sources
0.2 ^(H) / --	<u>22*</u>	--	62.0	(NON)	Upstream of Willard WPCP		
East Branch Jacobs Creek (1998) - ECBP Ecoregion - WWH existing						Habitat alteration	Agricultural runoff
-- /0.2	--	F*	--	(NON)	Upstream of West Branch at Townline Road		
Jacobs Creek (1998) - ECBP Ecoregion - WWH existing						Oil & Grease	Upstream impoundment
0.6 ^(H) /0.6	<u>20*</u>	F*	50.0	NON	Downstream of Willard WPCP at Egypt Road		

IBI = The Index of Biotic Integrity

ICI = Invertebrate Community Index

QHEI = Qualitative Habitat Evaluation Index

EWB = exceptional warmwater habitat

WWH = Warmwater Habitat

ns = Nonsignificant departure from biocriteria (<4 IBI or ICI units, or <0.5 MIwb units).

* = Indicates significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units); F = Fair.

Underlined scores are in the Poor or Very Poor range.

(NON) = Use attainment status based on one organism group is parenthetically expressed.

WPCP = Water Pollution Control Plant

H = Headwater site type (drainage area ≤ 20 square miles).

ECBP = Eastern Corn Belt Plain

** = The causes and sources included in this table represent only those which have been identified and ranked as having a "high" significance regarding impairment in Assessment Unit

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Table 12. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria					Maximum Aquatic Life	Inside Mixing Zone Maximum
		Average						
		Wildlife	Human Health	Agri-culture	Aquatic Life			
Aluminum	µg/L	--	4500	--	--	--	--	
Ammonia (Summer)	mg/L	--	--	--	0.8	--	--	
Ammonia (Winter)	mg/L	--	--	--	2.7	--	--	
Antimony	µg/L	--	780	--	190	900	1800	
Arsenic - TR	µg/L	--	580	100	150	340	680	
Barium	µg/L	--	160000	--	220	2000	4000	
Bis(2-ethylhexyl) Phthalate	µg/L	--	32 ^c	--	8.4	1100	2100	
Cadmium - TR	µg/L	--	730	50	6.1	17	33	
Chlorides	mg/L	--	--	--	--	--	--	
Chromium - TR	µg/L	--	14000	100	220	4700	9300	
Chromium, Dissolved Hexavalent	µg/L	--	14000	--	11	16	31	
Copper - TR	µg/L	--	64000	500	25	42	84	
Cyanide - free	µg/L	--	48000	--	5.2	22	44	
Iron - TR	µg/L	--	--	5000	--	--	--	
Lead - TR	µg/L	--	--	100	28	540	1100	
Manganese - TR	µg/L	--	61000	--	--	--	--	
Mercury	ng/L	1.3	3.1	10000	910	1700	1700	
Methyl ethyl ketone	µg/L	--	--	--	22000	200000	400000	
Molybdenum	µg/L	--	10000	--	20000	190000	370000	
Nickel - TR	µg/L	--	43000	200	140	1300	2500	
Nitrate-N + Nitrite-N	mg/L	--	--	100	--	--	--	
Pentachlorophenol	µg/L	--	1.6 ^c	--	--	--	--	
Selenium - TR	µg/L	--	3100	50	5	62	120	
Silver	µg/L	--	11000	--	1.3	12	24	
Strontium	µg/L	--	1400000	--	21000	40000	81000	
Total Filterable Residue	mg/L	--	--	--	1500	--	--	
Zinc - TR	µg/L	--	35000	25000	320	320	640	

^c = carcinogen

Table 13. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
<i>Stream Flows</i>				
1Q10 7Q10 30Q10 90Q10 Harmonic Mean	cfs	annual	0	Historical OEPA Determination (1992)
Mixing Assumption	%	average	100	
		maximum	100	
<i>Hardness</i>				
	mg/L	annual	319	eDMR; 2015-2020; 50th percentile
<i>pH</i>				
	S.U.	summer	8.165	eDMR; 2015-2020; 75th percentile
		winter	8.1	eDMR; 2015-2020; 75th percentile
<i>Temperature</i>				
	°C	summer	21.975	eDMR; 2015-2020; 75th percentile
		winter	10.2	eDMR; 2015-2020; 75th percentile
<i>Willard WPCP flow</i>				
	cfs (MGD)	annual	6.9625 (4.5)	NPDES Permit Application
<i>Background Water Quality</i>				
This data is not necessary due to the zero-flow receiving stream.				

NPDES = National Pollutant Discharge Elimination System
 OEPA = Ohio Environmental Protection Agency
 WPCP = water pollution control plant

Table 14. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Average				Maximum Aquatic Life	
		Wildlife	Human Health	Agri-culture	Aquatic Life		
Aluminum	µg/L	--	4500	--	--	--	--
Ammonia (Summer)	mg/L	--	--	--	0.8	--	--
Ammonia (Winter)	mg/L	--	--	--	2.7	--	--
Antimony	µg/L	--	780	--	190	900	1800
Arsenic - TR	µg/L	--	580	100	150	340	680
Barium	µg/L	--	160000	--	220	2000	4000
Bis(2-ethylhexyl) Phthalate	µg/L	--	32	--	8.4	1100	2100
Cadmium - TR	µg/L	--	730	50	6.1	17	33
Chlorides	mg/L	--	--	--	--	--	--
Chromium - TR	µg/L	--	14000	100	220	4700	9300
Chromium, Dissolved Hexavalent	µg/L	--	14000	--	11	16	31
Copper - TR	µg/L	--	64000	500	25	42	84
Cyanide - free	µg/L	--	48000	--	5.2	22	44
Iron - TR	µg/L	--	--	5000	--	--	--
Lead - TR	µg/L	--	--	100	28	540	1100
Manganese - TR	µg/L	--	61000	--	--	--	--
Mercury	ng/L	1.3	3.1	10000	910	1700	1700
Methyl ethyl ketone	µg/L	--	--	--	22000	200000	400000
Molybdenum	µg/L	--	10000	--	20000	190000	370000
Nickel - TR	µg/L	--	43000	200	140	1300	2500
Nitrate-N + Nitrite-N	mg/L	--	--	100	--	--	--
Pentachlorophenol	µg/L	--	1.6	--	--	--	--
Selenium - TR	µg/L	--	3100	50	5	62	120
Silver	µg/L	--	11000	--	1.3	12	24
Strontium	µg/L	--	1400000	--	21000	40000	81000
Total Filterable Residue	mg/L	--	--	--	1500	--	--
Zinc - TR	µg/L	--	35000	25000	320	320	640

Table 15. Parameter Assessment

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

Chlorides

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

Aluminum	Antimony	Arsenic - TR
Bis(2-ethylhexyl) Phthalate	Cadmium - TR	Chromium - TR
Chromium, Dissolved Hexavalent	Iron - TR	Lead - TR
Manganese - TR	Methyl ethyl ketone	Molybdenum
Nickel - TR	Nitrate-N + Nitrite-N	Silver
Strontium	Zinc - TR	

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

Barium	Free Cyanide	Selenium - 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.

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

<i>Parameter</i>	<i>Units</i>	<i>Recommended Effluent Limits</i>	
		<i>Average</i>	<i>Maximum</i>
Ammonia (Summer)	mg/L	0.8	--
Ammonia (Winter)	mg/L	2.7	--
Copper - TR	µg/L	25	42
Mercury	ng/L	1.3	1700
Pentachlorophenol	µg/L	1.6	--

PEL = preliminary effluent limit
PEQ = projected effluent quality
WLA = wasteload allocation
WQS = water quality standard

Table 16. Final Effluent Limits for Outfall 001

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Water Temperature	°C	----- Monitor -----				M ^c
Dissolved Oxygen	mg/L	5.0 min		--	--	PD
Total Suspended Solids – Summer	mg/L	12	18 ^d	204	306 ^d	PD
Total Suspended Solids – Winter	mg/L	20	30 ^d	340	511 ^d	PD
Oil & Grease	mg/L	--	10	--	--	WQS
Ammonia – Summer	mg/L	0.8	1.2 ^d	13.6	20.4 ^d	WLA/PD
Ammonia – Winter	mg/L	2.7	4.1 ^d	46.0	69.8 ^d	WLA/PD
Nitrate+Nitrite	mg/L	----- Monitor -----				M
Total Kjeldahl Nitrogen	mg/L	----- Monitor -----				M
Phosphorus	mg/L	1.0	1.5 ^d	17.0	26.0 ^d	PTS
Orthophosphate, Dissolved (as P)	mg/L	----- Monitor -----				SB1
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	25	42	0.43	0.72	WLA
Hexavalent Chromium (Dissolved)	µg/L	----- Monitor -----				M
<i>E. coli</i>	#/100 ml	126	284 ^d	--	--	WQS
Pentachlorophenol	µg/L	1.6	--	0.027	--	WLA
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury	ng/L	5.3	1700	0.00009	0.0258	WLA/VAR
Free Cyanide	µg/L	----- Monitor -----				M
Whole Effluent Toxicity						
<i>Ceriodaphnia dubia</i>	TU _a	----- Monitor -----				WET
<i>Ceriodaphnia dubia</i>	TU _c	----- Monitor -----				WET
<i>Pimephales promelas</i>	TU _a	--	0.3	--	--	WET
<i>Pimephales promelas</i>	TU _c	1.0	--	--	--	WET
pH, Maximum	SU	9.0 max		--	--	WQS
pH, Minimum	SU	6.5 min		--	--	WQS
Total Filterable Residue	mg/L	----- Monitor -----				RP
Carbonaceous Biochemical Oxygen Demand (5 day) – Summer	mg/L	10.0	15.0 ^d	170	255 ^d	PD

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Carbonaceous Biochemical Oxygen Demand (5 day) – Winter	mg/L	15.0	23.0 ^d	255	392 ^d	PD
Dioxin Toxicity Equivalent	pg/L	----- Monitor -----				OAC

^a Effluent loadings based on average design discharge flow of 4.5 MGD.

^b Definitions:

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))
 PTS = Phosphorus Treatment Standards (OAC 3745-33-06 (C))
 RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
 SB1 = Implementation of Senate Bill 1 (ORC 6111.03)
 DTE = Dioxin Toxicity Equivalents (OAC 3745-33-07 (A)(4))
 TMDL = Total Maximum Daily Load
 VAR = Mercury variance (OAC 3745-33-07(D)(10)(a))
 WET = Requiring water quality-based effluent limits and monitoring requirements for whole effluent toxicity in NPDES permits [40 CFR Part 132, Appendix F, Procedure 6 and OAC 3745-33-07(B)]
 WLA = Wasteload Allocation procedures (OAC 3745-2)
 WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum
 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.

Attachment 1. Mercury Data from Pollutant Minimization Program

Date	Influent Concentration (ng/L)	Effluent Concentration (ng/L)	Percent Reduction
10/7/2015	9.03	3.96	56.1
11/4/2015	8.72	3.72	57.3
12/9/2015	18.4	3.24	82.4
1/6/2016	148	4.5	97.0
2/3/2016	7.19	2.96	58.8
3/2/2016	13.3	2.73	79.5
4/6/2016	5.8	3.27	43.6
5/4/2016	7.05	1.63	76.9
6/8/2016	6.53	2.48	62.0
7/6/2016	10.2	1.35	86.8
8/3/2016	6.66	0.97	85.4
9/7/2016	38.3	2.97	92.2
10/5/2016	10.2	1.62	84.1
11/9/2016	11.9	2.19	81.6
12/7/2016	61	2.69	95.6
1/4/2017	12.1	3.58	70.4
2/8/2017	15.1	2.19	85.5
3/8/2017	26.4	2.85	89.2
4/5/2017	7.39	4.42	40.2
5/3/2017	7.49	3.3	55.9
6/7/2017	9.08	4.07	55.2
7/12/2017	17.3	10	42.2
8/2/2017	6.62	2.51	62.1
9/6/2017	9.7	1.8	81.4
10/4/2017	5.73	1.96	65.8
11/8/2017	5.27	7.08	-34.3
12/6/2017	12.6	3.64	71.1
1/3/2018	37.5	7.21	80.8
2/7/2018	6.87	3.44	49.9
3/7/2018	9.48	4.15	56.2
4/4/2018	59.8	4.51	92.5
5/2/2018	19.5	3.64	81.3
6/6/2018	6.87	7.58	-10.3
7/5/2018	6.05	1.83	69.8
8/8/2018	93.1	1.55	98.3
9/5/2018	14.6	1.1	92.5
10/3/2018	13	1.05	91.9
11/7/2018	13.5	2.39	82.3
12/12/2018	15.2	2.78	81.7

Date	Influent Concentration (ng/L)	Effluent Concentration (ng/L)	Percent Reduction
1/2/2019	7.04	2.86	59.4
2/6/2019	6.36	3.11	51.1
3/6/2019	11.2	2.31	79.4
4/3/2019	6.42	1.72	73.2
5/8/2019	10.6	2.44	77.0
6/5/2019	7.06	0.859	87.8
7/3/2019	12.6	3.35	73.4
8/8/2019	41.7	0.68	98.4
9/4/2019	13	1.1	91.5
10/2/2019	7.32	0.645	91.2
11/6/2019	6.08	0.954	84.3
12/3/2019	6.15	0.737	88.0
1/7/2020	4.18	2.8	33.0
2/3/2020	5.74	1.61	72.0
3/3/2020	5.5	1.94	64.7
4/7/2020	12.9	0.898	93.0
5/5/2020	2.99	4.15	-38.8
6/2/2020	5.24	1.19	77.3
7/7/2020	18.1	AA	100.0
8/4/2020	4.4	0.802	81.8
9/2/2020	7.1	AA	100.0

Attachment 2. Toxicity Evaluation

	Water Flea (<i>Ceriodaphnia dubia</i>)		Fathead Minnow (<i>Pimephales promelas</i>)	
	Acute	Chronic	Acute	Chronic
WLA (TU)	0.3	1.0	0.3	1.0
Total # of Tests	9	9	5	5
Maximum Value (TU)	--	--	1.25	1.99
[Where # tests < 10] Coefficient of Variation ⁶	0.6	0.6	0.6	0.6
[Where # tests ≥ 10] Coefficient of Variation (standard deviation/mean) ⁷	--	--	--	--
Multiplying Factors ⁶	1.8	1.8	2.3	2.3
PEQ	--	--	2.9	4.6
Reasonable Potential Demonstrated? (Yes/No)	No	No	Yes	Yes

⁶ 40 CFR 132, Appendix F – Great Lakes Water Quality Initiative Implementation Procedures

⁷ Results below detection will be assumed to be the detection limit.

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