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February 08, 2021

Ms. Audra Dickson, Program Manager
Wastewater Regulatory Program
Georgia Environmental Protection Division
2 Martin Luther King Jr Drive, Suite 1152 East
Atlanta, Georgia 30354

Subject: Brunswick-Glynn County Joint Water & Sewer Commission
Industrial Pretreatment Local Limits Evaluation
Academy Creek Water Pollution Control Plant (WPCP)

Dear Ms. Dickson:

Brown and Caldwell (BC) is pleased to submit this *Industrial Pretreatment Local Limits Evaluation* (LLE) report to the Georgia Environmental Protection Division (EPD) on behalf of Brunswick-Glynn County Joint Water & Sewer Commission (BGJWSC) for EPD's review and approval. This LLE report provides guidance for the development of local limits for industrial wastewater discharges to BGJWSC's Academy Creek Water Pollution Control Plant (WPCP).

If you have any questions regarding the enclosed report, please feel free to call us at (770) 394-2997.

Very truly yours,

Brown and Caldwell

Theresa Hui

Theresa Hui, P.E.
Project Manager

TTH:ehs

cc: Ms. Angela Walker, BGJWSC, Pretreatment Compliance Coordinator
Mr. Andrew Burroughs, BGJWSC, Executive Director

Enclosure: *Industrial Pretreatment Local Limits Evaluation*

Industrial Pretreatment
Local Limits Evaluation
Academy Creek Water Pollution Control Plant

Prepared for

Brunswick-Glynn County Joint Water & Sewer Commission
Brunswick, Georgia

2/8/2021

Industrial Pretreatment Local Limits Evaluation
Academy Creek Water Pollution Control Plant

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Brunswick-Glynn County JWSC
Brunswick, Georgia

February 8, 2021

Brown AND Caldwell

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List of Abbreviations

AIL	allowable industrial loading
AHL	allowable headworks loading
BOD	biochemical oxygen demand
$CaCO_3$	calcium carbonate
BGJWSC	Brunswick-Glynn County Joint Water & Sewer Commission
CF	Conversion Factor
CFR	Code of Federal Regulations
cfs	cubic foot/feet per second
COD	chemical oxygen demand
d	day(s)
DO	dissolved oxygen
EPA	United States Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FOG	fats, oils, and greases
kg	kilogram(s)
lb	pound(s)
LLE	Local Limits Evaluation
MAIL	maximum allowable industrial loading
MAHL	maximum allowable headworks loading
MBAS	methylene blue active substances
mgd	million gallons per day
mg/L	milligram per liter
NPDES	National Pollutant Discharge Elimination System
POC	pollutant of concern
POTW	publicly owned treatment works
SGF	safety and growth factor
TCLP	toxicity characteristic leaching procedure
TDR	total dissolved residue
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TPH	total petroleum hydrocarbons
TRC	total residual chlorine
TSS	total suspended solids
TTO	total toxic organics
USGS	United States Geological Survey
UV	ultraviolet
WQS	water quality standards
WPCP	water pollution control plant

List of Variables

1Q10	lowest average flow for a 1-day period that is expected to occur once every 10 years
7Q10	lowest average flow for a 7-day period that is expected to occur once every 10 years
AHL_{DESIGN}	AHL based on WPCP design criteria, lb/d
AHL_{NPDES}	AHL based on NPDES permit limit for effluent discharge, lb/d
AHL_{SEC}	AHL based on inhibition of secondary treatment processes, lb/d
AHL_{TER}	AHL based on inhibition of tertiary treatment processes, lb/d
AHL_{WQS}	AHL based on water quality standards, lb/d
AIL_{IU}	allowable industrial loading, lb/d
C_{DOM}	domestic and commercial background levels, mg/L
C_{HW}	concentrations in septic/hauled waste, mg/L
C_{INHIB2}	inhibition criterion for secondary treatment, mg/L
C_{INHIB3}	inhibition criterion for tertiary treatment, mg/L
C_{LIM}	uniform concentration-based local limit, mg/L
C_{NPDES}	NPDES permit limit for effluent discharge, mg/L
C_{STR}	receiving stream background concentration, mg/L
C_{WQS}	in-stream state water quality standard, mg/L
CF	conversion factor to convert dissolved to total metals fraction, unitless
DC	WPCP design criteria, mg/L
E_{WPCP}	WPCP effluent pollutant concentration, mg/L
I_r	WPCP influent pollutant concentration at headworks, mg/L
$L_{\%}$	percentage of MAHL currently utilized, percent
L_{INFL}	current influent loading (average or daily maximum), lb/d
L_{UNC}	loadings from uncontrolled sources, lb/d
PL	pollutant loading, lb/d
Q_{DOM}	domestic and commercial flow, mgd
Q_{HW}	septic and hauled waste flow, mgd
Q_{IND}	industrial flow, mgd
Q_{IU}	flow from an industrial user, mgd
Q_{NPDES}	NPDES permitted flow for effluent discharge, mgd
Q_{STR}	receiving stream (upstream) flow rate, mgd
Q_{WPCP}	WPCP average effluent flow rate, mgd
R_{PRIM}	removal efficiency from headworks to primary effluent, decimal
R_{SEC}	removal efficiency from headworks to secondary effluent, decimal
R_{WWT}	plant removal efficiency from headworks to effluent, decimal
WQS_{DISS}	WQS for the dissolved fraction, µg/L
WQS_{TOTAL}	WQS for the total recoverable fraction, µg/L

Executive Summary

Brown and Caldwell (BC) conducted a Local Limits Evaluation (LLE) in accordance with Georgia Environmental Protection Division (EPD) and the United Stated Environmental Protection Agency (EPA) for Brunswick-Glynn Joint Water & Sewer Commission (BGJWSC). This report provides guidance for the development of local limits on discharges to the Academy Creek water pollution control plant (WPCP) that receives industrial wastewater.

Applied Methodology and Approach

This LLE was prepared in accordance with EPD and EPA requirements. Details on the applied methodology, assumptions, and approach used during development of the proposed new local limits for the Academy Creek WPCP are described below.

- The industrial local limits for pollutants of concern (POCs) were derived based on the following criteria:
  - Revised NPDES limits
  - EPA POC
  - Protection of receiving stream water quality due to pass-through
  - Recent detections in the influent, effluent, or industrial wastewaters
  - Updated Water Quality Standards (WQS) and sludge disposal criteria
  - Prevention of treatment plant performance problems due to process interference or inhibition
  - Prevention of hazardous sludge disposal.
- Site-specific removal efficiencies were calculated for the conventional pollutants based on Academy Creek averages of influent and effluent analytical results data from the period of September 2019 through August 2020 and limited sampling in January 2021. In addition, removal efficiencies were calculated for those non-conventional POCs detected in the influent and/or effluent samples during the same time frame. Literature values were used for POCs with no available site-specific removal efficiencies.
- Literature values were used where site-specific domestic/commercial concentrations and septic/hauled waste concentrations of POCs in wastewater were not available. Background levels were assumed to be negligible when domestic/commercial levels were not available.
- Allowable headworks loadings were calculated based on the design criteria, NPDES permit limits, activated sludge treatment inhibition, sludge disposal standards, and acute and chronic WQS.
- All inhibition thresholds were based on literature values with the median threshold value, or minimum when there was no median, to provide a conservative limit.
- Currently, sludge from the Academy Creek WPCP is landfilled. Sludge is classified as Class A, and the EPA recommends the WPCP develop local limits to ensure the sludge meets “clean sludge” requirements [40 Code of Federal Regulations (CFR) 503.13]. The criteria used in calculations was the more stringent between the ceiling concentrations, and cumulative pollutant loading rates, monthly average pollutant concentrations.

- Georgia acute and chronic WQS are from EPD *Rules and Regulations for Water Quality Control* (Chapter 391-3-6-03). The most stringent acute and chronic water quality standard for each parameter was used. The receiving stream, Academy Creek, is tidally-influenced coastal/marine water, and per the EPD, a dilution factor of 12.8 has been assigned to the point of discharge from the Academy Creek WPCP into the receiving stream.
- The average effluent flow of 7.49 million gallons per day (mgd) was based on flow from BGJWSC. The average industrial flow of 1.105 mgd was based on requested flows from BGJWSC. The average septage/hauled flow of 0.0048 mgd was based on requested flows from BGJWSC. The average dry sludge to disposal of 7,272 pounds per day (lb/d) was based a requested flow from BGJWSC.
- The facility is currently authorized to discharge a monthly average of 13.5 mgd under NPDES Permit GA0025313 issued by EPD. This permit became effective as of July 1, 2020 and expires on June 30, 2025. Academy Creek is the receiving water for effluent from Academy Creek WPCP, and is in the Satilla River Basin, which is considered a coastal/marine water.
- A United States Geological Survey (USGS) monitoring station for Academy Creek upstream of the discharge point from Academy Creek WPCP was not available. Therefore, it was assumed that upstream background concentrations of POCs were negligible.
- A safety factor of 10 percent and a growth factor of 10 percent was used to adequately address data uncertainties in this LLE. The safety and growth factor of 20% was used for all POCs.

The following presents the important findings noted during the evaluation and also provides recommendations for future reviews and re-evaluations.

Important Findings of the LLE

The major findings of this LLE are listed below.

- The proposed local limits use the effluent flow with a dilution factor for flow in the acute and chronic water quality standard calculations.
- The current local limits used a 20 percent safety and growth factor.
- The proposed local limits consist of 34 parameters.

Recommendation for Future Review and Re-evaluations

Recommendations for future reviews and re-evaluations of local limits are as follows:

- Local limits should be reevaluated in the event of major changes that may affect local limits. These changes include, but are not limited to:
  - Revised NPDES limits
  - Changes associated with industrial users, for example, the addition of a new major industry
  - Significant domestic and/or commercial growth in the County
  - Additions or improvements of treatment processes occurring at the WPCPs
  - The revision of state and/or national water quality criteria
  - Changes in sludge disposal methods
  - Changes in the Industrial Pretreatment Program.

Section 1

Introduction

The Brunswick-Glynn County Joint Water & Sewer Commission (BGJWSC) operates Academy Creek Water Pollution Control Plan (WPCP) that serves a portion of Brunswick-Glynn County. The BGJWSC's current local limits for Academy Creek are based on an evaluation completed in March 2014 by Brown and Caldwell (BC).

In order to accommodate industrial loadings and determine whether loadings could be accepted from the four current industrial dischargers, the local limits should be reallocated among the industrial users discharging to Academy Creek WPCP. Prior to reallocating, local limits will be reevaluated to address pollutants of concern to make sure they meet regulatory requirements, help protect wastewater systems, personnel, and the environment, and help maintain sludge quality.

In addition, Academy Creek WPCP was issued a new National Pollutant Discharge Elimination System (NPDES) Permit by the EPD, effective June 16, 2020. In accordance with Part III.A.2.c., the current local limits must be reviewed with 180 days of the effective date of the permit issuance to ensure that the local limits continue to prevent interference with the operation of the WPCP, prevent pass-through of pollutants in violation of the NPDES permit, prevent municipal sludge contamination, and prevent toxicity to life in the receiving stream.

This Local Limits Evaluation (LLE) is a technical evaluation of the local limits developed for Academy Creek WPCP and is being submitted to the Georgia EPD for their approval.

1.1 Project Objective

The objective of this effort was to update industrial local limits for the Academy Creek WPCP to enforce the specific and general prohibitions as well as state and local regulations, address site-specific concerns, and provide WPCP protection limits. The specific and general prohibitions along with categorical standards are designed to provide a minimum acceptable level of control over industrial user discharges. Local limits are established to provide additional control to prevent site-specific and environmental problems due to non-domestic discharges. Therefore, this LLE used site-specific data to identify POCs that may be expected to be discharged in quantities sufficient to cause plant or environmental problems. Some of the factors considered in developing local limits included:

- Efficiency of the WPCP in treating wastes
- Compliance with NPDES permit limits
- Condition of the water body that receives treated effluent
- State and/or federal WQS that are applicable to the water body receiving treated effluent
- Retention, use, and disposal of sewage sludge
- Worker health and safety concerns.

This LLE provides documentation and reasoned guidance on the following:

- Determining POCs
- Gathering and analyzing data
- Calculating allowable headworks loadings (AHLs) for each POC based on applicable criteria

- Determining maximum allowable headworks loadings (MAHLs) and maximum allowable industrial loadings (MAILs) for each POC, and converting these loadings to local limits
- Comparing industrial loadings to MAILs to ensure that local limits meet the needs of the industries to the extent possible.

1.2 Organization of Report

This LLE report is organized into seven sections as follows:

- **Section 1** is an introduction to the LLE and describes the project objectives.
- **Section 2** describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the LLE.
- **Section 3** provides details regarding the development of local limits for Academy Creek WPCP.
- **Section 4** lists the industrial allocations.
- **Section 5** lists the final proposed local limits.
- **Section 6** provides the limitations.
- **Section 7** lists the references.

A large volume of data and calculations was utilized to complete the LLE for BGJWSC, including site-specific data, literature values, and calculation spreadsheets. The tables and appendices of this LLE contain the information needed to reproduce the local limits except for the raw analytical data, which are summarized in tables. Analytical data can be made available upon request.

The following data and calculation spreadsheets can be found in the appendices to this LLE:

- **Appendix A** contains site-specific data for Academy Creek WPCP used to develop the local limits. Included in this appendix are the following:
  - Monthly average estimations for the influent and effluent flows (Table A1)
  - Monthly estimations of volumes of sludge to disposal from Academy Creek WPCP (Table A1)
  - Concentrations of conventional pollutants in influent and effluent samples collected from September 2019 through August 2020 averaging from Academy Creek WPCP (Table A2)
  - Concentrations of metals and inorganics in influent and effluent samples collected between September 2019 through August 2020 averaging from Academy Creek WPCP (Table A3)
  - Concentrations of organics in influent and effluent samples collected between September 2019 through August 2020 and January 2021 averaging from Academy Creek WPCP (Table A4)
  - Removal efficiencies calculated for conventional pollutants, metals, inorganics, and organics based on average influent and effluent concentrations from Academy Creek WPCP (Tables A2 through A4)
- **Appendix B** contains the literature data used in the LLE when site-specific data were not available. Included in this appendix are the following:
  - Removal efficiencies for priority pollutants, including treatment plant removal efficiencies as well as removal efficiencies through primary, secondary, and tertiary treatment processes (Tables B1 through B3)
  - Treatment inhibition threshold levels for activated sludge treatment (Table B4)
  - Domestic and commercial pollutant loadings (Table B5)
  - Hauled waste pollutant loadings (Table B6).

- **Appendix C** contains the regulatory limits and/or criteria applicable to Academy Creek WPCP, including the following:
  - Calculated design-based wastewater treatment plant capacity criteria (Table C1)
  - NPDES permit limits (Table C2)
  - Biosolids landfill regulatory limits (Table C3)
  - WQS for Academy Creek WPCP (Tables C4 and C5)
  - Worker protection screening levels based on fume toxicity and explosivity (Tables C6 and C7).
- **Appendix D** contains the calculation worksheets used to calculate all allowable headworks loadings, allowable industrial loadings, and local limits for Academy Creek WPCP including the following:
  - Allowable headworks and industrial loadings based on design criteria, NPDES permit, activated sludge and nitrification inhibition threshold levels, sludge disposal, and acute and chronic WQS (Tables D1 through D7)
  - Summary of allowable headworks and industrial loadings (Tables D8 and D9)
  - Maximum allowable headworks loadings and local limits (Table D10).

Section 2

Pollutants of Concern: Screening and General Methodologies

This section describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the evaluation.

2.1 Screening for Pollutants of Concern

A POC is any pollutant that may be expected to be discharged to a WPCP in sufficient amounts to cause pass-through or interference or present risk to workers. Pollutants that are contributing to or known to cause operational problems (i.e., inhibition of a treatment process) are also considered POCs even if the pollutants are not currently causing permit violations. The United States Environmental Protection Agency (EPA) has identified 15 pollutants often found in WPCP sludge and effluent that it considers potential POCs. These include arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, zinc, molybdenum, selenium, 5-day biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia as nitrogen (for plants that accept non-domestic sources of ammonia). Additional POCs listed in Table 2-1 were identified using applicable EPA screening criteria contained in the EPA *Local Limits Development Guidance Manual* (EPA 2004):

- **NPDES permit limits:** These permit conditions establish the objectives that the WPCP must meet to prevent pass-through and interferences. The WPCP is required to prohibit discharge from industrial users in amounts that result in or cause a violation of any requirement of the WPCP's NPDES permit.
- **Water quality criteria:** Water quality criteria have been developed by EPA and/or EPD for protection of surface water, including the receiving waters for permitted dischargers. The WPCP does not have to develop a local limit for every pollutant for which there is a water quality standard or criterion. However, EPA recommends that any pollutant that has a reasonable potential to be discharged in amounts that could exceed WQS or criteria should be considered a POC and evaluated accordingly.
- **Sludge quality standards:** WPCPs must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WPCP's use of its chosen sludge disposal option. Currently, the Academy Creek WPCP hauls sludge to a local landfill. EPA recommends the WPCP develop local limits to ensure their sludge meets "clean sludge" requirements [40 Code of Federal Regulations (CFR) 503.13].
- **Prohibition on treatment plant interference:** The General Pretreatment Regulations prohibit any user of a WPCP from discharging pollutants that cause interference (i.e., a discharge that inhibits or disrupts a WPCP resulting in a violation of the WPCP's NPDES permit or noncompliance with the WPCP's sewage sludge requirements). EPA recommends that the WPCP consider pollutants that have previously interfered with or may potentially interfere with the treatment works' operation to be a potential POC.

- **Influent, effluent, and sludge scans at the WPCP:** EPA recommends that the WPCP conduct additional screening for any pollutant found in the priority pollutant scans of its influent, effluent, or sludge to determine whether the pollutant should be listed as a POC. Although a pollutant found in this way is a potential POC, the WPCP may determine based on the pollutant's concentration that the pollutant need not be selected as a POC for which local limits are developed.
- **Industrial discharge scans:** An additional screening was conducted to identify pollutants detected in the industrial users' discharge. Although a pollutant found in this way is a potential POC, the WPCP may determine, based on the pollutant's concentration, that the pollutant need not be selected as a POC for which local limits are developed.

In general, EPA recommends that an LLE be conducted for EPA's 15 POCs, as well as any pollutant for which the WPCP has a preexisting local limit or an applicable NPDES limit or sludge disposal limit, or that has caused inhibition or other problems in the past.

2.1.1 Pollutants of Concern

Table 2-1 provides the parameters and criteria used for this screening and identifies those pollutants for which local limits are needed based on the screening for Academy Creek WPCP.

In addition to EPA's 15 POCs with the exception of molybdenum, based on the above guidelines, 23 additional parameters were identified as POCs for Academy Creek WPCP. Additionally, the pollutants oil and grease, total Kjeldahl nitrogen (TKN), hydrogen sulfide, orthophosphate, and total residual chlorine were also included in the evaluation.

2.2 General Methodologies

This section presents the methodology used to calculate MAHLs. A MAHL is an estimate of the upper limit of pollutant loading to a WPCP intended to prevent pass-through or interference. Methodologies for calculating MAHLs are well established in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be broken down into a three-step procedure: (1) calculation of removal efficiencies, (2) calculation of AHLs for each environmental criterion, and (3) designation of the most stringent AHL as the MAHL for each POC.

2.2.1 Calculation of Removal Efficiencies

Removal efficiency is the fraction or percentage of the influent pollutant loading that is removed from the waste stream across an entire wastewater treatment works (plant removal efficiency) or through specific wastewater treatment processes within the works (primary, secondary, and/or tertiary removal efficiencies). Removal efficiencies are based largely on site-specific conditions such as climate, WPCP design, operation and maintenance, plant conditions, and sewage characteristics.

EPA recommends that site-specific data be used to calculate removal efficiencies. Since Academy Creek WPCP is an existing treatment plant, average plant removal efficiencies were calculated from the Academy Creek WPCP available influent and effluent data from September 2016 through August 2020 and January 2021, as presented in Tables A2 through A4 in Appendix A.

The proposed removal efficiencies reported by other WPCPs by studies that have been published in professional journals or by EPA were used in developing local limits. These literature-based data are presented in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be found in Appendix B. Those POCs with data available to calculate site-specific removal efficiencies are discussed in further detail in Section 3.

Pollutants of Concern Screening Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission - Academy Creek WPCP													
Parameter	Is the parameter a USEPA POC[a]?	Is there an existing NPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is the parameter detected in influent scans?	Is the parameter detected in effluent scans?	Is the parameter detected in sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported for the parameter?	Are worker protection screening values for the parameter?	Is there a need for Calculation based on screening?
Conventional Pollutants													
Ammonia	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Biochemical Oxygen Demand (BOD)	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	YES
Chemical Oxygen Demand (COD)	No	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	YES
Phosphorus, Total (as P)	No	Report	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	YES
Suspended Solids, Total (TSS)	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	YES
Inorganic Pollutants													
Antimony	No	No	Yes	No	No	Yes	No	No	Yes	Yes	No	No	YES
Arsenic	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Barium	No	No	No	No	No	No	No	No	No	No	No	No	
Cadmium	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Chromium III	No	No	Yes	No	No	No	No	No	No	No	Yes	No	
Chromium VI	No	No	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	No	YES
Chromium, Total	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	YES
Copper	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Cyanide	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	YES
Lead	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	YES
Mercury	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Molybdenum	Yes	No	Yes	No	Yes	No	No	No	No	No	No	No	
Nickel	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Selenium	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	YES
Silver	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	No	YES
Thallium	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
Vanadium	No	No	No	No	No	No	No	No	No	No	No	No	
Zinc	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	YES
Organic Pollutants													
Acenaphthene	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	
Acetone	No	No	No	No	No	No	No	No	No	No	No	No	
Acrolein	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Acrylonitrile	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Aldrin	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Anthracene	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	
Aroclor 1232	No	No	No	No	No	No	No	No	No	No	No	No	

Pollutants of Concern Screening Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission - Academy Creek WPCP													
Parameter	Is the parameter a USEPA POC[a]?	Is there an existing NPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is the parameter detected in influent scans?	Is the parameter detected in effluent scans?	Is the parameter detected in sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported for the parameter?	Are worker protection screening values for the parameter?	Is there a need for Calculation based on screening?
Aroclor 1242	No	No	Yes	No	No	No	No	No	No	No	No	Yes	
Aroclor 1254	No	No	Yes	No	No	No	No	No	No	No	No	Yes	
Aroclor 1260	No	No	No	No	No	Yes	No	No	No	No	No	No	
Benzene	No	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	
Benzidine	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Benzo(a)Anthracene	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
Benzo(a)Pyrene	No	No	No	No	No	No	No	No	Yes	Yes	No	No	
Benzo(g,h,i)perylene	No	No	No	No	No	No	No	No	Yes	No	No	No	
Benzo(k)Fluoroethene	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
Benzofluoranthene, 3,4-(Benzo[b]fluoranthene)	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
BHC-Alpha, a-	No	No	Yes	No	No	Yes	No	No	No	Yes	No	No	YES
BHC-Beta, b-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
BHC-Delta, d-	No	No	No	No	No	No	Yes	No	Yes	No	No	No	YES
Bis(2-chloroethyl)Ether	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Bis(2-chloroisopropyl)Ether	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Bis(2-chloromethyl)Ether	No	No	Yes	No	No	No	No	No	No	No	No	Yes	
Bis(2-ethylhexyl)Phthalate	No	No	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	YES
Bromoform	No	No	Yes	No	No	No	No	No	Yes	Yes	No	Yes	
Butylbenzyl Phthalate	No	No	Yes	No	No	Yes	No	No	No	Yes	No	No	YES
Carbon Disulfide	No	No	Yes	No	No	Yes	No	No	No	No	No	Yes	
Carbon Tetrachloride	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Chlordane	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Chlordane, Gamma	No	No	No	No	No	No	No	No	No	No	No	No	
Chlorobenzene	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	YES
Chlorodibromomethane	No	No	Yes	No	No	No	Yes	No	Yes	Yes	No	No	YES
Chloroethane	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	
Chloroform	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	YES
Chloronaphthalene, 2-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Chlorophenol, 2-	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	
Chrysene	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
Cresols	No	No	No	No	No	No	No	No	No	Yes	No	Yes	
DDD, 4,4'-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	

Pollutants of Concern Screening Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission - Academy Creek WPCP													
Parameter	Is the parameter a USEPA POC[a]?	Is there an existing NPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is the parameter detected in influent scans?	Is the parameter detected in effluent scans?	Is the parameter detected in sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported for the parameter?	Are worker protection screening values for the parameter?	Is there a need for Calculation based on screening?
DDE, 4,4'-	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
DDT, 4,4'-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Dibenzo(a,h)Anthracene	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
Dichlorobenzene, 1,2-	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	
Dichlorobenzene, 1,3-	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	
Dichlorobenzene, 1,4-	No	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	YES
Dichlorobenzidine, 3,3-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Dichlorobromomethane	No	No	Yes	No	No	No	Yes	No	Yes	Yes	No	No	YES
Dichlorodifluoromethane	No	No	Yes	No	No	No	No	No	No	No	No	Yes	
Dichlorofluoromethane	No	No	No	No	No	No	No	No	No	No	No	No	
Dichloroethane, 1,1-	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	
Dichloroethane, 1,2-	No	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	
Dichloroethylene, 1,1-	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Dichloroethylene, cis-1,2-	No	No	No	No	No	No	No	No	No	No	No	No	
Dichloroethylene, trans-1,2-	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Dichlorophenol, 2,4-	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	
Dichlorophenoxyacetic acid, 2,4-(2,4-D)	No	No	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	YES
Dichloropropane, 1,2-	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	
Dichloropropylene, 1,3-	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Dieldrin	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Diethyl phthalate	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	YES
Dimethyl phthalate	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	
Dimethylphenol, 2,4-	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	
Di-n-butyl phthalate	No	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	YES
Dinitrophenol, 2,4-	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	
Dinitrophenol, 2-Methyl-4,6-(Dinitro-o-cresol, 4,6-)	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Dinitrotoluene, 2,4-	No	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	
Diphenylhydrazine, 1,2-	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	
Endosulfan Sulfate	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Endosulfan, alpha-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Endosulfan, beta-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	

Pollutants of Concern Screening Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission - Academy Creek WPCP													
Parameter	Is the parameter a USEPA POC[a]?	Is there an existing NPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is the parameter detected in influent scans?	Is the parameter detected in effluent scans?	Is the parameter detected in sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported for the parameter?	Are worker protection screening values for the parameter?	Is there a need for Calculation based on screening?
Endrin	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Endrin Aldehyde	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Ethylbenzene	No	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	YES
Fluoranthene	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	
Fluorene	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	
Formaldehyde	No	No	Yes	Yes	No	No	No	No	Yes	No	No	Yes	YES
Heptachlor	No	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	YES
Heptachlor Epoxide	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Hexachlorobenzene	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	
Hexachlorobutadiene	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Hexachlorocyclopentadiene	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Hexachloroethane	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Indeno(1,2,3-cd)Pyrene	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	
Isophorone	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Isopropyltoluene, p-	No	No	No	No	No	No	No	No	No	No	No	No	
Lindane (alpha- and beta-BHC)	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Methyl Bromide (Bromomethane)	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Methyl Chloride (Chloromethane)	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	
Methyl ethyl ketone (2-Butanone)	No	No	Yes	No	No	No	No	No	No	No	No	Yes	
Methyl tert-butyl ether	No	No	No	No	No	No	No	No	No	No	No	No	
Methyl isobutyl ketone	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No	
Methylene blue active substances (MBAS)	No	No	No	No	No	No	No	No	No	No	No	No	
Methylene chloride	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	
Methoxychlor	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No	YES
Naphthalene	No	No	Yes	Yes	No	Yes	No	No	Yes	No	Yes	Yes	YES
Nitrobenzene	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	
N-Nitrosodimethylamine	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
N-Nitrosodiphenylamine	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Nitrophenol,2-	No	No	No	Yes	No	No	No	No	No	No	No	No	
Nitrophenol,4-	No	No	No	Yes	No	No	No	No	No	No	No	No	
Nonylphenol	No	No	No	No	No	No	No	No	No	No	No	No	
PCBs	No	No	Yes	No	No	No	No	No	No	Yes	No	No	

Pollutants of Concern Screening Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission - Academy Creek WPCP													
Parameter	Is the parameter a USEPA POC[a]?	Is there an existing NPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is the parameter detected in influent scans?	Is the parameter detected in effluent scans?	Is the parameter detected in sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported for the parameter?	Are worker protection screening values for the parameter?	Is there a need for Calculation based on screening?
Pentachlorophenol	No	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	
Phthalate, Di-n-octyl	No	No	No	No	No	No	No	No	Yes	No	No	No	
Phenanthrene	No	No	Yes	Yes	No	No	No	No	No	No	Yes	No	
Phenol	No	No	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	YES
Phenolics, Total Recoverable	No	No	No	No	No	No	No	No	No	No	No	No	
Pyrene	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No	
Pyridine	No	No	No	No	No	No	No	No	No	No	No	No	
Silvex (2,4,5-TP)	No	No	No	No	No	Yes	No	No	Yes	Yes	No	No	YES
2,4,5-T	No	No	No	No	No	No	No	No	Yes	No	No	No	
Tetrachloroethane, 1,1,2,2-	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Tetrachloroethylene	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	
Toluene	No	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	YES
Toxaphene	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	
Trichlorobenzene, 1,2,4-	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Trichloroethane, 1,1,1-	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	
Trichloroethane, 1,1,2-	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Trichloroethylene	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	
Trichlorofluoromethane	No	No	Yes	No	No	No	No	No	No	No	No	Yes	
Trichlorophenol, 2,4,5-	No	No	No	No	No	No	No	No	No	No	No	No	
Trichlorophenol, 2,4,6-	No	No	Yes	No	No	No	No	No	No	Yes	No	No	
Vinyl Chloride	No	No	Yes	Yes	No	No	No	No	No	Yes	No	Yes	
Xylenes, Total	No	No	No	No	No	No	No	No	No	No	No	No	
Other Pollutants													
Oil & Grease	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No	YES
Total Dissolved Residue (TDR)	No	No	No	No	No	No	No	No	No	No	No	No	
Total Dissolved Solids (TDS)	No	No	No	No	No	No	No	No	No	No	No	No	
Total Petroleum Hydrocarbons (TPH)	No	No	No	No	No	No	No	No	No	No	No	No	
Total Toxic Organics (TTO)	No	No	No	Yes	No	No	No	No	Yes	No	No	No	
Sulfide	No	No	Report	Yes	No	No	No	No	Yes	Yes	Yes	No	
Iodine	No	No	No	No	No	No	No	No	No	No	Yes	No	
Surfactants	No	No	Yes	No	No	No	No	No	No	No	Yes	No	
Sodium	No	No	Yes	No	No	No	No	No	No	No	No	No	
Chloride	No	No	Yes	No	No	No	No	No	No	No	Yes	No	

Pollutants of Concern Screening Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission - Academy Creek WPCP													
Parameter	Is the parameter a USEPA POC[a]?	Is there an existing NPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is the parameter detected in influent scans?	Is the parameter detected in effluent scans?	Is the parameter detected in sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported for the parameter?	Are worker protection screening values for the parameter?	Is there a need for Calculation based on screening?
Hydrogen sulfide	No	No	No	No	No	No	Yes	No	No	No	No	Yes	YES
Total Residual Chlorine (TRC)	No	Yes	No	No	No	No	Yes	No	No	Yes	No	No	YES
Ortho-Phosphate	No	Report	No	No	No	No	Yes	No	No	No	No	No	YES
Organic Nitrogen	No	Report	No	No	No	No	No	No	No	No	No	No	
Nitrate-Nitrite as N	No	Report	No	No	No	No	No	Yes	No	No	No	No	
Kjeldahl Nitrogen, Total (TKN)	No	Report	No	No	No	No	No	Yes	Yes	No	No	No	YES

[a] United States Environmental Protection Agency (USEPA) Pollutant of Concern (POC).
[b] National Pollutant Discharge Elimination System
[c] Water Quality Standards

2.2.2 Calculation of Allowable Headworks Loadings

In this step, an AHL is calculated for each applicable criterion: WPCP design criteria, NPDES permit limits, state WQS, and the various forms of interference that can occur through the treatment processes. Equations for calculating AHLs are based on a concentration-based and mass-based approach. Equations are presented and described in Section 3. Once WPCP and POC-specific AHLs are calculated for each of the applicable criteria, the lowest, or most stringent, of the AHLs is chosen as the MAHL. This helps ensure that the resulting local limits are protective of each environmental criterion considered in the development of local limits.

2.2.3 Determination of Maximum Allowable Industrial Loadings and Local Limits

Once MAHLs are identified, they are used to calculate the MAILs and the concentration-based industrial local limits. The concentration-based industrial local limits are compared to screening levels protective of the WPCP workers, and the more stringent values are selected as the final local limits. Several methods are commonly used to allocate local limits to industrial users, including uniform industrial local limits, flow- or mass-based limits, and other limits developed on a case-by-case basis. Based on the needs of Academy Creek WPCP, BGJWSC has chosen to implement concentration-based limits for each WPCP.

Section 3

Academy Creek: Local Limits Development

The primary objective of this section is to describe the methodologies used to develop local limits for Academy Creek WPCP. Included in this section are descriptions of AHL calculations based on various environmental criteria, including:

- Design criteria
- NPDES permits
- State acute and chronic WQS
- Activated sludge treatment inhibition
- Sludge disposal regulations.

Also included in this section are references to data sources used for calculating AHLs and the rationale for assumptions. Results of AHL calculations, determinations of the MAHLs, and calculations for MAILs and industrial local limits are also provided.

3.1 Introduction

The Academy Creek WPCP is located in the south part of Glynn County at 2909 Newcastle Street in Brunswick, Georgia (Figure 3-1). The plant is authorized to discharge a monthly average of 13.5 mgd of advanced treated effluent under the NPDES (Permit No. GA0025313) by EPD.

Figure 3-1. Aerial Photograph of the Academy Creek WPCP (December 2020)

3.1.1 NPDES Permit

The facility is authorized to initially discharge a monthly average of 13.5 mgd of advanced treated effluent to the Academy Creek under NPDES Permit GA0025313 issued by EPD (refer to Appendix C, Table C2 for NPDES permit discharge limitations). This permit became effective as of July 1, 2020 and expires on June 30, 2025. Academy Creek is the receiving water for effluent from Academy Creek WPCP, and is in the Satilla River Basin, which is considered a coastal/marine water.

3.1.2 Treatment Processes

The Academy Creek WPCP is a pure oxygen activated sludge system. It treats the domestic sewage generated from the City of Brunswick sanitary sewer service area, hauled septage, and industrial wastewater. Primary treatment consists of two mechanical bar screens to remove coarse solids and debris, and grit chambers. The WPCP biologically removes organic matter and nutrients in three aeration basins using activated sludge treatment, followed by six secondary clarifiers. Secondary effluent is disinfected by chlorination and dechlorinated before discharge into the adjacent Academy Creek.

Waste activated sludge is digested in four digesters with a total capacity of 1.8 MG. The digesters are traditional complete mix, surface aerated basins. The digesters are aerated continuously except when sludge is to be removed or to allow gravity thickening. The solids are thickened to about 2 percent total solids and fed to the belt press for dewatering.

Dewatered sludge is conveyed to a 50-cubic-yard hopper where it is stored before drying in the dehydration chamber. A natural gas burner heats immiscible oil which flows through rotating discs in the dehydration chamber. The discs transfer heat from the heated thermal fluid to the wet sludge. The discs also grind the sludge to ensure heat is evenly distributed. Biosolids are heated in the dehydration chamber above 200 degrees Fahrenheit for 4 hours. Air emissions from the dehydration chamber are channeled through a condenser/scrubber. Air borne particulates are combined with condensed water and piped to the beginning of the WPCP headworks.

Dried solids are conveyed to a truck for collection and disposal. The target solids content for the process is 92 percent. The biosolids can be designated as Class A and are suitable for landfilling.

The following sections describe the development of AHLs based on the various criteria. Calculation spreadsheets used to develop AHLs and local limits are included in Appendix E. A summary of AHLs developed for Academy Creek WPCP can be found in Appendix D, Table D8.

3.2 Site-Specific Flows and Removal Efficiencies

Average flow rates and plant removal efficiencies are used to calculate AHLs for all criteria. Influent, effluent, and sludge flows for the Academy Creek WPCP are summarized in Appendix A, Table A1. Currently, the monthly average effluent flow and permitted flow for the Academy Creek WPCP is 7.49 mgd and 13.5 mgd, respectively.

Influent and effluent concentrations of conventional pollutants from Academy Creek WPCP, including ammonia, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total phosphorous, and TSS, from September 2019 through August 2020 are summarized in Appendix A, Table A2. For non-conventional pollutants, priority pollutant influent and effluent data sets were averaged between 2015 and 2021 for use in this evaluation from Academy Creek WPCP, and detections are presented in Appendix A, Tables A3 and A4. Site-specific removal efficiencies, R_{WPCP}, were calculated for the following POCs using average influent and effluent pollutant concentrations (Appendix A, Tables A2 through A4). Negative percent removals were assessed individually, and literature values were used when applicable.

3.2.1 Conventional POCs

- **Ammonia**: A plant removal efficiency of 53.43 percent was calculated using average influent and effluent concentrations of 19.3 mg/L and 9.0 mg/L, respectively.
- **BOD**: A plant removal efficiency of 95.64 percent was calculated using average influent and effluent concentrations of 195 mg/L and 8.5 mg/L, respectively.
- **COD**: A plant removal efficiency of 85.86 percent was calculated using average influent and effluent concentrations of 442 mg/L and 62.5 mg/L, respectively.
- **Phosphorus, total**: A plant removal efficiency of 61.07 percent was calculated using average influent and effluent concentrations of 11.1 mg/L and 4.3 mg/L, respectively.
- **TSS**: A plant removal efficiency of 93.03 percent was calculated using average influent and effluent concentrations of 201 mg/L and 14.0 mg/L, respectively.

3.2.2 Inorganic POCs

- **Antimony**: A plant removal efficiency of 7.02 percent was calculated using an influent concentration of 0.00081 mg/L and an average effluent concentration of 0.00075 mg/L.
- **Arsenic**: A plant removal efficiency of 16.8 percent was calculated using an influent concentration of 0.00218 mg/L and an average effluent concentration of 0.00182 mg/L.
- **Cadmium**: A plant removal efficiency of 24.0 percent was calculated using an influent concentration of 0.00022 mg/L and an average effluent concentration of 0.00016 mg/L.
- **Hexavalent Chromium**: A plant removal efficiency of 66.55 percent was calculated using an influent concentration of 0.00967 mg/L and an average effluent concentration of 0.00323 mg/L.
- **Chromium, total**: A plant removal efficiency of 43.68 percent was calculated using an influent concentration of 0.00317 mg/L and an average effluent concentration of 0.00178 mg/L.
- **Copper**: A plant removal efficiency of 83.50 percent was calculated using an influent concentration of 0.02667 mg/L and an average effluent concentration of 0.00440 mg/L.
- **Cyanide**: A plant removal efficiency of -111 percent was calculated using an influent concentration of 0.00350 mg/L and an average effluent concentration of 0.00738 mg/L. Removal was considered negligible and 0 percent was used in calculations.
- **Lead**: A plant removal efficiency of 69.3 percent was calculated using an influent concentration of 0.00293 mg/L and an average effluent concentration of 0.00090 mg/L.
- **Mercury**: A plant removal efficiency of 21.96 percent was calculated using an influent concentration of 0.00007 mg/L and an average effluent concentration of 0.00006 mg/L.
- **Nickel:** A plant removal efficiency of 11.60 percent was calculated using an influent concentration of 0.00302 mg/L and an average effluent concentration of 0.0067 mg/L.
- **Selenium:** A plant removal efficiency of 36.73 percent was calculated using an influent concentration of 0.00163 mg/L and an average effluent concentration of 0.00103 mg/L.
- **Silver:** A plant removal efficiency of 81.32 percent was calculated using an influent concentration of 0.00061 mg/L and an average effluent concentration of 0.00011 mg/L.
- **Zinc**: A plant removal efficiency of 80.85 percent was calculated using an influent concentration of 0.12533 mg/L and an average effluent concentration of 0.02400 mg/L.

3.2.3 Organic POCs

- **BHC-Alpha**: A plant removal efficiency of 93.06 percent was calculated using an influent concentration of 0.00004 mg/L and an average effluent concentration of 0.000003 mg/L.

- **BHC-Delta**: A plant removal efficiency of -253 percent was calculated using an influent concentration of 0.00001 mg/L and an average effluent concentration of 0.00002 mg/L. Removal was considered negligible and 0 percent was used in calculations.
- **Bis(2-ethylhexyl)phthalate**: A plant removal efficiency of 57.2 percent was calculated using an influent concentration of 0.00378 mg/L and an average effluent concentration of 0.00162 mg/L.
- **Butylbenzyl Phthalate**: A plant removal efficiency of 57.93 percent was calculated using an influent concentration of 0.00290 mg/L and an average effluent concentration of 0.00122 mg/L.
- **Chlorobenzene**: A plant removal efficiency of 61.95 percent was calculated using an influent concentration of 0.00068 mg/L and an average effluent concentration of 0.00026 mg/L.
- **Chlorodibromomethane**: A plant removal efficiency of 43.75 percent was calculated using an influent concentration of 0.00080 mg/L and an average effluent concentration of 0.00045 mg/L.
- **Chloroform**: A plant removal efficiency of -23.06 percent was calculated using an influent concentration of 0.00183 mg/L and an average effluent concentration of 0.00225 mg/L. Removal was considered negligible and 0 percent was used in calculations.
- **1,4-Dichlorobenzene**: A plant removal efficiency of 69.01 percent was calculated using an influent concentration of 0.00187 mg/L and an average effluent concentration of 0.00058 mg/L.
- **Dichlorobromomethane**: A plant removal efficiency of 6.06 percent was calculated using an influent concentration of 0.00110 mg/L and an average effluent concentration of 0.000103 mg/L.
- **2,4-D:** A plant removal efficiency of 82.5 percent was calculated using an influent concentration of 0.00143 mg/L and an average effluent concentration of 0.00025 mg/L.
- **Diethyl Phthalate:** A plant removal efficiency of 64.73 percent was calculated using an influent concentration of 0.00244 mg/L and an average effluent concentration of 0.00086 mg/L.
- **Di-n-butyl Phthalate:** A plant removal efficiency of 56.83 percent was calculated using an influent concentration of 0.00204 mg/L and an average effluent concentration of 0.00088 mg/L.
- **Ethylbenzene**: A plant removal efficiency of 40.72 percent was calculated using an influent concentration of 0.00056 mg/L and an average effluent concentration of 0.00033 mg/L.
- **Formaldehyde:** A plant removal efficiency of 24.00 percent was calculated using a sampled influent concentration of 0.025 mg/L and an effluent concentration of 0.019 mg/L.
- **Heptachlor:** A plant removal efficiency of -97.42 percent was calculated using an influent concentration of 0.000006 mg/L and an average effluent concentration of 0.000011 mg/L. Removal was considered negligible and 0 percent was used in calculations.
- **Methoxychlor**: A plant removal efficiency of -0.62 percent was calculated using an influent concentration of 0.000008 mg/L and an average effluent concentration of 0.000008 mg/L. Removal was considered negligible and 0 percent was used in calculations.
- **Naphthalene**: A plant removal efficiency of 58.82 percent was calculated using an influent concentration of 0.00170 mg/L and an average effluent concentration of 0.00070 mg/L.
- **Phenol:** A plant removal efficiency of 25.16 percent was calculated using an influent concentration of 0.00478 mg/L and an average effluent concentration of 0.00358 mg/L.
- **Silvex (2,4,5-TP):** A plant removal efficiency of 4.91 percent was calculated using an influent concentration of 0.00006 mg/L and an average effluent concentration of 0.00006 mg/L.
- **Toluene**: A plant removal efficiency of 74.01 percent was calculated using an influent concentration of 0.00185 mg/L and an average effluent concentration of 0.00048 mg/L.

3.3 Calculation of AHLs Based on NPDES Permit

An effective means of restricting the discharge of pollutants into receiving waters is through a NPDES permit limit. NPDES is the permitting system established by the Clean Water Act that regulates the discharge of pollutants into the waters of the United States. Such discharges are prohibited unless a NPDES permit is issued by EPA or the state. NPDES permit limits applied to discharges from WPCPs are used in the derivation of local limits to prevent pollutant pass-through. Pass-through is defined as a discharge that enters the waters of the United States from a WPCP in quantities or concentrations, alone or in complex mixtures, that cause a violation of any requirement of the WPCP's NPDES permit.

The NPDES permit limit for each POC, if applicable, can be found in the WPCP's current NPDES permit and is commonly expressed in mg/L and/or kilograms per day (kg/d). The Academy Creek WPCP's NPDES permit includes limitations for discharging effluent from the WPCP into the receiving stream. Therefore, AHLs are calculated based on the NPDES permit limits for discharge, as described further below.

3.3.1 Calculation of AHLs Based on Effluent Discharge

Academy Creek's NPDES permit for effluent discharge includes monthly average and weekly average discharge limitations for flow, BOD, TSS, ammonia, enterococci, a minimum and maximum for pH, total residual chlorine, and a daily minimum for dissolved oxygen (DO). The permit also includes reporting requirements for total phosphorus, ortho-phosphate, organic nitrogen, nitrate-nitrite, TKN, and chronic whole effluent toxicity. EPA recommends that only the more conservative monthly average concentrations be used in calculating NPDES-based AHLs.

As illustrated in Equation 3-1, an AHL based on a NPDES permit limit (AHL_{NPDES}) is the pollutant loading at the NPDES permitted flow (C_{NPDES} * Q_{NPDES}) divided by the fraction of the pollutant not removed by the plant (1 – R_{WPCP}).

Equation 3-1

$$AHL_{NPDES} = \frac{(8.34)(C_{NPDES})(Q_{NPDES})}{(1-R_{WPCP})}$$

Where:

$$R_{WPCP} = \frac{\bar{I}_r - \bar{E}_{WPCP}}{\bar{I}_r}$$

and:

AHL_{NPDES}	= AHL based on NPDES permit limit, lb/d
C_{NPDES}	= NPDES permit limit for effluent discharge, mg/L
Q_{NPDES}	= NPDES permitted flow rate for effluent discharge, mgd
R_{WPCP}	= Plant removal efficiency from headworks to plant effluent, as decimal
I_r	= WPCP influent pollutant concentration at headworks, mg/L
E_{WPCP}	= WPCP effluent pollutant concentration, mg/L
8.34	= Conversion factor, lb/gal

3.3.1.1 Data Sources and Assumptions

Calculations were performed based on the following components.

3.3.1.1.1 Flow Rates

Academy Creek WPCP has an average effluent flow of 7.49 mgd (Appendix A, Table A1), which is more than half the NPDES permitted flow, Q_{NPDES}, of 13.5 mgd. The NPDES permitted flow of 13.5 mgd was used as the flow rate at Academy Creek WPCP in Equation 3.1.

3.3.1.1.2 Permit Limits

NPDES current monthly average permit limits for POCs, C_{NPDES}, are 20 mg/L BOD, 30 mg/L TSS, 17.4 mg/L ammonia, and 0.14 mg/L total residual chlorine (Appendix C, Table C2). Beginning July 2023, seasonal limits for BOD, TSS, and ammonia will take effect, resulting in significantly lower limits. Local limit calculations were evaluated at the lower seasonal limits of 7.5 mg/L BOD and 20 mg/L TSS. BGJWSC will be implementing technology to achieve the lower seasonal limit of 1 mg/L for ammonia by July 2023. Therefore, ammonia was evaluated at the current NPDES permit limit of 17.4 mg/L and the new NPDES lower seasonal limit of 1 mg/L.

3.3.1.1.3 Plant Removal Efficiencies

Site-specific removal efficiencies, R_{WPCP}, described in Section 3.2 were used in this calculation where possible. When site-specific removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1 through B3.

3.3.1.2 Calculation Results

The data used and calculation results for the AHLs based on NPDES permit limits at the Academy Creek WPCP are provided in Appendix C, Table C2. AHLs based on NPDES permits were calculated only for those pollutants with established permit limits and sufficient data to support the calculations. A summary of AHLs based on NPDES permit limits is provided in Appendix D, Table D3.

3.4 Calculation of AHLs Based on Water Quality Standards

Acute and chronic WQS established by EPD were used to calculate AHLs for the protection of the receiving stream. As illustrated in Equation 3-2, AHLs based on state WQS (AHL_{WQS}) are calculated as the pollutant loading to the water body at the water quality limit [C_{WQS} (Q_{STR} + Q_{WPCP})], adjusted for the background loading of the water body (C_{STR} * Q_{STR}), and divided by the fraction of the pollutant not removed by the plant (1 - R_{WPCP}).

Equation 3-2

$$AHL_{WQS} = \frac{(8.34)[C_{WQS}(Q_{STR}+Q_{WPCP})-(C_{STR}*Q_{STR})]}{(1-R_{WPCP})}$$

Where:

AHL_{WQS}	= AHL based on state WQS, lb/d
C_{STR}	= Receiving stream background concentration, mg/L
C_{WQS}	= In-stream state WQS, mg/L
Q_{STR}	= Receiving stream (upstream) flow rate, mgd
Q_{WPCP}	= WPCP average flow rate, mgd
R_{WPCP}	= Plant removal efficiency from headworks to plant effluent, as decimal
8.34	= Conversion factor, lb/gal

3.4.1 Data Sources and Assumptions

AHLs based on WQS were calculated using Equation 3-2. The following data sources and assumptions were used.

3.4.1.1 Receiving Stream Flow Rates

The receiving stream, Academy Creek, is tidally-influenced coastal/marine water. While the freshwater flow may be negligible in the receiving stream, tidal flows may be significant. Therefore, statistical stream flows typically utilized in these equations such as "1Q10" and "7Q10" flow rates are not relevant. Per the EPD, a dilution factor of 12.8 has been assigned to the point of discharge from the Academy

Creek WPCP into the receiving stream. This dilution factor can be applied to the WPCP's average flow rate of 7.49 mgd to calculate a stream flow rate of 95.84 mgd (Appendix D, Table D1).

3.4.1.2 Water Quality Standards

The water use classification for the Academy Creek are coastal and recreation. Therefore, several sets of WQS are applicable to the stream, including Georgia Acute and Chronic WQS for Coastal and Marine Estuarine Waters, and EPA National Recommended WQC for Saltwater for the protection of Aquatic Life. The state WQS were obtained from the *Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6* (DNR, 2011). The federal WQC were obtained from EPA's *National Recommended Water Quality Criteria* (EPA, 2009).

Metals

WQS for metals are reported for the dissolved fraction of the metal. Most metals measurements, however, are reported in the total or total recoverable form. Total and total recoverable metals concentrations are always at least as high as dissolved metals concentrations because a fraction of the metal may be sorbed onto particulates in the water. Therefore, EPA recommends that WPCPs convert dissolved metals WQS into the total metals form before using the standards to calculate water quality-based AHLs. Equation 3-3 was used to calculate total recoverable WQS:

Equation 3-3

$$WQS_{TOTAL} = \frac{WQS_{DISS}}{CF}$$

Where:

WQS_{TOTAL} = Water quality standard for the total recoverable fraction, ug/L
WQS_{DISS} = Water quality standard for the dissolved fraction, ug/L
CF = Conversion factor, unitless

Tables C4 and C5 in Appendix C provide the total recoverable and dissolved water quality standards for metals for Georgia and EPA, respectively. Table C5 in Appendix C provides a summary of the applicable water quality standards. Allowable headworks loadings were calculated for the most stringent of applicable state and federal WQS. Water quality standards were not available for total chromium; therefore, the more stringent standards for chromium (VI) was used for total chromium.

3.4.1.3 Upstream Background Concentrations

A United States Geological Survey (USGS) monitoring station for Academy Creek upstream of the discharge point from Academy Creek WPCP was not available. Therefore, it was assumed that upstream background concentrations of POCs were negligible.

3.4.1.4 Flow Rates

Per the NPDES Wasteload Allocation Form from March 2020 provided by the EPD, a dilution factor of 12.8 has been assigned to the point of discharge from the Academy Creek WPCP into the receiving stream. This dilution factor can be applied to the WPCP's average flow rate of 7.49 mgd to calculate a stream flow rate of 95.84 mgd (Appendix D, Table D1).

Plant removal efficiencies were applied as described in Section 3.3.1.1.

3.4.2 Calculation Results

The calculations for total recoverable metals standards are provided in Appendix C, Tables C4 and C5. The final state and federal WQS for POCs are listed in Appendix C, Table C5. The data and calculation results for the AHLs to ensure compliance with the state and/or federal WQS at Academy Creek WPCP are provided in Appendix D. AHLs based on WQS were calculated only for those pollutants with

established standards or criteria. A summary of AHLs based on WQS is provided in Appendix D, Table D8.

3.5 Calculation of AHLs Based on Treatment Inhibition

Inhibition-based AHLs were calculated to protect against operational problems for biological treatment processes during secondary and/or tertiary treatment. This inhibition can interfere with a WPCP's ability to remove pollutants, including BOD. EPA does not require WPCPs to calculate AHLs based on inhibition threshold levels if current loadings are acceptable to the treatment processes. For WPCP, AHLs were calculated to prevent future loadings that may cause inhibition. Although site-specific inhibition data are preferred, literature data are available for use in developing AHLs when there are no current inhibition problems.

3.5.1 Activated Sludge Treatment Inhibition

As illustrated in Equation 3-4, the AHL based on inhibition of activated sludge treatment (AHL_{SEC1}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion (C_{INHIB2} * Q_{WPCP}) by the fraction of the pollutant not removed after primary treatment (1 - R_{PRIM}).

Equation 3-4

$$AHL_{SEC} = \frac{(8.34)(C_{INHIB2})(Q_{WPCP})}{(1-R_{PRIM})}$$

Where:

AHL_{SEC}	= AHL based on inhibition of activated sludge treatment, lb/d
C_{INHIB2}	= Inhibition criterion for activated sludge treatment, mg/L
Q_{WPCP}	= WPCP average flow rate, mgd
R_{PRIM}	= Removal efficiency from headworks to primary treatment effluent, decimal
8.34	= Conversion factor, lb/gal

3.5.1.1 Data Sources and Assumptions

AHLs based on activated sludge treatment inhibition were calculated using Equation 3-4. The following data sources and assumptions were used.

Activated Sludge Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WPCPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB2}, are provided in Appendix B, Table B4. Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate. Academy Creek WPCP has an average effluent flow of 7.49 mgd (Appendix A, Table A1), which is more than half the NPDES permitted flow, Q_{NPDES}, of 13.5 mgd. The average flow of 7.49 mgd was used as the flow rate at Academy Creek WPCP in Equation 3.23.

Primary Removal Efficiencies. Primary treatment at the Academy Creek WPCP occurs through a packaged screening structure and secondary treatment occurs through SBRs. Site-specific activated sludge removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.5.1.2 Calculation Results

The data and calculation results for the AHLs to protect against activated sludge treatment inhibition at the WPCP are provided in Appendix D, Table D4. A summary of AHLs based on activated sludge treatment inhibition is provided in Appendix D, Table D8.

3.6 Calculation of AHLs Based on Sludge Disposal Regulations

Sludge disposal-based AHLs can be calculated for sludge depending on its end use. For example, sludge may be applied to land to condition the soil or fertilize crops, disposed of in a landfill, or incinerated. As stated earlier, sludge from WPCP is currently landfilled. WPCPs must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WPCP's use of its chosen sludge disposal option. EPA recommends the WPCP develop local limits to ensure their sludge meets "clean sludge" requirements (40 CFR 503.13). These federal sludge regulations establish limitations for nine common metals that are controlled primarily by the Pretreatment Program. For all land application of biosolids, WPCPs must comply with the ceiling concentrations of Table 1 in 40 CFR 503. In addition, for biosolids that are applied to agricultural land, a WPCP must also comply with either the cumulative loading rates of Table 2 or the monthly average pollutant concentrations in Table 3 in 40 CFR 503. The criterion used in calculations was the more stringent between the ceiling concentrations, cumulative pollutant loading rates, and monthly average pollutant concentrations.

As illustrated in Equation 3-5, the AHL based on sludge regulations (AHL_{SLDG}) is calculated by dividing the pollutant loading of sludge at the sludge standard ($C_{SLDGSTD}$ * Q_{SLDG}) by the overall plant removal efficiency (R_{WPCP}).

Equation 3-5

$$AHL_{SLDG} = \frac{(C_{SLDGSTD})(Q_{SLDG})(0.0022)}{(R_{WPCP})}$$

Where:

AHL_{SLDG}	= AHL based on sludge regulations, lb/d
$C_{SLDGSTD}$	= Most stringent sludge standard, mg/kg-dry
Q_{SLDG}	= Total sludge flow to disposal, dry metric tons/d
R_{WPCP}	= Removal efficiency from headworks to final effluent, decimal
0.0022	= Conversion factor

3.6.1 Data Sources and Assumptions

AHLs based on sludge regulations were calculated using Equation 3-5. The sludge standard used in the equation, $C_{SLDGSTD}$, is the most stringent criteria listed in Tables 1 through 3 of 40 CFR 503 (Appendix C, Table C3. Sludge flow to disposal (Q_{SLDG}) is equal to the average flow of dry sludge to disposal of 7,272 pounds per day (lb/d) based on data from Academy Creek WPCP (Appendix A, Table A1).

Plant removal efficiencies were applied as discussed in Section 3.3.1.1.

3.6.2 Calculation Results

The data and calculation results for the AHLs based on sludge disposal regulations for the WPCP are provided in Appendix D, Table D5. A summary of AHLs based on sludge disposal regulations is provided in Appendix D, Table D8.

3.7 Calculation of AHLs Based on Design Criteria

Some pollutants such as ammonia, BOD, COD, total phosphorus, and TSS require additional evaluation before MAHLs are established because WPCPs are typically designed to treat these pollutants. EPA recommends that WPCPs develop AHLs based on design criteria when the WPCP begins to operate at 80 to 90 percent of its design capacity for 3 to 6 consecutive months. In addition, if the rate of increase in pollutant loadings suggests that the full capacity of the WPCP will be used within 5 to 7 years, then planning to avoid future violations should begin immediately.

As illustrated in Equation 3-6, the AHL based on design criteria (AHL_{DESIGN}) is calculated by multiplying the design criteria (mg/L) by the WPCP permitted flow (mgd).

Equation 3-6 $AHL_{DESIGN} = 8.34 \times DC \times Q_{NPDES}$

Where:

AHL_{DESIGN}	= AHL based on design criteria, lb/d
DC	= Design criteria, mg/L
Q_{NPDES}	= WPCP permitted flow rate, mgd
8.34	= Conversion factor, lb/gal

3.7.1 Data Sources and Assumptions

AHLs based on design criteria were calculated using Equation 3-6. The following data sources and assumptions were used.

3.7.1.1 Design Criteria

Academy Creek WPCP was design criteria was calculated from the maximum monthly average effluent values and plant percent removal efficiencies. The plant was designed to treat maximum month BOD, TSS, COD, ammonia and total phosphorus influent concentrations of 229 mg/L, 287 mg/L, 488 mg/L, 37 mg/L, and 25 mg/L, respectively. The influent design criteria are provided in Appendix C, Table C1.

Flow Rate. Academy Creek WPCP has an average effluent flow of 7.49 mgd (Appendix A, Table A1), which is more than half the NPDES permitted flow, Q_{NPDES}, of 13.5 mgd. The NPDES permitted flow of 13.5 mgd was used as the flow rate at Academy Creek WPCP in Equation 3.6.

3.7.2 Calculation Results

The data and calculation results for the AHLs based on design criteria for the Academy Creek WPCP are provided in Appendix D, Table D2. A summary of AHLs is provided in Appendix D, Table D8.

3.8 Special Cases

The following sections describe the methods for developing local limits for other parameters.

3.8.1 Total Kjeldahl Nitrogen (TKN)

AHLs could not be calculated for this pollutant due to the lack of applicable environmental criteria. Since no influent or effluent data were available for the WPCP, and no problems associated with TKN have been reported, it was determined that a local limit is still not needed for this pollutant. Therefore, this pollutant was not included in the remainder of this evaluation.

3.8.2 Total Phosphorus and Orthophosphate

AHLs could not be calculated for orthophosphate, and only the design criteria AHL could be calculated for total phosphorus. There are no applicable standards or criteria for which to calculate a limit for orthophosphate, and there have been no problems associated with orthophosphate that have been reported. Orthophosphate was not included in the remainder of this evaluate due to this.

The WPCP is now required to report total phosphorus results per the NPDES permit. An AHL was calculated based on design criteria for total phosphorus at 2,776 lbs/day. This loading was carried through the remainder of this evaluation as the MAHL for total phosphorus.

3.8.3 Hydrogen Sulfide

As described in the 2012 Local Limits Development document (BGJWSC, 2012), the BGJWSC conducted a study of dissolved and vapor-phase sulfide and determined that at a level of 2.0 mg/L, resultant hydrogen sulfide gas in manholes and at the influent wet well were generally below toxic levels. For the past several years, the BGJWSC has been monitoring sulfide in the collection system. Based on a recent laboratory report, concentrations of sulfide at the Pinova discharge sampling location and the WPCP effluent were non-detect for sulfide.

In addition, based on information provided in the 2012 Local Limits Development document, sulfates are naturally present in groundwater in this region. Since industries use groundwater from production wells, it is anticipated that sulfides in wastewater could be originating from groundwater and not from the industries. It is recommended to continue to report sulfide at Pinova from their effluent, and not develop a local limit for sulfide.

3.8.4 Fats, Oils, and Greases

Fats, oils, and greases (FOG) includes materials of vegetable, animal, and mineral origin. The pretreatment regulations in 40 CFR 403.5(b)(6) prohibit the discharge of "petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through." If treatment inhibition is occurring, WPCPs could calculate FOG removal efficiencies, determine FOG inhibition criteria, and determine AHLs based on inhibition.

According to EPA, most WPCPs have adopted a 100 mg/L limit for FOG of animal or vegetable origin as determined by an approved analytical procedure for oil and grease analysis. BGJWSC has historically used 100 mg/L as the local limit for oil and grease and has found this limit to be effective for the treatment plant capacity; therefore, BGJWSC will continue to use this limit in this LLE.

3.8.5 Total Residual Chlorine

Chlorine is added to the waste stream as part of the treatment processes. Since the source of chlorine is the treatment plant itself, it was determined that a local limit is still not needed for this pollutant. Therefore, this pollutant was not included in the remainder of this evaluation.

3.9 Maximum Allowable Headworks Loadings

Appendix D, Table D8 provides a summary of the AHLs calculated to ensure compliance with each of the environmental criteria: design criteria, NPDES permit limits, activated sludge treatment inhibition, nitrification treatment inhibition, sludge disposal, and WQS. Appendix D, Table D10 identifies the most stringent AHL for each POC, referred to as the MAHL. This loading is the maximum loading the WPCP can accept at the headworks, and it is used to calculate the MAILs and local limits.

EPA recommends that local limits are needed when the current average influent loading of a toxic pollutant exceeds 60 percent of the MAHL or when the maximum daily influent loading of a toxic pollutant exceeds 80 percent of the MAHL any time during the 12-month period preceding the analysis. Equation 3-7 compares WPCP loadings based on permitted flow to the calculated MAHLs for individual POCs and can be used to calculate the percentage of the MAHL currently being received at the WPCP. The average influent loading was used in this equation for all POCs.

Equation 3-7 $$L_{\%} = \frac{L_{INFL}}{MAHL} * 100$$

Where: $$L_{INFL} = 8.34 \times Q_{WPCP} \times PL$$

and:

$L_{\%}$	=	Percentage of MAHL currently utilized, percent
L_{INFL}	=	Current influent loading (average or daily maximum), lb/d
MAHL	=	Calculated MAHL, lb/d
Q_{WPCP}	=	WPCP average flow rate, mgd
PL	=	Average influent pollutant loading, lb/d
8.34	=	Conversion factor, lb/gal

3.9.1 Data Sources and Assumptions

Average influent and effluent concentrations of conventional pollutants were available for September 2019 through August 2020 (Appendix A, Table A2). Using the average flow rate at the Academy Creek WPCP of 7.49 mgd and the conversion factor 8.34, the average influent concentrations were converted to average influent loadings for use in Equation 3-7.

3.9.2 Calculation Results

Calculated percentages of MAHLs currently received at the Academy Creek WPCP are provided in Appendix D, Table D10. For those that have been detected, most conventional POCs are below 60 percent of the MAHL (Appendix D, Table D10). BOD is above 60 percent of the MAHL but below 80 percent.

BGJWSC has not eliminated any POCs from the evaluation based on current utilizations. Therefore, all POCs included in Table 2-1 were retained for the remainder of the LLE.

3.10 Maximum Allowable Industrial Loadings and Local Limits

The MAIL is the estimated maximum loading of a pollutant that can be received at a WPCP's headworks from all permitted industrial users and other controlled sources without causing pass-through or interference. As shown in Equation 3-8, the MAIL is calculated by subtracting estimates of loadings from uncontrolled sources (L_{UNC}), including septic/hauled waste, from a MAHL adjusted with a safety and growth factor (SGF).

Equation 3-8

$$MAIL = MAHL(1 - SGF) - (L_{UNC})$$

Where:

$$L_{UNC} = (C_{DOM} \times Q_{DOM} \times 8.34) + (C_{HW} \times Q_{HW} \times 8.34)$$

and:

MAIL	=	Maximum allowable industrial loading, lb/d
MAHL	=	Maximum allowable headworks loading, lb/d
L_{UNC}	=	Loadings from uncontrolled sources, lb/d (uncontrolled sources = domestic/commercial + septic/hauled waste)
SGF	=	Safety and growth factor, decimal, if desired
C_{DOM}	=	Domestic and commercial background levels, mg/L
Q_{DOM}	=	Domestic and commercial flow, mgd
C_{HW}	=	Septic/hauled waste levels, mg/L
Q_{HW}	=	Septic/hauled flow, mgd
8.34	=	Conversion factor, lb/gal

A WPCP can then use several basic approaches to assign limits to its controlled or permitted dischargers, including limits based on industrial user contributions of a pollutant, uniform limits for all controlled dischargers, as needed case-by-case, or creative allocation methods. These approaches can vary between WPCPs and pollutants. For this LLE, the concentration-based limits methods, described in EPA's *Local Limits Development Guidance Manual* (EPA 2004), were used to calculate local limits. As

illustrated in Equation 3-9, this method of allocating MAILs for conservative pollutants yields one concentration-based limit per pollutant (C_{LIM}) that applies to every controlled discharger. In this equation, the calculated MAIL for each pollutant is divided by the total industrial flow rate, Q_{IND}.

Equation 3-9

$$C_{LIM} = \frac{MAIL}{(Q_{IND})(8.34)}$$

Where:
and:

$$Q_{IND} = Q_{WWTP} - Q_{DOM} - Q_{HW}$$

C_{LIM}	=	Concentration-based local limit, mg/L
MAIL	=	Maximum allowable industrial loading, lb/d
Q_{IND}	=	Total flow rate from industrial sources, mgd
Q_{DOM}	=	Total flow rate from domestic/commercial sources, mgd
Q_{HW}	=	Total flow rate from septic/hauled waste, mgd
Q_{WPCP}	=	WPCP average flow rate, mgd
8.34	=	Conversion factor, lb/gal

3.10.1 Data Sources and Assumptions

Flow Rates. Average flow from domestic and commercial sources (Q_{DOM}) is 6.62 mgd and was calculated by subtracting total industrial flow (Q_{IND}) and septic/hauled waste flow (Q_{HW}) from the Academy Creek WPCP average influent flow rate (Q_{WPCP}) of 7.73 mgd (Appendix A, Table A1). The total industrial flow, Q_{IND}, of 1.105 mgd, and the septic/hauled waste, Q_{HW}, receiving at WPCP is estimated from Academy Creek WPCP at 0.0048 mgd.

Domestic and Commercial Wastewater Background Concentrations. When site-specific domestic/commercial background concentrations of POCs in wastewater were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used for domestic and commercial background levels (C_{DOM}) of POCs in wastewater (Appendix B, Table B5).

In cases where C_{DOM} values were not available, and for those pollutants not detected in the plant's influent, C_{DOM} was assumed to be negligible.

Safety and Growth Factor. A safety and growth factor is site-specific and depends on local conditions and incorporates both a safety factor and a growth factor. The main purpose of a safety factor is to address data "uncertainties" that can affect the ability of the WPCP to calculate accurate local limits. At a minimum, EPA recommends a 10 percent safety factor. Safety factors can vary between POCs and should depend on the variability of the WPCP's data, amount of data the WPCP used to develop its MAHLs, quality of the WPCP's data, amount of literature data used, history of compliance with the parameter, and potential for industrial user slug loadings (for example, because of a chemical spill or flood event). In addition to the safety factor, a growth factor can be incorporated to account for anticipated growth in the county from present until the local limits will be reevaluated.

A safety factor of 10 percent was used in the evaluation. A growth factor of 10 percent was used in the evaluation.

3.10.2 Calculation Results

Appendix D, Tables D2 through D7 provide the results of converting commercial/domestic background levels and septic/hauled waste concentrations to pollutant loadings from these sources and calculates the AILs. A summary of AILs is provided in Appendix D, Table D10, and the MAILs are identified in Appendix D, Table D10. There can be cases where the total domestic/commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or

no pollutant loading is available for industrial users. In the case of negative MAILs, the domestic/commercial background concentrations were used as the industrial local limits. The calculated MAILs were then used to calculate industrial local limits, which are also summarized in Appendix D Table D10. In this LLE, there were no instances of negative MAILs.

3.10.3 Worker Safety and Protection

The safety and protection of the WPCP workers are also considered in a LLE. In 1990, EPA issued guidance for reactive and gas/vapor-toxic discharges to WPCPs for the purpose of protecting WPCP workers. This guidance requires WPCPs to identify and control potential exposures to substances in industrial wastewaters that are reactive or that create toxic gases and vapors.

3.10.3.1 Data Sources and Assumptions

Worker Protection Screening Levels for fume toxicity and for explosivity are available in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Similar screening levels are found in EPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 1992). These values are provided in Appendix C Tables C6 and C7. During the 2014 LLE, all worker safety and protection values were applied to the local limits. Upon assessment of the data provided by BGJWSC, it is recommended that past local limits based on worker safety and protection standards that were non-detect for the past 6 years be removed. This will be discussed further in Section 3.11.

3.10.4 Domestic and Commercial Background Concentrations

There can be cases where the total domestic and commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. This situation may arise in part because some of the facilities considered "uncontrollable" are commercial facilities such as gas stations, radiator repair shops, car washes, or hospitals, which may discharge high levels of pollutants. The WPCP may need to evaluate the sources it considers uncontrollable to see if some of them would be better classified as controlled sources with reducible pollutant loadings. There were no negative MAIL or local limits calculated in this evaluation.

3.10.4.1 Data Sources and Assumptions

The domestic and commercial background concentrations used in this screening are provided in Appendix B, Table B5, and are consistent with those described in Section 3.10.1.

3.10.5 Calculation Results

Refer to the four right-most columns in Appendix D Table D10 for results of screening the calculated local limits against Worker Protection Screening Levels and the domestic and commercial background levels.

3.11 Summary

The calculated and proposed local limits that apply to all non-domestic dischargers to the Academy Creek WPCP are discussed below. Based on this comprehensive evaluation, influent loadings below the proposed limits are not expected to cause interferences with treatment processes at the Academy Creek WPCP.

3.11.1 Conventional Pollutants

The following local limits were developed for conventional pollutants:

- **Ammonia (current):** The calculated local limit of 363 mg/L is based on the calculated design criteria of 37.0 mg/L. Based on this criterion, the MAHL is 4,183 lb/d with a 29 percent current utilization. It is recommended to keep the 2014 local limit of 37.0 mg/L.
- **Ammonia (implement in July 2023):** The calculated local limit of 21 mg/L is based on the calculated NPDES permit limit of 1.0 mg/L. Based on this criterion, the MAHL is 242 lb/d with a 499 percent current utilization. The MAIL is 193 lb/d with a 12.7 percent utilization. It is recommended to lower the limit by July 2023 to 21 mg/L. BGJWSC is implementing new technologies to meet the new NPDES seasonal ammonia limits and the local limit will be re-evaluated.
- **Biological oxygen demand:** The calculated local limit of 1,682 mg/L is based on the NPDES permit limit of 7.5 mg/L. Based on this criterion, the MAHL is 19,368 lb/d with a 62.9 percent current utilization. It is recommended to keep the 2014 local limit of 1,000 mg/L.
- **Chemical oxygen demand:** The calculated local limit of 4,770 mg/L is based on the calculated design criteria of 488 mg/L. Based on this criterion, the MAHL is 54,941 lb/d with a 50.3 percent current utilization. It is recommended to keep the 2014 local limit of 2,000 mg/L.
- **Total phosphorus:** The calculated local limit of 237 mg/L is based on the calculated design criteria of 25 mg/L. Based on this criterion, the MAHL is 2,776 lb/d with a 25.0 percent current utilization. Since there is room for growth, it is recommended to increase the local limit from 6 mg/L to 20 mg/L to accommodate loading from the SIU Rich Products.
- **Total suspended solids:** The calculated local limit of 2,805 mg/L is based on the calculated design criteria of 287 mg/L. Based on this criterion, the MAHL is 32,307 lb/d with a 38.8 percent current utilization. It is recommended to keep the 2014 local limit of 1,000 mg/L.

If additional loading or changes to loadings are applied to the Academy Creek WPCP, a new LLE will need to be completed to assess if pollutant limits will need to be re-instated.

3.11.2 Inorganic Pollutants

The following local limits were developed for inorganic pollutants:

- **Antimony:** The calculated local limit of 47.9 mg/L is based on the chronic water quality standard of 0.640 mg/L. It is recommended to keep the 2014 local limit of 22 mg/L since all SIUs are meeting this limit.
- **Arsenic:** The calculated local limit of 0.159 mg/L is based on the sludge disposal standard of 41 mg/kg. It is recommended to keep the 2014 local limit of 0.047 mg/L.
- **Cadmium:** The calculated local limit for cadmium is 0.101 mg/L, based on the sludge disposal standard of 39 mg/kg. It is recommended to keep the 2014 local limit of 0.03 mg/L since all SIUs are meeting this limit.
- **Total chromium:** The calculated local limit for total chromium is 6.48 mg/L, based on the more stringent chronic water quality standard for hexavalent chromium of 0.0504 mg/L. It is recommended to keep the 2014 local limit of 3.37 mg/L since all SIUs are meeting this limit.
- **Hexavalent chromium:** The calculated local limit for hexavalent chromium is 5.42 mg/L is based on the activated sludge treatment inhibition value of 1.0 mg/L. It is recommended to keep the 2014 local limit of 1.70 mg/L since all SIUs are meeting this limit.
- **Copper:** The calculated local limit of 0.95 mg/L is based on the sludge disposal standard of 1500 mg/kg. It is recommended to keep the 2014 local limit of 0.30 mg/L since all SIUs are meeting this limit.
- **Cyanide:** The calculated local limit of 0.052 mg/L is based on the acute water quality standard of 0.001 mg/L. The current local limit is 0.11 mg/L. Since current percent loading is at 13.1% from all

industries, it is recommended to keep the 2014 local limit of 0.11 mg/L. In the event a new industry is added, the local limits will be re-evaluated to ensure the WPCP is still being protected.

- **Lead:** The calculated local limit for lead is 0.25 mg/L is based on the sludge disposal limit of 300 mg/kg. It is recommended to keep the 2014 local limit of 0.16 mg/L since all SIUs are meeting this limit.
- **Mercury:** The calculated local limit for mercury is 0.002 mg/L, based on the chronic water quality standard of 0.000029 mg/L. It is recommended to keep the 2014 local limit of 0.0019 mg/L since all SIUs are meeting this limit.
- **Nickel:** The calculated local limit for nickel is 0.681 mg/L based on the chronic water quality standard of 0.00302 mg/L. It is recommended to keep the 2014 local limit of 0.49 mg/L since all SIUs are meeting this limit.
- **Selenium:** The calculated local limit for selenium is 0.17 mg/L, based on the sludge disposal criteria of 100 mg/kg. It is recommended to keep the 2014 local limit of 0.10 mg/L since all SIUs are meeting this limit.
- **Silver:** The calculated local limit for silver is 0.891 mg/L, based on the acute water quality standard of 0.002 mg/L. It is recommended to keep the 2014 local limit of 0.30 mg/L since all SIUs are meeting this limit.
- **Zinc:** The calculated local limit for zinc is 0757 mg/L, based on the sludge disposal criteria of 2800 mg/kg. It is recommended to keep the 2014 local limit of 0.54 mg/L since all SIUs are meeting this limit.

Current local limits to be removed:

- **Trivalent chromium:** The current local limit for trivalent chromium is 24.6 mg/L. Since there were no detections in the influent, effluent, and sludge data for the past 6 years, it is recommended to remove this limit and use hexavalent and total chromium limits to protect the WPCP.
- **Molybdenum: :** The current local limit for molybdenum is 0.13 mg/L. Since there were no detections in the influent, effluent, and sludge data for the past 6 years, it is recommended to remove this limit.
- **Thallium: :** The current local limit for thallium is 0.016 mg/L. Since there were no detections in the influent, effluent, and sludge data for the past 6 years, it is recommended to remove this limit.

If additional loading or changes to loadings are applied to the Academy Creek WPCP, a new LLE will need to be completed to assess if pollutant limits will need to be re-instated.

3.11.3 Organic Pollutants

The following local limits were developed for organic pollutants:

- **BHC-Alpha** The calculated local limit for BHC-Alpha of 0.005 mg/L is based on chronic state water quality standards. It is recommended to keep the 2014 local limit of 0.00017 mg/L since all SIUs are meeting this limit.
- **Bis(2-ethylhexyl)phthalate:** The calculated local limit for bis(2-ethylhexyl)phthalate of 0.362 mg/L is based on chronic state water quality standards It is recommended to keep the 2014 local limit of 0.270 mg/L since all SIUs are meeting this limit.
- **Butylbenzyl Phthalate:** The calculated local limit for butylbenzyl phthalate of 338 mg/L is based on chronic state water quality standards. It is recommended to keep the 2014 local limit of 195 mg/L since all SIUs are meeting this limit.
- **Chlorodibromomethane:** The calculated local limit for chlorodibromomethane of 1.7 mg/L is based on chronic state water quality standards. It is recommended to keep the 2014 local limit of 0.32 mg/L since all SIUs are meeting this limit.

- **Dichlorobromomethane:** The calculated local limit for dichlorobromomethane of 1.35 mg/L is based on chronic state water quality standards. It is recommended to keep the 2014 local limit of 0.25 mg/L since all SIUs are meeting this limit.
- **2,4-Dichlorophenoxyacetic acid (2,4-D):** The calculated local limit for 2,4-D of 29.9 mg/L is based on chronic state water quality standards. The current local limit is 39.6 mg/L, and it is recommended to lower the limit to 29.9 mg/L. All SIUs are able to meet this new limit.
- **Di-n-Butyl Phthalate:** The calculated local limit for di-n-butyl phthalate of 780 mg/L is based on chronic state water quality standards. It is recommended to keep the 2014 local limit of 153 mg/L since all SIUs are meeting this limit.
- **Formaldehyde:** Due to a lack of regulatory limits for formaldehyde, a local limit was not able to be calculated. The 2014 local limit was solely based on the worker protection standard of 0.06 mg/L. Sampling was performed in the WPCP influent, and formaldehyde was detected at 0.025 mg/L. Formaldehyde was not detected in the WPCP effluent and the Pinova influent sampling locations. The Pinova average concentration for formaldehyde over the last 3 years was calculated at 0.296 mg/L. Since the sampling of the influent showed a formaldehyde detection well below the worker protection, it is recommended that the formaldehyde local limit be raised to 0.3 mg/L and the WPCP influent and effluent continue to be monitored for formaldehyde to ensure detections are below worker protection.
- **Heptachlor:** The calculated local limit for heptachlor of 0.00001 mg/L is based on chronic state water quality standards; however, the MAHL loading is 534%. This is due to the fact that laboratories cannot report down to the 2014 local limit of 0.0000027 mg/L. There was a detection in the 2020 effluent priority pollutant scan of 0.000037 mg/L, but no detections in the WPCP influent or SIU effluent. It is recommended to prohibit heptachlor from industrial effluent, rather than establishing a local limit.
- **Phenols:** The calculated local limit for phenols of 30.0 mg/L is based on chronic state water quality standards. It is recommended to keep the 2014 local limit of 20.78 mg/L since all SIUs are meeting this limit.

The following POCs were selected local limits evaluation and will remain the same as the current 2014 local limit based on worker safety and protection standards:

- **Chlorobenzene:** The calculated local limit for chlorobenzene of 314 mg/L is based on chronic state water quality standards. The worker safety and protection level of 2.29 mg/L is recommended.
- **Chloroform:** The calculated local limit for chloroform of 35.2 mg/L is based on chronic state water quality standards. The worker safety and protection level of 0.06 mg/L is recommended.
- **1,4-Dichlorobenzene:** The calculated local limit for 1,4-dichlorobenzene of 314 mg/L is based on activated sludge treatment inhibition. The worker safety and protection level of 3.55 mg/L is recommended.
- **Diethyl Phthalate:** The calculated local limit for diethyl phthalate of 9,326 mg/L is based on chronic state water quality standards. The worker safety and protection level of 107 mg/L is recommended.
- **Ethylbenzene:** The calculated local limit for ethylbenzene of 265 mg/L is based on chronic state water quality standards. The worker safety and protection level of 1.59 mg/L is recommended.
- **Naphthalene:** The calculated local limit for naphthalene of 4842 mg/L is based on activated sludge treatment inhibition. The worker safety and protection level of 2.65 mg/L is recommended.
- **Toluene:** The calculated local limit for toluene of 1085 mg/L is based on activated sludge treatment inhibition. The worker safety and protection level of 2.08 mg/L is recommended.

The following POCs were selected local limits evaluation but are not recommended for local limits:

- **Lindane (BHC-Delta):** The calculated local limit for lindane of 0.01 mg/L is based on acute state water quality standards. Since the percent MAHL in use is 0.278%, a local limit is not recommended at this time.
- **Methoxychlor:** The calculated local limit for methoxychlor of 0.002 mg/L is based on chronic state water quality standards. Since the percent MAHL in use is 1.95%, a local limit is not recommended at this time.
- **Silvex (2,4,5-TP):** The calculated local limit for silvex of 3.93 mg/L is based on chronic state water quality standards. Since the percent MAHL in use is 0.009%, a local limit is not recommended at this time.

Current local limits to be removed:

- **Worker safety and protection POCs:** Due to not being detected in the influent, effluent, or sludge data in the last 6 years, the following local limits from 2014 are recommended to be removed:
    - Acenaphthene, Acrolein, Acrylonitrile, Aldrin, Anthracene, Aroclor 1242, Aroclor 1254, Benzene, Benzidine, Benzo(a)Anthracene, Benzo(k)Fluoroethene, Benzofluoranthene, 3,4-(Benzo[b]fluoranthene), BHC-Beta, b-, Bis(2-chloroethyl)Ether, Bis(2-chloroisopropyl)Ether, Bis(2-chloromethyl)Ether, Bromoform, Carbon Disulfide, Carbon Tetrachloride, Chlordane, Chloroethane, Chloronaphthalene, 2-, Chlorophenol, 2-, Chrysene, DDD, 4,4'-, DDE, 4,4'-, DDT, 4,4'-, Dibenzo(a,h)Anthracene, Dichlorobenzene, 1,2-, Dichlorobenzene, 1,3-, Dichlorobenzidine, 3,3-, Dichlorodifluoromethane, Dichloroethane, 1,1-, Dichloroethane, 1,2-, Dichloroethylene, 1,1, Dichloroethylene, trans-1,2-, Dichlorophenol, 2,4-, Dichloropropane, 1,2-, Dichloropropylene, 1,3-, Dieldrin, Dimethyl phthalate, Dimethylphenol, 2,4-, Dinitrophenol, 2,4-, Dinitrophenol, 2-Methyl-4,6- (Dinitro-o-cresol, 4,6-), Dinitrotoluene, 2,4-, Diphenylhydrazine, 1,2-, Endosulfan Sulfate, Endosulfan, alpha-, Endosulfan, beta-, Endrin, Endrin Aldehyde, Fluoranthene, Fluorene, Heptachlor Epoxide, Hexachlorobenzene, Hexachlorobutadiene, Hexachlorocyclopentadiene, Hexachloroethane, Indeno(1,2,3-cd)Pyrene, Isophorone, Methyl Bromide (Bromomethane), Methyl Chloride (Chloromethane), Methyl ethyl ketone (2-Butanone), Methyl isobutyl ketone, Methylene chloride, Nitrobenzene, N-Nitrosodimethylamine, N-Nitrosodiphenylamine, PCBs, Pentachlorophenol, Phenanthrene, Pyrene, Tetrachloroethane, 1,1,2,2-, Tetrachloroethylene, Toxaphene, Trichlorobenzene, 1,2,4-, Trichloroethane, 1,1,1-, Trichloroethane, 1,1,2-, Trichloroethylene, Trichlorofluoromethane, Trichlorophenol, 2,4,6-, and Vinyl Chloride.

3.11.4 Other Pollutants

The following local limits were developed for other pollutants:

- **Fats, Oils, and Grease:** The local limit for FOG is 100 mg/L, based on EPA's guidance document, *Controlling Fats, Oils, and Grease Discharges from Food Service Establishments* (September 2012). Per EPA, local limits for FOG typically range between 50 and 450 mg/L, with 100 mg/L as the most commonly reported value.

The following 2014 local limits are recommended for removal:

- **Surfactants:** The WPCP is no longer sampling for surfactants due to there being no issues with it in the last 6 years. It is recommended that the local limit be removed.
- **Sodium:** There have been no problems associated with sodium in the last 6 years. It is recommended that the local limit be removed.
- **Chloride:** There have been no problems associated with chloride in the last 6 years. It is recommended that the local limit be removed.

Section 4

Industrial Allocations

This section describes the methodologies used to allocate the MAILs to the permitted industries.

4.1 Introduction

A WPCP has several options available for applying limits to its controllable sources, including permitted industries. Limits can be applied as concentration-based limits (typically in mg/L) or mass-based limits (typically in lb/day), or both. The type of limit is in part dependent on the type of method used by the WPCP to allocate the MAILs among the dischargers. There are several methods commonly used to allocate limits.

The uniform method of allocating MAILs is a very commonly used method that yields one limit per pollutant that applies to all IUs regardless of size, permitted flow, or discharge. This method is not always preferred, since some IUs that do not discharge the pollutant may be given an allocation of the MAIL that they may not need whereas other IUs that do discharge that same pollutant may have to pretreat to comply with the uniform local limit.

Two additional methods of allocating MAILs among IUs are flow-based or mass-based limits. Flow-based limits are based on the permitted flows of each IU, whereas the mass-based limits are based on the proportion of the discharger's loadings to the total influent loadings at the WPCP.

Finally, a WPCP may set limits specific to each IU on a case-by-case basis. This type of allocation allows the WPCP personnel to use their knowledge of each IU discharge in conjunction with their own judgment in setting limits. This method can be used in conjunction with either flow-based or mass-based limits.

4.2 Allocations of MAILs

The final proposed local limits are provided in Table 5-1. These are the local limits that, once approved by EPA, will apply to all non-domestic dischargers at the Academy Creek WPCP. To ensure that these local limits can realistically be met by the permitted industrial dischargers, an evaluation was completed that compares current actual loadings from each industry to their new allowable loading based on the local limits. The new allowable MAILs for all industries are reported in Appendix D, Table D10. There is the option to use Equation 4.1 to determine the new allowable loadings for each specific industry (AIL_{IU}). In this equation, the mass-based MAIL is multiplied by the ratio of flow from an individual industrial user (Q_{IU}) and the WPCP industrial flow (Q_{IND}).

Equation 4.1 was used to calculate flow-based allocations of the MAILs.

Equation 4.1 $$ALLOC_{PP} = (MAIL) - (L_{FUTURE})$$

Where: $$L_{FUTURE} = (MAIL) \times (F_{FUTURE})$$

and:

- $ALLOC_{PP}$ = Portion of the MAIL allocated to industrial user, lb/day
- MAIL = Maximum allowable industrial loading, lb/day
- L_{FUTURE} = Amount of loading allocated to future potential industries, lb/day

F_{FUTURE} = Fraction of MAIL to be allocated to future potential industries, decimal

4.2.1 Calculation Results

In general, current actual loadings from each industry are less than new allowable loadings, and total actual loadings from all industries account for less than 50 percent of the MAILs with the exception of heptachlor. The MAIL for heptachlor is based on a chronic water quality standard lower than reporting limits laboratories are unable to achieve. Since the reporting limits are higher than the WQSs, a false exceedance is observed. Since 2018, there have been no detections of heptachlor in industrial effluent.

4.3 Summary

Concentration-based discharge permit limits were developed for the permitted industrial users for discharges to Academy Creek WPCP. Following EPD's approval of the final proposed local limits for Academy Creek WPCP, these discharge permit limits will be incorporated into the new industrial discharge permits for the permitted industries.

Section 5

Final Proposed Local Limits

Table 5-1 provides a summary of the calculated concentration-based local limits for the Academy Creek WPCP. The final proposed local limits are as follows:

Table 5-1. Summary of Local Limits for Academy Creek WPCP

	Recommended Local Limits (mg/l)	Technical basis
Conventional pollutants		
Ammonia (current)	37	2014 Local Limit
Ammonia (implement in July 2023 or re-evaluate)	21	NPDES Permit Limits
Biochemical Oxygen Demand (BOD)	1000	2014 Local Limit
Chemical Oxygen Demand (COD)	2000	2014 Local Limit
Phosphorus, Total (as P)	20	2014 Local Limit
Suspended Solids, Total (TSS)	1000	2014 Local Limit
Inorganic Pollutants		
Antimony	21.7	2014 Local Limit
Arsenic	0.047	2014 Local Limit
Cadmium	0.030	2014 Local Limit
Chromium VI	1.70	2014 Local Limit
Chromium, Total	3.37	2014 Local Limit
Copper	0.30	2014 Local Limit
Cyanide	0.11	2014 Local Limit
Lead	0.160	2014 Local Limit
Mercury	0.0019	2014 Local Limit
Nickel	0.49	2014 Local Limit
Selenium	0.10	2014 Local Limit
Silver	0.30	2014 Local Limit
Zinc	0.54	2014 Local Limit
Organic Pollutants		
BHC-Alpha, a-	0.00017	2014 Local Limit
Bis(2-ethylhexyl)Phthalate	0.270	2014 Local Limit
Butylbenzyl Phthalate	195	2014 Local Limit
Chlorobenzene	2.29	Worker Protection
Chlorodibromomethane	0.320	2014 Local Limit
Chloroform	0.060	Worker Protection
Dichlorobenzene, 1,4-	3.55	Worker Protection

Table 5-1. Summary of Local Limits for Academy Creek WPCP		
	Recommended Local Limits (mg/l)	Technical basis
Dichlorobromomethane	0.250	2014 Local Limit
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	29.9	Chronic WQS
Diethyl phthalate	107	Worker Protection
Di-n-butyl phthalate	153	2014 Local Limit
Ethylbenzene	1.59	Worker Protection
Formaldehyde	0.300	Industry Data
Heptachlor	Prohibited	Chronic WQS
Naphthalene	2.65	Worker Protection
Phenols	20.78	2014 Local Limit
Toluene	2.08	Worker Protection
Other Pollutants		
Oil and Grease	100	EPA Recommendation

Section 6

Limitations

This document was prepared solely for BGJWSC in accordance with professional standards at the time the services were performed and in accordance with the Agreement for General Engineering Services between BGJWSC and BC dated August 26, 2020. This document is governed by the specific scope of work authorized by BGJWSC; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by BGJWSC and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Section 7

References

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Appendix A: Academy Creek WPCP Data

Table A1. Flow Summary for Academy Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission							
Date	Influent Flow (mgd)		Effluent Flow (mgd)		Sludge to Landfill		
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Total Monthly (dry tons)	Monthly Average (dry lb/day)	Monthly Average (dry tons/day)
Sep-19	6.87	8.28	7.06	8.76	81.77	9,619	4.81
Oct-19	7.31	16.06	7.50	10.67	61.88	7,280	3.64
Nov-19	8.38	12.30	8.52	12.82	55.00	6,111	3.06
Dec-19	9.66	19.85	10.05	18.94	44.88	5,985	2.99
Jan-20	8.80	10.58	9.10	11.41	61.04	8,138	4.07
Feb-20	7.87	9.26	8.05	9.18	126.20	12,017	6.01
Mar-20	7.84	10.48	7.17	10.50	43.54	4,837	2.42
Apr-20	7.83	10.74	6.88	10.00	71.62	8,425	4.21
May-20	6.86	7.78	5.95	7.22	59.80	7,976	3.99
Jun-20	8.36	12.69	7.77	12.35	61.42	8,189	4.09
Jul-20	6.24	6.91	5.72	6.45	33.78	4,223	2.11
Aug-20	6.74	7.80	6.08	7.27	20.11	4,469	2.23
Averages	7.73	11.06	7.49	10.46	60.09	7,272	3.64
Maximum	9.66	19.85	10.05	18.94	126.20	12,017	6.01
Minimum	6.24	6.91	5.72	6.45	20.11	4,223	2.11

Table A2. Influent and Effluent Summary for Conventional Pollutants for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Year	Influent BOD (mg/L)		Effluent BOD (mg/L)		Influent COD[a] (mg/)		Effluent COD (mg/L)[a]		Influent TSS (mg/)		Effluent TSS (mg/L)		Influent Ammonia (mg/L)	Effluent Ammonia (mg/L)	Influent Phosphorus (mg/L)	Effluent Phosphorus (mg/L)	Effluent Orthophosphate (mg/L)	Effluent Total Residual Chlorine (mg/L)
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Average	Monthly Average	Monthly Average	Monthly Average	Monthly Average
Sep-19	165	245	6.0	8.0	408	626	58.0	75.0	197	318	9.0	13.0	31.9	17.3	1.9	1.2	1.2	0.02
Oct-19	192	294	9.0	13.0	435	612	69.0	84.0	160	215	14.0	24.0	21.4	11.6	5.8	3.6	1.6	0.02
Nov-19	198	329	10.0	30.0	436	1041	66.0	111.0	210	719	16.0	50.0	17.1	9.5	12.2	5.3	1.6	0.02
Dec-19	177	248	10.0	26.0	388	716	63.0	113.0	193	475	16.0	50.0	13.6	7.3	20.0	9.6	1.4	0.01
Jan-20	189	308	10.0	14.0	425	843	61.0	81.0	185	339	13.0	23.0	14.0	8.6	7.2	1.3	1.5	0.01
Feb-20	209	285	9.0	28.0	468	809	61.0	106.0	234	468	11.0	40.0	19.3	11.5	21.6	6.0	1.8	0.01
Mar-20	192	324	8.0	14.0	439	665	54.0	89.0	186	345	10.0	27.0	19.8	8.4	16.2	7.2	1.5	0.01
Apr-20	185	259	9.0	16.0	445	650	67.0	92.0	210	348	15.0	36.0	18.0	6.1	8.6	1.9	0.9	0.01
May-20	224	483	8.0	17.0	490	1220	59.0	80.0	241	922	15.0	30.0	18.1	5.0	14.2	4.0	1.3	0.01
Jun-20	207	453	7.0	19.0	486	1042	67.0	84.0	223	408	18.0	31.0	14.8	5.3	10.4	3.9	1.0	0.02
Jul-20	211	365	9.0	15.0	----	----	----	----	184	403	20.0	40.0	23.0	7.6	7.2	4.2	1.4	0.03
Aug-20	191	316	7.0	9.0	----	----	----	----	188	604	11.0	17.0	20.9	9.8	8.0	3.7	1.1	0.02
Average	195	326	8.5	17.4	442	822	62.5	91.5	201	464	14.0	31.8	19.3	9.0	11.1	4.3	1.4	0.02
Maximum	224	483	10.0	30.0	490	1220	69.0	113.0	241	922	20.0	50.0	31.9	17.3	21.6	9.6	1.8	0.03
Minimum	165	245	6.0	8.0	388	612	54.0	75.0	160	215	9.0	13.0	14	5.0	1.9	1.2	0.9	0.01
Removal Efficiency (%)	95.64%				85.86%				93.03%				53.43%		61.07%		----	----

[a]Influent and effluent COD data for July and August 2020 DMR were not included and therefore not shown in this table.

Abbreviations:

mg/L - milligrams per liter.
COD - Chemical Oxygen Demand.
BOD - Biochemical Oxygen Demand.
TSS - Total Suspended Solids.

Table A3. Influent and Effluent Summary for Inorganic Pollutants for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Event	Antimony (mg/L)		Arsenic (mg/L)		Cadmium (mg/L)		Chromium, hexavalent (mg/L)		Chromium, Total (mg/L)		Copper (mg/L)		Cyanide (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2015 PPS	*2.00E-03*	*2.00E-03*	**1.60E-03**	*1.30E-03*	*1.30E-04*	*1.30E-04*	*3.00E-03*	*3.00E-03*	*2.50E-03*	*2.50E-03*	**7.00E-03**	**4.50E-03**	**5.80E-03**	**5.90E-03**
2016 PPS	**8.40E-04**	*5.00E-04*	**5.50E-03**	**3.60E-03**	**3.80E-04**	*1.50E-04*	*3.00E-03*	**4.40E-03**	**5.90E-03**	*1.60E-03*	**6.90E-02**	**4.00E-03**	**3.30E-03**	**5.30E-03**
2017 PPS	*5.00E-04*	*5.00E-04*	*1.50E-03*	*1.50E-03*	*1.50E-04*	*1.50E-04*	*3.00E-03*	*3.00E-03*	**2.00E-03**	*1.60E-03*	**2.30E-02**	*1.70E-03*	*2.50E-03*	*2.50E-03*
2018 PPS	*5.00E-04*	*5.00E-04*	*1.50E-03*	*1.50E-03*	**3.30E-04**	*1.50E-04*	*3.00E-03*	*3.00E-03*	**3.50E-03**	**1.80E-03**	**2.10E-02**	**4.30E-03**	**4.40E-03**	**2.50E-02**
2019 PPS	*5.00E-04*	*5.00E-04*	*1.50E-03*	*1.50E-03*	*1.50E-04*	***2.50E-04***	*3.00E-03*	*3.00E-03*	**2.60E-03**	*1.60E-03*	**1.80E-02**	**2.50E-03**	*2.50E-03*	*2.50E-03*
2020 PPS	*5.00E-04*	*5.00E-04*	*1.50E-03*	*1.50E-03*	*1.50E-04*	*1.50E-04*	**4.30E-02**	*3.00E-03*	**2.50E-03**	*1.60E-03*	**2.20E-02**	**9.40E-03**	*2.50E-03*	**3.10E-03**
Average	0.00081	0.00075	0.00218	0.00182	0.00022	0.00016	0.00967	0.00323	0.00317	0.00178	0.02667	0.00440	0.00350	0.00738
Maximum	0.00200	0.00200	0.00550	0.00360	0.00038	0.00025	0.04300	0.00440	0.00590	0.00250	0.06900	0.00940	0.00580	0.02500
Minimum	0.00050	0.00050	0.00150	0.00130	0.00013	0.00013	0.00300	0.00300	0.00200	0.00160	0.00700	0.00170	0.00250	0.00250
Removal Efficiencies (%)	7.02%		16.8%		24.0%		66.55%		43.68%		83.50%		-111%	

Event	Lead (mg/L)		Mercury (mg/L)		Nickel (mg/L)		Selenium (mg/L)		Silver (mg/L)		Zinc (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2015 PPS	**2.80E-03**	*5.00E-04*	*8.00E-05*	*8.00E-05*	**2.60E-03**	**2.90E-03**	*1.10E-03*	*1.10E-03*	*1.80E-04*	*1.80E-04*	**1.10E-01**	**2.90E-02**
2016 PPS	**6.30E-03**	*9.80E-04*	*8.00E-05*	*8.00E-05*	**5.20E-03**	**3.10E-03**	**4.10E-03**	**1.10E-03**	**1.30E-03**	*1.00E-04*	**2.00E-01**	**3.00E-02**
2017 PPS	**1.60E-03**	*9.80E-04*	*8.00E-05*	*8.00E-05*	**2.50E-03**	**2.10E-03**	*1.00E-03*	*1.00E-03*	**1.70E-03**	*1.00E-04*	**8.20E-02**	**1.80E-02**
2018 PPS	**2.80E-03**	*9.80E-04*	*8.00E-05*	**2.90E-06**	**3.20E-03**	**2.80E-03**	**1.60E-03**	*1.00E-03*	**2.30E-04**	*1.00E-04*	**1.30E-01**	**1.50E-02**
2019 PPS	**1.60E-03**	*9.80E-04*	*8.00E-05*	*8.00E-05*	**1.60E-03**	**2.70E-03**	*1.00E-03*	*1.00E-03*	**1.20E-04**	*1.00E-04*	**9.00E-02**	**1.70E-02**
2020 PPS	**2.50E-03**	*9.80E-04*	**2.40E-05**	**8.00E-06**	**3.00E-03**	**2.40E-03**	*1.00E-03*	*1.00E-03*	**1.10E-04**	*1.00E-04*	**1.40E-01**	**3.50E-02**
Average	0.00293	0.00090	0.00007	0.00006	0.00302	0.00267	0.00163	0.00103	0.00061	0.00011	0.12533	0.02400
Maximum	0.00630	0.00098	0.00008	0.00008	0.00520	0.00310	0.00410	0.00110	0.00170	0.00018	0.20000	0.03500
Minimum	0.00160	0.00050	0.00002	0.00000	0.00160	0.00210	0.00100	0.00100	0.00011	0.00010	0.08200	0.01500
Removal Efficiencies (%)	69.3%		21.96%		11.60%		36.73%		81.32%		80.85%	

Abbreviations:

mg/L - milligrams per liter.

PPS- Priority Pollutant Scan

Notes:

Values in bold represent detections.

Values in italics were nondetect and are reported at the method detection limit.

Table A4. Influent and Effluent Summary for Organics for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Event	BHC-Alpha (mg/L)		BHC-Delta (Lindane) (mg/L)		Bis(2-ethylhexyl)phthalate[a] (mg/L)		Butylbenzyl phthalate[a] (mg/L)		Chlorobenzene (mg/L)		Chlorodibromomethane (mg/L)		Chloroform (mg/L)		1,4-Dichlorobenzene[a] (mg/L)		Dichlorobromomethane (mg/L)		2,4-D (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2015 PPS	*3.30E-06*	*3.40E-06*	*7.30E-06*	*7.40E-06*	*1.60E-03*	----	*1.20E-03*	----	*2.60E-04*	*2.60E-04*	*3.20E-04*	**1.10E-03**	**9.40E-04**	**2.90E-03**	*5.60E-04*	----	*4.40E-04*	**1.80E-03**	**5.30E-03**	**6.10E-04**
2016 PPS	*3.30E-06*	*3.40E-06*	*7.30E-06*	*7.50E-06*	**1.80E-03**	*1.60E-03*	*1.20E-03*	*1.20E-03*	*2.60E-04*	*2.60E-04*	*3.20E-04*	*3.20E-04*	**2.20E-03**	**2.40E-03**	**1.60E-03**	*5.70E-04*	*4.40E-04*	**1.90E-03**	*3.60E-05*	*3.70E-05*
2017 PPS	*3.40E-06*	*3.30E-06*	*7.50E-06*	**1.00E-04**	**1.90E-03**	*1.60E-03*	*1.20E-03*	*1.20E-03*	*2.60E-04*	*2.60E-04*	*3.20E-04*	*3.20E-04*	**7.80E-04**	**2.20E-03**	**2.80E-03**	*5.70E-04*	*4.40E-04*	**7.20E-04**	**8.80E-04**	*3.60E-05*
2018 PPS	*3.30E-06*	*3.50E-06*	*7.20E-06*	*7.70E-06*	*1.60E-03*	*1.70E-03*	**2.00E-03**	*1.30E-03*	*2.60E-04*	*2.60E-04*	*3.20E-04*	*3.20E-04*	**1.10E-03**	**1.60E-03**	*5.70E-04*	*6.20E-04*	*4.40E-04*	**4.40E-04**	**2.30E-03**	*3.50E-05*
2019 PPS	**2.30E-04**	*1.70E-06*	*3.70E-06*	*3.70E-06*	*7.80E-03*	*1.60E-03*	*5.80E-03*	*1.20E-03*	*2.60E-03*	*2.60E-04*	*3.20E-03*	*3.20E-04*	*5.00E-03*	**2.30E-03**	*2.80E-03*	*5.70E-04*	*4.40E-03*	**5.70E-04**	*5.90E-05*	**4.10E-04**
2020 PPS	*1.70E-06*	*1.70E-06*	*3.80E-06*	*3.60E-06*	*8.00E-03*	*1.60E-03*	*6.00E-03*	*1.20E-03*	**4.60E-04**	*2.60E-04*	*3.20E-04*	*3.20E-04*	**9.50E-04**	**2.10E-03**	*2.90E-03*	*5.70E-04*	*4.40E-04*	**7.70E-04**	*1.80E-05*	**3.80E-04**
Average	0.00004	0.000003	0.00001	0.00002	0.00378	0.00162	0.00290	0.00122	0.00068	0.00026	0.00080	0.00045	0.00183	0.00225	0.00187	0.00058	0.00110	0.00103	0.00143	0.00025
Maximum	0.00023	0.000004	0.00001	0.00010	0.00800	0.00170	0.00600	0.00130	0.00260	0.00026	0.00320	0.00110	0.00500	0.00290	0.00290	0.00062	0.00440	0.00190	0.00530	0.00061
Minimum	0.00000	0.000002	0.00000	0.00000	0.00160	0.00160	0.00120	0.00120	0.00026	0.00026	0.00032	0.00032	0.00078	0.00160	0.00056	0.00057	0.00044	0.00044	0.00002	0.00004
Removal Efficiencies (%)	93.06%		-253.0%		57.2%		57.93%		61.95%		43.75%		-23.06%		69.01%		6.06%		82.5%	

Event	Diethyl Phthalate[a] (mg/L)		Di-n-butyl Phthalate[a] (mg/L)		Ethylbenzene (mg/L)		Formaldehyde (mg/L)		Heptachlor (mg/L)		Methoxychlor (mg/L)		Naphthalene[a] (mg/L)		Phenol[a] (mg/L)		Silvex (2,4,5-TP) (mg/L)		Toluene (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2015 PPS	*8.30E-04*	----	*8.50E-04*	----	**7.30E-04**	*3.30E-04*	----	----	*6.90E-06*	*7.00E-06*	*9.50E-06*	*9.70E-06*	*6.80E-04*	----	*1.10E-03*	----	**1.00E-04**	*7.00E-05*	**1.00E-03**	*4.80E-04*
2016 PPS	**2.00E-03**	*8.40E-04*	*8.90E-04*	*8.60E-04*	**1.10E-03**	*3.30E-04*	----	----	*6.90E-06*	*7.10E-06*	*9.50E-06*	*9.80E-06*	**7.30E-04**	*6.90E-04*	**5.80E-03**	*1.10E-03*	*6.90E-05*	*7.00E-05*	**1.80E-03**	*4.80E-04*
2017 PPS	**1.50E-03**	*8.50E-04*	**9.30E-04**	*8.70E-04*	**3.50E-04**	*3.30E-04*	----	----	*7.10E-06*	*7.00E-06*	*9.80E-06*	*9.60E-06*	**1.20E-03**	*6.90E-04*	**5.90E-03**	**1.20E-02**	*7.00E-05*	*7.00E-05*	**1.30E-03**	*4.80E-04*
2018 PPS	**1.80E-03**	*9.20E-04*	*8.60E-04*	*9.40E-04*	*3.30E-04*	*3.30E-04*	----	----	*6.90E-06*	*7.30E-06*	*9.50E-06*	*1.00E-05*	*6.90E-04*	*7.50E-04*	*1.10E-03*	*1.20E-03*	*6.80E-05*	*6.60E-05*	*4.80E-04*	*4.80E-04*
2019 PPS	*4.20E-03*	*8.50E-04*	*4.30E-03*	*8.70E-04*	*3.30E-04*	*3.30E-04*	----	----	*3.50E-06*	*3.50E-06*	**5.20E-06**	*4.80E-06*	*3.40E-03*	*6.90E-04*	**8.20E-03**	*1.10E-03*	*5.00E-05*	*6.10E-05*	*4.80E-03*	*4.80E-04*
2020 PPS	*4.30E-03*	*8.40E-04*	*4.40E-03*	*8.60E-04*	**5.00E-04**	*3.30E-04*	----	----	*3.60E-06*	**3.70E-05**	*4.90E-06*	*4.80E-06*	*3.50E-03*	*6.80E-04*	**6.60E-03**	**2.50E-03**	*3.00E-05*	*3.10E-05*	**1.70E-03**	*4.80E-04*
2021 Sampling	----	----	----	----	----	----	**2.50E-02**	*1.90E-02*	----	----	----	----	----	----	----	----	----	----	----	----
Average	0.00244	0.00086	0.00204	0.00088	0.00056	0.00033	0.025000	0.019000	0.0000058	0.000011	0.000008	0.000008	0.00170	0.00070	0.00478	0.00358	0.00006	0.00006	0.00185	0.00048
Maximum	0.00430	0.00092	0.00440	0.00094	0.00110	0.00033	0.025000	0.019000	0.000007	0.000037	0.000010	0.000010	0.00350	0.00075	0.00820	0.01200	0.00010	0.00007	0.00480	0.00048
Minimum	0.00083	0.00084	0.00085	0.00086	0.00033	0.00033	0.025000	0.019000	0.000004	0.000004	0.000005	0.000005	0.00068	0.00068	0.00110	0.00110	0.00003	0.00003	0.00048	0.00048
Removal Efficiencies (%)	64.73%		56.83%		40.72%		24.00%		-97.42%		-0.62%		58.82%		25.16%		4.91%		74.01%	

[a]Due to improper dilution and 0% surrogate recovery on SVOC analysis on the effluent 2015 sample, Non-detections are considered negligible.

Abbreviations:

mg/L - milligrams per liter.

PPS- Priority Pollutant Scan

Notes:

Values in bold represent detections.

Values in italics were nondetect and are reported at the method detection limit.

Appendix B: Literature Data

Table B1. Primary Treatment Removal Efficiencies[a] - Literature Values Local Limits Evaluation for Academy Creek WPCP Brunswick-Glynn County Joint Water & Sewer Commission		
Pollutant	Median (%)	No. of POTWs with Removal Data[b]
Metal/Nonmetal Inorganics		
Cadmium	15	6 of 40
Chromium, Total	27	12 of 40
Copper	22	12 of 40
Cyanide	27	12 of 40
Lead	57	1 of 40
Mercury	10	8 of 40
Nickel	14	9 of 40
Silver	20	4 of 40
Zinc	27	12 of 40
Organics		
1,1,1-Trichloroethane	40	10 of 40
1,2-trans-Dichloroethylene	36	9 of 40
Benzene	25	8 of 40
Butyl benzyl phthalate	62	4 of 40
Chloroform	14	11 of 40
Diethyl phthalate	56	1 of 40
Di-n-butyl phthalate	36	3 of 40
Ethylbenzene	13	12 of 40
Naphthalene	44	4 of 40
Phenols	8	11 of 40
Tetrachloroethylene	4	12 of 40
Trichloroethylene	20	12 of 40

[a] Pollutant removals between POTW influent and primary effluent. From *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume I (EPA 440/1-82/303), USEPA, Washington, DC, September 1982, page 61.

[b] Median removal efficiencies from a database of removal efficiencies for 40 POTWs. Only POTWs with average influent concentrations exceeding three times each pollutant's detection limit were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-55, Table 3-9.

Table B2. Removal Efficiencies Through Activated Sludge Treatment[a] - Literature Values Local Limits Evaluation for Academy Creek WPCP Brunswick-Glynn County Joint Water & Sewer Commission					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Arsenic	11-78	31	45	53	5 of 26
Cadmium	25-99	33	67	91	19 of 26
Chromium	25-97	68	82	91	25 of 26
Copper	2-99	67	86	95	26 of 26
Cyanide	3-99	41	69	84	25 of 26
Lead	1-92	39	61	76	23 of 26
Mercury	1-95	50	60	79	20 of 26
Molybdenum[c]	6-71		29		6
Nickel	2-99	25	42	62	23 of 26
Selenium	25-89	33	50	67	4 of 26
Silver	17-95	50	75	88	24 of 26
Zinc	23-99	64	79	88	26 of 26
Organics[b]					
1,1,1-Trichloroethane	18-99	75	85	94	23 of 26
1,2-trans-Dichloroethylene	17-99	50	67	91	17 of 26
Anthracene	29-99	44	67	1	5 of 26
Benzene	25-99	50	80	96	18 of 26
Bis (2-ethylhexyl) phthalate	17-99	47	72	87	25 of 26
Butyl benzyl phthalate	25-99	50	67	92	16 of 26
Chloroform	17-99	50	67	83	24 of 26
Diethyl phthalate	17-98	39	62	90	15 of 26
Di-n-butyl phthalate	11-97	39	64	87	19 of 26
Ethylbenzene	25-99	67	86	97	25 of 26
Methylene Chloride	2-99	36	62	77	26 of 26
Naphthalene	25-98	40	78	90	16 of 26
Phenanthrene	29-99	37	68	86	6 of 26
Phenol	3-99	75	90	98	19 of 26
Pyrene	73-95	76	86	95	2 of 26
Tetrachloroethylene	15-99	50	80	93	26 of 26
Toluene	25-99	80	93	98	26 of 26
Trichloroethylene	20-99	75	89	98	25 of 26

[a] Pollutant removals between POTW influent and secondary effluent (including secondary clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All secondary activated sludge treatment plants sampled as part of the study were considered.

[c] Source: USEPA Region 8, Technically Based Local Limits Development Strategy, April 11, 2003.

Source (unless otherwise noted): *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-57, Table 3-11.

Table B3. Removal Efficiencies Through Tertiary Treatment[a] - Literature Values Local Limits Evaluation for Academy Creek WPCP Brunswick-Glynn County Joint Water & Sewer Commission					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Cadmium	33-81	50	50	73	3 of 4
Chromium	22-93	62	72	89	4 of 4
Copper	8-99	58	85	98	4 of 4
Cyanide	20-93	32	66	83	4 of 4
Lead	4-86	9	52	77	3 of 4
Mercury	33-79	43	67	75	4 of 4
Nickel	4-78	17	17	577	3 of 4
Silver	27-87	55	62	82	3 of 4
Zinc	1-90	50	78	88	4 of 4
Organics[b]					
1,1,1-Trichloroethane	50-98	79	94	97	4 of 4
1,2-trans-Dichloroethylene	50-96	50	83	93	2 of 4
Benzene	5-67	40	50	54	2 of 4
Bis (2-ethylhexyl) phthalate	45-98	59	76	94	4 of 4
Butyl benzyl phthalate	25-94	50	63	85	4 of 4
Chloroform	16-75	32	53	64	3 of 4
Diethyl phthalate	20-57	29	38	50	3 of 4
Di-n-butyl phthalate	14-84	27	50	70	4 of 4
Ethylbenzene	65-95	80	89	94	3 of 4
Methylene Chloride	11-96	31	57	78	4 of 4
Naphthalene	25-94	33	73	86	3 of 4
Phenol	33-98	80	88	96	4 of 4
Tetrachloroethylene	67-98	80	91	97	4 of 4
Toluene	50-99	83	94	97	4 of 4
Trichloroethylene	50-99	62	93	98	4 of 4

[a] Pollutant removals between POTW influent and tertiary effluent (including final clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.

Tertiary treatment was taken to include POTWs with effluent microscreening, mixed media filtration, post aeration, and/or nitrification/denitrification.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All tertiary treatment plants sampled as part of the study were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-58, Table 3-12.

Table B4. Activated Sludge Inhibition Threshold Levels[a] - Literature Values Local Limits Evaluation for Academy Creek WPCP Brunswick-Glynn County Joint Water & Sewer Commission			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	1	1-10	Unknown
Chromium, Total	1	1-100	Pilot
Chromium III	10	10-50	Unknown
Chromium VI	1	1	Unknown
Copper	1	1	Pilot
Lead	0.1	0.1-5.0	Unknown
		10-100	Lab
Nickel	1	1.0-2.5	Unknown
		5	Pilot
Zinc	0.08	0.08-5	Unknown
		5-10	Pilot
Arsenic	0.1	0.1	Unknown
Mercury	0.1	0.1-1	Unknown
		2.5 as Hg(II)	Lab
Silver	0.25	0.25-5	Unknown
Cyanide	0.1	0.1-5	Unknown
		5	Full
Ammonia	480	480	Unknown
Iodine	10	10	Unknown
Sulfide	25	25-30	Unknown
Organics			
Anthracene	500	500	Lab
Benzene	100	100-500	Unknown
		125-500	Lab
2-Chlorophenol	5	5	Unknown
		20-200	Unknown
1,2 Dichlorobenzene	5	5	Unknown
1,3 Dichlorobenzene	5	5	Unknown
Dichlorobenzene, 1,4-	5	5	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dimethylphenol	50	40-200	Unknown
2,4-Dinitrotoluene	5	5	Unknown
1,2-Diphenylhydrazine	5	5	Unknown
Ethylbenzene	200	200	Unknown
Hexachlorobenzene	5	5	Unknown
Naphthalene		500	Lab
		500	Unknown
		500	Unknown
Nitrobenzene	30	30-500	Unknown
		500	Lab
		500	Unknown
Pentachlorophenol	0.95	0.95	Unknown
		50	Unknown
		75-150	Lab
Phenathrene	500	500	Lab
		500	Unknown
Phenols	50	50-200	Unknown
		200	Unknown
		200	Unknown
Toluene	200	200	Unknown
1,2,6 Trichlorophenol	50	50-100	Lab
Surfactants	100	100-500	Unknown

[a] References/Sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program*; pages 3-44 and 3-45, Table 3-2.

Table B5. Domestic/Commercial Pollutant Loadings Local Limits Evaluation for Academy Creek WPCP Brunswick-Glynn County Joint Water & Sewer Commission					
Pollutant	USEPA Literature Values[a]				
	Number of Detections	Number of Samples	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Average Concentration (mg/L)
Metal/Nonmetal Inorganics					
Arsenic	140	205	0.0004	0.088	0.007
Barium	3	3	0.04	0.216	0.115
Boron	4	4	0.1	0.42	0.3
Cadmium	361	538	0.00076	0.11	0.008
Chromium III	1	2	<0.005	0.007	0.006
Chromium, Total	311	522	<0.001	1.2	0.034
Copper	603	607	0.005	0.74	0.14
Cyanide	7	7	0.01	0.37	0.082
Fluoride	2	2	0.24	0.27	0.255
Iron	18	18	0.0002	3.4	0.989
Lead	433	540	0.001	2.04	0.058
Lithium	2	2	0.03	0.031	0.031
Manganese	3	3	0.04	0.161	0.087
Mercury	218	235	<0.0001	0.054	0.002
Nickel	313	540	<0.001	1.6	0.047
Ortho-Phosphate	2	2	27.4	30.2	28.8
Phosphorus, Total (as P)	1	1	0.7	0.7	0.7
Silver	181	224	0.0007	1.052	0.019
Zinc	636	638	0.01	1.28	0.231
Organics					
Chloroform	21	30	<0.002	0.069	0.009
1,1-Dichloroethene	2	29	0.005	0.008	0.007
1,1-Dichloroethane	1	28	0.026	0.026	0.026
Trans-1,2-Dichloroethene	1	28	0.013	0.013	0.013
Fluoranthene	2	5	0.00001	<0.001	0.001
Methylene Chloride	7	30	0.00008	0.055	0.027
Phenols	2	2	0.00002	0.00003	0.000025
Bis(2-ethylhexyl)Phthalate	5	5	0.00002	0.022	0.006
Pyrene	2	3	0.00001	<0.005	0.0002
Tetrachloroethylene	5	29	0.00001	0.037	0.014
1,2,4-Trichlorobenzene	1	3	<0.002	0.035	0.013
Pesticides					
Total BHC	3	3	0.001	0.001	0.001
4,4-DDD	3	3	0.00026	0.0004	0.0003
Total Endosulfan	3	3	0.002	0.002	0.002

[a] Source: USEPA *Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Programs*, May 1991.

Table B6. Hauled Waste Pollutant Loadings Local Limits Evaluation for Academy Creek WPCP Brunswick-Glynn County Joint Water & Sewer Commission					
Pollutant	USEPA Literature Values[a]				
	Number of Detections	Number of Samples	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Average Concentration (mg/L)
Metal/Nonmetal Inorganics					
Arsenic	144	145	0	3.5	0.141
Barium	128	128	0.002	202	5.758
Cadmium	825	1097	0.005	8.1	0.097
Chromium, Total	931	1019	0.01	34	0.49
Cobalt	16	32	<0.003	3.45	0.406
Copper	963	971	0.01	260.9	4.835
Cyanide	575	577	0.001	1.53	0.469
Iron	464	464	0.2	2740	39.287
Lead	962	1067	<0.025	118	1.21
Manganese	5	5	0.55	17.05	6.088
Mercury	582	703	0.0001	0.742	0.005
Nickel	813	1030	0.01	37	0.526
Silver	237	272	<0.003	5	0.099
Tin	11	25	<015	1	0.076
Zinc	959	967	<0.001	444	9.971
Nonconventionals					
Chemical Oxygen Demand (COD)	183	183	510	117500	21247.951
Organics					
Acetone	118	118	0	210	10.588
Benzene	112	112	0.005	3.1	0.062
Ethylbenzene	115	115	0.005	1.7	0.067
Isopropyl Alcohol	117	117	1	391	14.055
Methyl Alcohol	117	117	1	396	15.84
Methyl Ethyl Ketone	115	115	1	240	3.65
Methylene Chloride	115	115	0.005	2.2	0.101
Toluene	113	113	0.005	1.95	0.17
Xylene	87	87	0.005	0.72	0.051

[a] Source: USEPA *Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Programs*, May 1991. PP. I-27 and I-28.

Appendix C: Regulatory Limits and Criteria

Table C1. Influent Basis of Design for Academy Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water & Sewer Commission			
Parameter	Academy Creek WPCP Design Influent Criteria[a]		
	Maximum Monthly Average Effluent Value[a]	Plant Removal Efficiency (%)	Calculated Influent Design Criteria
Flow (MGD)	----	----	13.5
Biochemical Oxygen Demand (BOD) (mg/L)	10	95.64	229
Chemical Oxygen Demand[b] (COD) (mg/L)	69	85.86	488
Ammonia (mg/L)	17.3	53.43	37
Suspended Solids, Total (TSS) (mg/L)	20	93.03	287
Phosphorus, Total (as P) (mg/L)	9.6	61.07	25

[a] Discharge limitations are from the Academy Creek WPCP, NPDES Permit No. GA0025313, P. 31, June 16, 2020.

Table C2. NPDES Permit Limits for Academy Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water & Sewer Commission		
Parameter	Academy Creek WPCP Discharge Limitations[a]	
	Monthly Average	Weekly Average
Flow, mgd	13.5	16.9
Biochemical Oxygen Demand (BOD- 5 day), mg/L (lb/day)	20 (1,024)	30 (1,279)
January- April[c]	20 (1024)	30 (1,279)
May-October[c]	7.5 (383.8)	11.3 (479.8)
November-December[c]	20 (1024)	30 (1,279)
Total Suspended Solids (TSS), mg/L (lb/day)	30 (1,535)	45 (1,919)
Total Suspended Solids (TSS), mg/L (lb/day)[c]	20 (1024)	30 (1,279)
Enterococci, #/100 mL	35	70
Enterococci, #/100 mL	----	135[b]
Ammonia, as N mg/L (lb/day)	17.4 (890)	26.1 (1,113)
January- April[c]	5 (255.9)	7.5 (319.9)
May-October[c]	1.0 (51.2)	1.5 (64.0)
November-December[c]	5 (255.9)	7.5 (319.9)
Total Residual Chlorine, mg/L	----	0.14[b]
Dissolved Oxygen (DO), Minimum, mg/L	----	5.0
pH, Minimum to Maximum, Standard Unit (SU)	6.0 to 9.0	
Total Phosphorus, as P, mg/L (kg/day)	Report	
Orthohosphate, as P, mg/L (kg/day)	Report	
Organic Nitrogen, as N, mg/L	Report	
Nitrate-Nitrite, as N, mg/L	Report	
Total Kjeldahl Nitrogen, as N, mg/L	Report	
Chronic Toxicity Test	Report NOEC	

[a]Discharge limitations are from the Academy Creek WPCP, NPDES Permit No. GA0025313, June 16, 2020.

Table C3. Biosolids Land Application and Landfill Regulatory Limits
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water & Sewer Commission

Parameter	Ceiling Concentration (Table 1, 40 CFR 503.13)[a]		Cumulative Pollutant Loading Rates (Table 2, 40 CFR 503.13)[a]		Monthly Average Pollutant Concentration (Table 3, 40 CFR 503.13)[a]		Landfill Disposal - TCLP Regulatory Level[b]		Most Stringent Criteria (mg/kg-dry)
	mg/kg-dry	lb/1,000 lbs-dry	kg/hectare-dry	lb/acre-dry	mg/kg-dry	lb/1,000 lb-dry	mg/L	mg/kg-dry	
Inorganic Pollutants									
Arsenic	75	75	41	37	41	41	5.0	100	41
Barium	-----	-----	-----	-----	-----	-----	100	2000	0
Cadmium	85	85	39	35	39	39	1.0	20	39
Chromium, Total	-----	-----	-----	-----	-----	-----	5.0	100	0
Copper	4,300	4,300	1,500	1,338	1,500	1,500	-----	-----	1500
Lead	840	840	300	268	300	300	5.0	100	300
Mercury	57	57	17	15	17	17	0.2	4.0	17
Molybdenum	75	75	-----	-----	-----	-----	-----	-----	75
Nickel	420	420	420	375	420	420	-----	-----	420
Selenium	100	100	100	89	100	100	1.0	20	100
Silver	-----	-----	-----	-----	-----	-----	5.0	100	0
Zinc	7,500	7,500	2,800	2,498	2,800	2,800	-----	-----	2800
Organic Pollutants									
Benzene	-----	-----	-----	-----	-----	-----	0.5	10	10
Carbon tetrachloride	-----	-----	-----	-----	-----	-----	0.5	10	10
Chlordane	-----	-----	-----	-----	-----	-----	0.03	0.6	0.6
Chlorobenzene	-----	-----	-----	-----	-----	-----	100	2000	2000
Chloroform	-----	-----	-----	-----	-----	-----	6.0	120	120
Cresol, o-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresol, m-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresol, p-	-----	-----	-----	-----	-----	-----	200	4000	4000
Cresols	-----	-----	-----	-----	-----	-----	200	4000	4000
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	-----	-----	-----	-----	-----	-----	10.0	200	200
Dichlorobenzene, 1,4-	-----	-----	-----	-----	-----	-----	7.5	150	150
Dichloroethane, 1,2-	-----	-----	-----	-----	-----	-----	0.5	10	10
Dichloroethylene, 1,1-	-----	-----	-----	-----	-----	-----	0.7	14	14
Dinitrotoluene, 2,4-	-----	-----	-----	-----	-----	-----	0.13	2.6	2.6
Endrin	-----	-----	-----	-----	-----	-----	0.02	0.4	0.4
Heptachlor	-----	-----	-----	-----	-----	-----	0.008	0.16	0.16
Heptachlor epoxide	-----	-----	-----	-----	-----	-----	0.008	0.16	0.16
Hexachlorobenzene	-----	-----	-----	-----	-----	-----	0.13	2.6	2.6
Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	0.5	10	10
Hexachloroethane	-----	-----	-----	-----	-----	-----	3.0	60	60
Lindane	-----	-----	-----	-----	-----	-----	0.4	8.0	8
Methoxychlor	-----	-----	-----	-----	-----	-----	10	200	200
Methyl ethyl ketone	-----	-----	-----	-----	-----	-----	200	4000	4000
Nitrobenzene	-----	-----	-----	-----	-----	-----	2.0	40	40
Pentachlorophenol	-----	-----	-----	-----	-----	-----	100	2000	2000
Pyridine	-----	-----	-----	-----	-----	-----	5.0	100	100
Tetrachloroethylene	-----	-----	-----	-----	-----	-----	0.7	14	14
Toxaphene	-----	-----	-----	-----	-----	-----	0.5	10	10
Trichloroethylene	-----	-----	-----	-----	-----	-----	0.5	10	10
Trichlorophenol, 2,4,5-	-----	-----	-----	-----	-----	-----	400	8000	8000
Trichlorophenol, 2,4,6-	-----	-----	-----	-----	-----	-----	2.0	40	40
Silvex (2,4,5-TP)	-----	-----	-----	-----	-----	-----	1.0	20	20
Vinyl chloride	-----	-----	-----	-----	-----	-----	0.2	4	4

[a] For the application of biosolids to agricultural land, forest, public contact sites, reclamation sites, a POTW must comply with the Ceiling Concentrations and either the cumulative pollutant loading rates or the monthly average pollutant concentrations (also referred to as the "Clean Sludge" concentrations). Regulations from 40 CFR 503.13, Tables 1-4, October 25, 1995. and GA Chapter 391-3-6-.17.

Table C4. Derivation of State and Federal Water Quality Standard for Metals for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water & Sewer Commission

Metal	Georgia WQS for Coastal and Marine Estuary Waters						USEPA National Recommended WQS for Aquatic Life in Saltwater					
	Georgia WQS, Dissolved[a] (ug/L)		Conversion Factor (CF) for Acute (CMC)[a]	Conversion Factor (CF) for Chronic (CCC)[a]	Georgia WQS, Total Recoverable (ug/L)[c]		WQS, Dissolved (ug/L)[b]		Saltwater Conversion Factor (CF) for Acute (CMC)[b]	Saltwater Conversion Factor (CF) for Chronic (CCC)[b]	WQS, Total Recoverable (ug/L)[c]	
	Acute (CMC)	Chronic (CCC)			Acute (CMC)	Chronic (CCC)	Acute (CMC)	Chronic (CCC)			Acute (CMC)	Chronic (CCC)
Arsenic	69	36	1.000	1.000	69	36	69	36	1	1	69	36
Cadmium	33	7.9	0.994	0.994	33	7.9	33	7.9	0.994	0.994	33	7.9
Chromium (III)	----	----	----	----	----	----	---	---	----	----	----	----
Chromium (VI)	1100	50	0.993	0.993	1108	50	1100	50	0.993	0.993	1108	50
Copper	4.8	3.1	0.830	0.830	5.8	3.7	4.8	3.1	0.83	0.83	6	3.7
Cyanide	1	1	----	----	1	1	1	1	----	----	1	1
Lead	210	8.1	0.951	0.951	221	8.5	140	5.6	0.951	0.951	147	5.9
Mercury	1.8	0.025	0.85	0.85	2.1	0.029	1.8	0.94	0.85	0.85	2.1	1.1
Nickel	74	8.2	0.990	0.990	75	8.3	74	8.2	0.99	0.99	75	8.3
Selenium	290	71	0.998	0.998	291	71	290	71	0.998	0.998	291	71
Silver	----	----	0.85	----	----	----	1.9	----	0.85	----	2.2	----
Zinc	90	81	0.946	0.946	95	86	90	81	0.946	0.946	95	86

WQS = Water Quality Standard.

CMC = Criterion Maximum Concentration.

CCC = Criterion Continuous Concentration.

[a] Conversion Factors for Acute and Chronic Standards and conversion factors are from the Georgia Rule 391-3-6-.03 accessed 10/8/2020.

[b] Conversion Factors for Acute and Chronic Standards and conversion factors are from the National Recommended Water Quality Criteria, USEPA accessed 10/8/2020 and available at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table.

[c] For those metals reported in terms of dissolved fraction, total recoverable criteria are calculated from the following:
CMC (total) = CMC (dissolved) / CF.
CCC (total) = CCC (dissolved) / CF.

Table C5. Summary of Water Quality Standards
Local Limits Evaluation for Academy Creek WPCP
Brunswick-Glynn County Joint Water & Sewer Commission

Pollutant	State WQS[a]						Federal WQC[b]			Most Stringent Overall[c] (mg/L)
	391-3-6-.03(5.e)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Most Stringent WQS[c] (ug/L)	Aquatic Life		Most Stringent WQC (ug/L)	
	Chronic WQS (ug/L)	Acute WQS for Coastal and Marine Estuarine Waters (ug/L)	Chronic WQS for Coastal and Marine Estuarine Waters (ug/L)	Chronic WQS for Coastal and Marine Estuarine Waters (ug/L)	WQS (ug/L)		Acute WQC for Saltwater (ug/L)	Chronic WQC for Saltwater (ug/L)		
Conventional Pollutants										
Ammonia	----	----	----	----	----	----	44,000	6,600	6,600	6.60
Inorganic Pollutants										
Antimony	----	----	----	----	640	640	----	----	----	0.6400
Arsenic	----	69	36	----	50	36	69	36	36	0.0360
Cadmium	----	33	7.9	----	----	7.9	33	8	7.9	0.0079
Chromium VI	----	1108	50	----	----	50	1108	50	50	0.0504
Copper	----	5.8	3.7	----	----	3.7	5.8	3.7	3.7	0.0037
Cyanide	----	1.00	1.00	1.0	----	1.0	1.0	1.0	1.0	0.0010
Lead	----	221	9	----	----	8.5	147	5.9	5.9	0.0059
Mercury	----	2.1	0.029	----	----	0.029	2.1	1.1	1.1	0.00003
Nickel	----	75	8	----	----	8.3	75	8	8.3	0.0083
Selenium	----	291	71	----	----	71	291	71	71	0.0711
Silver	----	----	----	----	----	----	2.2	----	2.2	0.0022
Thallium	----	----	----	----	0.47	0.47	----	----	----	0.0005
Zinc	----	95	86	----	----	86	95	86	86	0.0856
Organic Pollutants										
Acenaphthene	----	----	----	----	990	990	----	----	----	0.9900
Acrolein	----	----	----	----	9.3	9.3	----	----	----	0.0093
Acrylonitrile	----	----	----	----	0.25	0.25	----	----	----	0.0003
Aldrin	----	----	----	----	0.00005	0.00005	1.3	----	1.3	0.00000005
Anthracene	----	----	----	----	40000	40000	----	----	----	40.0
Benzene	----	----	----	----	51	51	----	----	----	0.0510
Benzidine	----	----	----	----	0.0002	0.0002	----	----	----	0.0000002
Benzo(a)Anthracene	----	----	----	----	0.018	0.018	----	----	----	0.000018
Benzo(a)Pyrene	----	----	----	----	0.018	0.018	----	----	----	0.000018
Benzo(k)Fluoroethene	----	----	----	----	0.018	0.018	----	----	----	0.000018
Benzofluoranthene, 3,4-	----	----	----	----	0.018	0.018	----	----	----	0.000018
BHC-Alpha, a-	----	----	----	----	0.0049	0.0049	----	----	----	0.000005
BHC-Beta, b-	----	----	----	----	0.017	0.017	----	----	----	0.000017
Bis(2-chloroethyl)Ether	----	----	----	----	0.53	0.53	----	----	----	0.0005
Bis(2-chloroisopropyl)Ether	----	----	----	----	65000	65000	----	----	----	65.0
Bis(2-ethylhexyl)Phthalate	----	----	----	----	2.2	2.2	----	----	----	0.0022
Bromoform	----	----	----	----	140	140	----	----	----	0.1400
Butylbenzyl Phthalate	----	----	----	----	1900	1900	----	----	----	1.9000
Carbon Tetrachloride	----	----	----	----	1.6	1.6	----	----	----	0.0016
Chlordane	----	----	----	0.004	0.00081	0.00081	0.09	0.004	0.004	0.0000008
Chlorobenzene	----	----	----	----	1600	1600	----	----	----	1.6000
Chlorodibromomethane	----	----	----	----	13	13	----	----	----	0.0130

Pollutant	State WQS[a]						Federal WQC[b]			Most Stringent Overall[c] (mg/L)
	391-3-6-.03(5.e)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Most Stringent WQS[c] (ug/L)	Aquatic Life		Most Stringent WQC (ug/L)	
	Chronic WQS (ug/L)	Acute WQS for Coastal and Marine Estuarine Waters (ug/L)	Chronic WQS for Coastal and Marine Estuarine Waters (ug/L)	Chronic WQS for Coastal and Marine Estuarine Waters (ug/L)	WQS (ug/L)		Acute WQC for Saltwater (ug/L)	Chronic WQC for Saltwater (ug/L)		
Chloroform	----	----	----	----	470	470	----	----	----	0.4700
Chloronapthalene, 2-	----	----	----	----	1600	1600	----	----	----	1.6000
Chlorophenol, 2-	----	----	----	----	150	150	----	----	----	0.1500
Chrysene	----	----	----	----	0.018	0.018	----	----	----	0.0000180
DDD, 4,4'-	----	----	----	----	0.00031	0.00031	----	----	----	0.0000003
DDE, 4,4'-	----	----	----	----	0.00022	0.00022	----	----	----	0.0000002
DDT, 4,4'-	----	----	----	0.001	0.0022	0.001	0.13	0.001	0.001	0.0000010
Dibenzo(a,h)Anthracene	----	----	----	----	0.018	0.018	----	----	----	0.0000180
Dichlorobenzene, 1,2-	----	----	----	----	1300	1300	----	----	----	1.3000
Dichlorobenzene, 1,3-	----	----	----	----	960	960	----	----	----	0.9600
Dichlorobenzene, 1,4-	----	----	----	----	190	190	----	----	----	0.1900
Dichlorobenzidine, 3,3-	----	----	----	----	0.028	0.028	----	----	----	0.000028
Dichlorobromomethane	----	----	----	----	17	17	----	----	----	0.0170
Dichloroethane, 1,2-	----	----	----	----	37	37	----	----	----	0.0370
Dichloroethylene, 1,1-	----	----	----	----	7100	7100	----	----	----	7.1000
Dichloroethylene, trans-1,2-	----	----	----	----	10000	10000	----	----	----	10.0000
Dichlorophenol, 2,4-	----	----	----	----	290	290	----	----	----	0.2900
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	70	----	----	----	----	70	----	----	----	0.0700
Dichloropropane, 1,2-	----	----	----	----	15	15	----	----	----	0.0150
Dichloropropylene, 1,3-	----	----	----	----	21	21	----	----	----	0.0210
Dieldrin	----	----	----	0.0019	0.000054	0.000054	0.71	0.0019	0.0019	0.00000005
Diethyl phthalate	----	----	----	----	44000	44000	----	----	----	44.0
Dimethyl phthalate	----	----	----	----	1100000	1100000	----	----	----	1,100
Dimethylphenol, 2,4-	----	----	----	----	850	850	----	----	----	0.8500
Di-n-butyl phthalate	----	----	----	----	4500	4500	----	----	----	4.5000
Dinitrophenol, 2,4-	----	----	----	----	5300	5300	----	----	----	5.3000
Dinitrophenol, 2-Methyl-4,6-	----	----	----	----	280	280	----	----	----	0.2800
Dinitrotoluene, 2,4-	----	----	----	----	3.4	3.4	----	----	----	0.0034
Diphenylhydrazine, 1,2-	----	----	----	----	0.2	0.2	----	----	----	0.0002
Endosulfan Sulfate	----	----	----	----	89	89	----	----	----	0.0890
Endosulfan, alpha-	----	----	----	0.0087	89	0.0087	0.034	0.0087	0.0087	0.0000
Endosulfan, beta-	----	----	----	0.0087	89	0.0087	0.034	0.0087	0.0087	0.0000
Endrin	----	----	----	0.0023	0.06	0.0023	0.037	0.0023	0.0023	0.0000
Endrin Aldehyde	----	----	----	----	0.3	0.3	----	----	----	0.0003
Ethylbenzene	----	----	----	----	2100	2100	----	----	----	2.1000
Fluoranthene	----	----	----	----	140	140	----	----	----	0.1400
Fluorene	----	----	----	----	5300	5300	----	----	----	5.3000
Heptachlor	----	----	----	0.0036	0.000079	0.000079	0.053	0.0036	0.0036	0.00000008
Heptachlor Epoxide	----	----	----	0.0036	0.000039	0.000039	0.053	0.0036	0.0036	0.00000004
Hexachlorobenzene	----	----	----	----	0.00029	0.00029	----	----	----	0.00000029
Hexachlorobutadiene	----	----	----	----	18	18	----	----	----	0.0180

Pollutant	State WQS[a]						Federal WQC[b]			Most Stringent Overall[c] (mg/L)
	391-3-6-.03(5.e)(i)	391-3-6-.03(5)(ii)		391-3-6-.03(5)(iii)	391-3-6-.03(5)(iv)	Most Stringent WQS[c] (ug/L)	Aquatic Life		Most Stringent WQC (ug/L)	
	Chronic WQS (ug/L)	Acute WQS for Coastal and Marine Estuarine Waters (ug/L)	Chronic WQS for Coastal and Marine Estuarine Waters (ug/L)	Chronic WQS for Coastal and Marine Estuarine Waters (ug/L)	WQS (ug/L)		Acute WQC for Saltwater (ug/L)	Chronic WQC for Saltwater (ug/L)		
Hexachlorocyclopentadiene	----	----	----	----	1100	1100	----	----	----	1.1000
Hexachloroethane	----	----	----	----	3.3	3.3	----	----	----	0.0033
Indeno(1,2,3-cd)Pyrene	----	----	----	----	0.018	0.018	----	----	----	0.000018
Isophorone	----	----	----	----	960	960	----	----	----	0.9600
Lindane (BHC-Delta, d-)	----	----	----	----	1.8	1.80	0.16	----	0.16	0.0002
Methoxychlor	0.03	----	----	----	----	0.03	----	0.03	0.03	0.0000
Methyl Bromide (Bromomethane)	----	----	----	----	1500	1500	----	----	----	1.5000
Methylene chloride	----	----	----	----	590	590	----	----	----	0.5900
Nitrobenzene	----	----	----	----	690	690	----	----	----	0.6900
N-Nitrosodimethylamine	----	----	----	----	3.0	3.0	----	----	----	0.0030
N-Nitrosodi-n-Propylamine	----	----	----	----	0.5	0.5	----	----	----	0.0005
N-Nitrosodiphenylamine	----	----	----	----	6.0	6.0	----	----	----	0.0060
PCBs	----	----	----	0.03	0.000064	0.000064	----	0.03	0.03	0.00000006
Pentachlorophenol	----	----	----	7.9	3.0	3.0	13	7.9	7.9	0.0030
Phenols	----	----	----	300	857,000	300	----	----	----	0.3000
Pyrene	----	----	----	----	4,000	4,000	----	----	----	4.0000
Silvex (2,4,5-TP)	50	----	----	----	----	50	----	----	----	0.0500
Tetrachloroethane, 1,1,2,2-	----	----	----	----	4	4	----	----	----	0.0040
Tetrachloroethylene	----	----	----	----	3.3	3.3	----	----	----	0.0033
Toluene	----	----	----	----	5,980	5,980	----	----	----	5.9800
Toxaphene	----	----	----	0.0002	0.00028	0.00020	0.21	0.0002	0.0002	0.00000020
Trichlorobenzene, 1,2,4-	----	----	----	----	70	70	----	----	----	0.0700
Trichloroethane, 1,1,2-	----	----	----	----	16	16	----	----	----	0.0160
Trichloroethylene	----	----	----	----	30	30	----	----	----	0.0300
Trichlorophenol, 2,4,6-	----	----	----	----	2.4	2.4	----	----	----	0.0024
Vinyl Chloride	----	----	----	----	2.4	2.4	----	----	----	0.0024
Other Pollutants										
Total Residual Chlorine (TRC)	----	----	----	----	----	----	13	7.5	7.5	0.0075
Sulfide	----	----	----	----	----	----	----	2.0	2.0	0.0020

WQS = Water Quality Standard

WQC = Water Quality Criteria

[a] In-stream criterion from Georgia Rule 391-3-6-.03. For metals, values are expressed in terms of the total recoverable fraction in the water column (refer to Table C3).

[b] USEPA National Recommended Water Quality Criteria, Aquatic Life Criteria Table (2009). For metals, values are expressed in terms of the total recoverable fraction in the water column (refer to Table C4).

[c] The most stringent of applicable State WQS and Federal WQC were identified and used to develop local limits based on water quality.

[d] Acute and chronic criteria for ammonia are pH and temperature dependent and are determined from the USEPA Ambient Water Quality Criteria for Ammonia (Saltwater) (1989) document, with an average effluent pH of 7.0, an average effluent temperature of 25, and an average salinity of 10-20 g/kg.

Table C6. Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water & Sewer Commission			
Pollutant	Discharge Screening Levels[a]		Most Stringent Screening Level for Worker Protection (mg/L)
	Based on Fume Toxicity (mg/L)	Based on Explosivity (mg/L)	
Acrolein	0.047	13,163	0.047
Acrylonitrile	4.822	14,586	4.822
Benzene	0.014	169	0.014
Bromoform	0.227		0.227
Carbon Tetrachloride	0.011		0.011
Chlorobenzene	2.290	395	2.290
Chloroethane	5.880	222	5.880
Chloroform	0.060		0.060
Dichloroethane, 1,1-	1.685	909	1.685
Dichloroethane, 1,2-	0.168	5,221	0.168
Dichloroethylene, 1,1-	0.016	215	0.016
Dichloroethylene, trans-1,2-	2.040	571	2.040
Dichloropropane, 1,2-	4.289	1,326	4.289
Ethylbenzene	1.659	106	1.659
Hydrogen Cyanide	1.149	13,529	1.149
Hydrogen Sulfide	0.034	96	0.034
Methyl Bromide (Bromomethane)	0.305	1,521	0.305
Methyl Chloride (Chloromethane)	0.557	450	0.557
Methylene chloride	4.139	4,307	4.139
Tetrachloroethane, 1,1,2,2-	1.847		1.847
Toluene	2.075	152	2.075
Trichloroethane, 1,1,1-	2.759	591	2.759
Trichloroethane, 1,1,2-	1.601	9,611	1.601
Trichloroethylene	0.026	1,029	0.026
Vinyl Chloride	0.012	88	0.012

[a] Source: EPA Guidance Manual - Local Limits Development Guidance, Appendix I.

Table C7. Secondary Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water & Sewer Commission			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Acrylonitrile	1.19	1794	1.19
Aldrin	0.38		0.38
Aroclor 1242	0.01		0.01
Aroclor 1254	0.005		0.005
Benzene	0.13	20	0.13
Bis(2-chloromethyl)Ether	0.0005		0.0005
Bromoform	0.24		0.24
Carbon Disulfide	0.06	6.3	0.06
Carbon Tetrachloride	0.03		0.03
Chlordane	1.27		1.27
Chlorobenzene	2.31	40	2.31
Chloroethane	0.42	1.6	0.42
Chloroform	0.41		0.41
Dichlorobenzene, 1,2-	3.75	165	3.75
Dichlorobenzene, 1,4-	3.55	104	3.55
Dichlorodifluoromethane	0.04		0.04
Dichloroethane, 1,1-	4.58	128	4.58
Dichloroethane, 1,2-	1.05	660	1.05
Dichloroethylene, 1,1-	0.003	3.3	0.003
Dichloroethylene, trans-1,2-	0.28	14	0.28
Dichloropropane, 1,2-	3.62	164	3.62
Dichloropropylene, 1,3-	0.08	435	0.08
Dieldrin	13		13
Diethyl phthalate	107		107
Dinitro-o-cresol, 4,6-	10.78		10.78
Dinitrotoluene, 2,4-	7.21		7.21
Endrin	4.9		4.9
Ethylbenzene	1.59	16	1.59
Formaldehyde	0.06	412	0.06
Heptachlor	0.003		0.003
Hexachlorobutadiene	0.0002		0.0002
Hexachlorocyclopentadiene	658		658
Hexachloroethane	0.093		0.093
Methyl Bromide (Bromomethane)	0.002	4.7	0.002
Methyl Chloride (Chloromethane)	0.06	1.1	0.06
Methyl ethyl ketone	249	2486	249
Methylene chloride	2.06	494	2.06
Napthalene	2.65	240	2.65

Table C7. Secondary Screening Levels for WWTP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water & Sewer Commission			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Nitrobenzene	9.41	17046	9.41
Pentachlorophenol	4.37		4.37
Phenol	1,024		1,024
Tetrachloroethane, 1,1,2,2-	0.44		0.44
Tetrachloroethylene	0.53		0.53
Toluene	1.36	17	1.36
Toxaphene	0.003		0.003
Trichlorobenzene, 1,2,4-	0.39	197	0.39
Trichloroethane, 1,1,1-	1.55	33	1.55
Trichloroethane, 1,1,2-	1.15		1.15
Trichloroethylene	0.71	114	0.71
Trichlorofluoromethane	1.23		1.23
Vinyl Chloride	0.0003	2.2	0.0003

[a] Gas/Vapor Toxicity Screening Levels from Tables 4-2 and/or B-1 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

[b] Explosivity Screening Levels from Table 4-2 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

Appendix D: Maximum Allowable Headworks Loadings Analysis for the Academy Creek WPCP

Summary of MAHLs, MAILs, and Local Limits for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	Maximum Allowable Headworks Loading (lbs/day)	Industrial Loadings			Calculated Limits (mg/L)	Local Limit Needed?	2014Local Limits (mg/L)	DRAFT Technical Basis
		Maximum Allowable Industrial Loading (lbs/day)	Current Permitted Industrial Loading (lbs/day)	Industrial Loading in Reserve (lbs/day)				
Conventional Pollutants								
Ammonia (Current)	4,183	3,346	33	3,313	363	Yes	37	Design Criteria
Ammonia (July 2023)	242	193	33	160	21	Yes	37	NPDES Permit Limits
Biochemical Oxygen Demand (BOD)	19,368	15,494	2,153	13,341	1,682	Yes	1,000	NPDES Permit Limits
Chemical Oxygen Demand (COD)	54,941	43,953	3,490	40,463	4,770	Yes	2,000	Design Criteria
Phosphorus, Total (as P)	2,776	2,184	351	1,833	237	Yes	6	Design Criteria
Suspended Solids, Total (TSS)	32,307	25,846	554	25,292	2,805	Yes	1,000	Design Criteria
Inorganic Pollutants								
Antimony	552	441	0.003	441	47.9	Yes	22	Chronic State WQS
Arsenic	1.77	1.469	0.019	1.45	0.159	Yes	0.047	Sludge Disposal
Cadmium	1.18	0.929	0.002	0.926	0.101	Yes	0.030	Sludge Disposal
Chromium VI	62.5	50.0	0.052	49.9	5.42	Yes	1.70	Activated Sludge Treatment Inhibition
Chromium, Total	77.0	59.7	0.018	59.7	6.48	Yes	3.37	Chronic State WQS
Copper	13.0	8.77	0.091	8.68	0.952	Yes	0.30	Sludge Disposal
Cyanide	0.862	0.477	0.047	0.430	0.052	Yes	0.110	Acute State WQS
Lead	3.14	2.31	0.012	2.29	0.250	Yes	0.160	Sludge Disposal
Mercury	0.032	0.022	0.000	0.022	0.002	Yes	0.002	Chronic State WQS
Nickel	8.07	6.27	0.419	5.85	0.681	Yes	0.490	Chronic State WQS
Selenium	1.98	1.58	0.005	1.58	0.172	Yes	0.100	Sludge Disposal
Silver	10.3	8.21	0.008	8.20	0.891	Yes	0.300	Acute State WQS
Zinc	25.2	6.97	0.453	6.52	0.757	Yes	0.540	Sludge Disposal
Organic Pollutants								
BHC-Alpha, a-	0.061	0.049	0.00001	0.049	0.005	Yes	0.00017	Chronic State WQS
Lindane (BHC-Delta, d-)	0.138	0.110	0.00007	0.110	0.012	No		
Bis(2-ethylhexyl)Phthalate	4.43	3.33	0.022	3.31	0.362	Yes	0.270	Chronic State WQS
Butylbenzyl Phthalate	3,892	3,114	0.010	3,114	338	Yes	195	Chronic State WQS
Chlorobenzene	3,624	2,899	0.015	2,899	315	Yes	2.29	Worker Protection
Chlorodibromomethane	19.9	15.9	0.009	15.9	1.73	Yes	0.320	Chronic State WQS
Chloroform	405	324	0.058	324	35.2	Yes	0.060	Worker Protection
Dichlorobenzene, 1,4-	312	250	0.015	250	27.1	Yes	3.55	Worker Protection
Dichlorobromomethane	15.6	12.5	0.010	12.5	1.35	Yes	0.250	Chronic State WQS
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	345	276	0.116	276	29.9	Yes	39.6	Chronic State WQS
Diethyl phthalate	107,416	85,933	0.018	85,933	9,326	Yes	107	Worker Protection
Di-n-butyl phthalate	8,983	7,186	0.017	7,186	780	Yes	153	Chronic State WQS
Ethylbenzene	3,053	2,442	0.016	2,442	265	Yes	1.59	Worker Protection
Formaldehyde			0.296		0.30	Yes	0.060	Industry Data
Heptachlor	0.00007	0.0001	0.00003	0.00002	0.00001	No	0.0000027	Chronic State WQS
Methoxychlor	0.026	0.021	0.00004	0.021	0.002	No		
Naphthalene	55,774	44,619	0.021	44,619	4,842	Yes	2.65	Worker Protection
Phenols	345	276	0.481	276	30.0	Yes	20.8	Chronic State WQS
Silvex (2,4,5-TP)	45.3	36.3	0.0007	36.3	3.93	No		
Toluene	12,493	9,995	0.034	9,995	1,085	Yes	2.08	Worker Protection

Table D1. Maximum Allowable Headworks Loading Analysis for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

WPCP Name:	Academy Creek
Date:	8-Feb-21
Average WPCP Flow (mgd):	7.49
Total Actual Industrial Flow (mgd):	1.105
Septic/Hauled Waste Flow (mgd):	0.0048
Domestic/Commercial Flow (mgd):	6.62
Dry Sludge to Disposal (tons/day):	3.64
Dry Sludge to Disposal (lb/day):	7,272
Sludge Percent Solids (%)	92
Specific Gravity of Sludge (kg/L)	NA
NPDES Permit Number:	GA0025313
NPDES Permitted Discharge (mgd):	13.50
Receiving Stream:	Academy Creek
Dilution Factor:	12.80
Effluent Flow with Dilution Factor:	95.84
Stream Classification:	Tidal/Coastal
Safety and Growth Factor (%):	20

Table D2. Local Limits Determination Based on Design Criteria for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Design Criteria (mg/L) (DC)	NPDES Permitted Flow (mgd) (Q_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{DESIGN})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Allowable Industrial Loading (lb/day) (AIL_{DESIGN})	Industrial Local Limit (mg/L) ($C_{LIM-DESIGN}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants														
Ammonia (Current)	1.105	7.490	13.500	0.0048		6.39		37	13.5	4183	0	3346.0	363	20
Ammonia (July 2023)	1.105	7.490	13.500	0.0048		6.39		37	13.5	4183	0	3346.0	363	20
Biochemical Oxygen Demand (BOD)	1.105	7.490	13.500	0.0048		6.39		229	13.5	25823	0	20659	2242	20
Chemical Oxygen Demand (COD)	1.105	7.490	13.500	0.0048	21247.9510	6.39		488	13.5	54941	0	43953	4770	20
Phosphorus, Total (as P)	1.105	7.490	13.500	0.0048		6.39	0.70	25	13.5	2776	37	2184	237	20
Suspended Solids, Total (TSS)	1.105	7.490	13.500	0.0048		6.39		287	13.5	32307	0	25846	2805	20
Inorganic Pollutants														
Antimony	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Arsenic	1.105	7.490	13.500	0.0048	0.1410	6.39	0.002		13.5	-----	0.12	-----	-----	20
Cadmium	1.105	7.490	13.500	0.0048	0.0970	6.39	0.000		13.5	-----	0.01	-----	-----	20
Chromium VI	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Chromium, Total	1.105	7.490	13.500	0.0048	0.4900	6.39	0.034		13.5	-----	1.81	-----	-----	20
Copper	1.105	7.490	13.500	0.0048	4.8350	6.39	0.027		13.5	-----	1.42	-----	-----	20
Cyanide	1.105	7.490	13.500	0.0048	0.4690	6.39	0.004		13.5	-----	0.2	-----	-----	20
Lead	1.105	7.490	13.500	0.0048	1.2100	6.39	0.003		13.5	-----	0.2	-----	-----	20
Mercury	1.105	7.490	13.500	0.0048	0.0050	6.39	0.000		13.5	-----	0.0	-----	-----	20
Nickel	1.105	7.490	13.500	0.0048	0.5260	6.39	0.003		13.5	-----	0.160645	-----	-----	20
Selenium	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Silver	1.105	7.490	13.500	0.0048	0.0990	6.39	0.001		13.5	-----	0.03	-----	-----	20
Zinc	1.105	7.490	13.500	0.0048	9.9710	6.39	0.231		13.5	-----	12.30	-----	-----	20
Organic Pollutants														
BHC-Alpha, a-	1.105	7.490	13.500	0.0048		6.39	0.700		13.5	-----	37.277	-----	-----	20
Lindane (BHC-Delta, d-)	1.105	7.490	13.500	0.0048		6.39	0.7000		13.5	-----	37.277	-----	-----	20
Bis(2-ethylhexyl)Phthalate	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Butylbenzyl Phthalate	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Chlorobenzene	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Chlorodibromomethane	1.105	7.490	13.500	0.0048	0.1410	6.39	0.0022		13.5	-----	0.11626760	-----	-----	20
Chloroform	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Dichlorobenzene, 1,4-	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Dichlorobromomethane	1.105	7.490	13.500	0.0048	0.4900	6.39	0.0340		13.5	-----	1.81057942	-----	-----	20
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	1.105	7.490	13.500	0.0048	0.4690	6.39	0.004		13.5	-----	0.186	-----	-----	20
Diethyl phthalate	1.105	7.490	13.500	0.0048	1.2100	6.39	0.003		13.5	-----	0.156	-----	-----	20
Di-n-butyl phthalate	1.105	7.490	13.500	0.0048	1.2100	6.39	0.0029		13.5	-----	0.156	-----	-----	20
Ethylbenzene	1.105	7.490	13.500	0.0048	0.0050	6.39	0.0001		13.5	-----	0.00376317	-----	-----	20
Formaldehyde	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Heptachlor	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Methoxychlor	1.105	7.490	13.500	0.0048	0.0990	6.39	0.0006		13.5	-----	0.03230642	-----	-----	20
Naphthalene	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Phenols	1.105	7.490	13.500	0.0048		6.39			13.5	-----	0	-----	-----	20
Silvex (2,4,5-TP)	1.105	7.490	13.500	0.0048		6.39	0.0000		13.5	-----	0.00133131	-----	-----	20
Toluene	1.105	7.490	13.500	0.0048	0.1700	6.39			13.5	-----	0	-----	-----	20

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(AIL_{DESIGN})	Allowable industrial loading to the WPCP in lb/day
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	($C_{LIM-DESIGN}$)	Local limits for industrial users in mg/L.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(SGF)	Safety and growth factor as a percent.
(DC)	The pollutant concentration the WPCP was designed to treat in mg/L.	8.34	Unit conversion factor.
(Q_{NPDES})	NPDES permitted flow for the POTW in mgd.		

Table D3. Local Limits Determination Based on Monthly NPDES Permit Levels for Academy Creek WPCP for Discharge to Academy Creek
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Pollutant Loading[a] (mg/L) (PL)	Domestic & Commercial Bkgd Conc.[a,b] (mg/L) (C_{DOM})	Septic/Hauled Waste Conc.[a,c] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WPCP})	NPDES Monthly Limit for Discharge (mg/L) (C_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{NPDES})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{NPDES})	Industrial Local Limit (mg/L) ($C_{LIM-NPDES}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																
Ammonia (Current)	1.105	7.490	13.500	6.385	0.0048	19.3			53.43	17.40	4207	0	0	3365	365	20
Ammonia (July 2023)	1.105	7.490	13.500	6.385	0.0048	19.3			53.43	1.00	242	0	0	193	21	20
Biochemical Oxygen Demand (BOD)	1.105	7.490	13.500	6.385	0.0048	195			95.64	7.50	19368	0	0	15494	1682	20
Chemical Oxygen Demand (COD)	1.105	7.490	13.500	6.385	0.0048	442		21248	85.86		-----	0	850.6	-----	-	20
Phosphorus, Total (as P)	1.105	7.490	13.500	6.385	0.0048	11.11	0.7		61.07		-----	37.3	0	-----	-	20
Suspended Solids, Total (TSS)	1.105	7.490	13.500	6.385	0.0048	201			93.03	20	32307	0	0	25846	2805	20
Inorganic Pollutants																
Antimony	1.105	7.490	13.500	6.385	0.0048	0.0008			7.02		-----	0	0	-----	-	20
Arsenic	1.105	7.490	13.500	6.385	0.0048	0.0022	0.0022	0.1410	16.8		-----	0.12	0.00564	-----	-	20
Cadmium	1.105	7.490	13.500	6.385	0.0048	0.00022	0.0002	0.0970	24		-----	0.01	0.00388	-----	-	20
Chromium VI	1.105	7.490	13.500	6.385	0.0048	0.0097			66.55		-----	0	0	-----	-	20
Chromium, Total	1.105	7.490	13.500	6.385	0.0048	0.0032	0.0340	0.4900	43.68		-----	1.81	0.01962	-----	-	20
Copper	1.105	7.490	13.500	6.385	0.0048	0.0267	0.0267	4.8350	83.5		-----	1.42	0.19355	-----	-	20
Cyanide	1.105	7.490	13.500	6.385	0.0048	0.0035	0.0035	0.4690	0		-----	0.19	0.01878	-----	-	20
Lead	1.105	7.490	13.500	6.385	0.0048	0.003	0.0029	1.2100	69.3		-----	0.16	0.04844	-----	-	20
Mercury	1.105	7.490	13.500	6.385	0.0048	0.00007	0.0001	0.0050	21.96		-----	0.00	0.00020	-----	-	20
Nickel	1.105	7.490	13.500	6.385	0.0048	0.00302	0.0030	0.5260	11.6		-----	0.16	0.02106	-----	-	20
Selenium	1.105	7.490	13.500	6.385	0.0048	0.00163			36.73		-----	0	0	-----	-	20
Silver	1.105	7.490	13.500	6.385	0.0048	0.0006	0.0006	0.0990	81.32		-----	0.03	0.00396	-----	-	20
Zinc	1.105	7.490	13.500	6.385	0.0048	0.12533	0.2310	9.9710	80.85		-----	12.301	0.39916	-----	-	20
Organic Pollutants																
BHC-Alpha, a-	1.105	7.490	13.500	6.385	0.0048	0.00004			93.06		-----	0	0	-----	-	20
Lindane (BHC-Delta, d-)	1.105	7.490	13.500	6.385	0.0048	*0.00001*			0		-----	0	0	-----	-	20
Bis(2-ethylhexyl)Phthalate	1.105	7.490	13.500	6.385	0.0048	0.00378	0.00378		57.2		-----	0.201	0	-----	-	20
Butylbenzyl Phthalate	1.105	7.490	13.500	6.385	0.0048	0.00290			57.93		-----	0	0	-----	-	20
Chlorobenzene	1.105	7.490	13.500	6.385	0.0048	0.00068			61.95		-----	0	0	-----	-	20
Chlorodibromomethane	1.105	7.490	13.500	6.385	0.0048	*0.00080*			43.75		-----	0	0	-----	-	20
Chloroform	1.105	7.490	13.500	6.385	0.0048	0.00183	0.00183		0		-----	0.10	0	-----	-	20
Dichlorobenzene, 1,4-	1.105	7.490	13.500	6.385	0.0048	0.00187			69.01		-----	0	0	-----	-	20
Dichlorobromomethane	1.105	7.490	13.500	6.385	0.0048	*0.00110*			6.1		-----	0	0	-----	-	20
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	1.105	7.490	13.500	6.385	0.0048	0.00143			82.5		-----	0	0	-----	-	20
Diethyl phthalate	1.105	7.490	13.500	6.385	0.0048	0.00244			64.7		-----	0	0	-----	-	20
Di-n-butyl phthalate	1.105	7.490	13.500	6.385	0.0048	0.00204			56.83		-----	0	0	-----	-	20
Ethylbenzene	1.105	7.490	13.500	6.385	0.0048	0.00056		0.0670	40.72		-----	0	0.00268	-----	-	20
Formaldehyde	1.105	7.490	13.500	6.385	0.0048	0.02500			24		-----	0	0	-----	-	20
Heptachlor	1.105	7.490	13.500	6.385	0.0048	0.00001			0		-----	0	0	-----	-	20
Methoxychlor	1.105	7.490	13.500	6.385	0.0048	0.00001			0		-----	0	0	-----	-	20
Naphthalene	1.105	7.490	13.500	6.385	0.0048	0.00170			58.8		-----	0	0	-----	-	20
Phenols	1.105	7.490	13.500	6.385	0.0048	0.00478	0.000025		25.16		-----	0.00	0	-----	-	20
Silvex (2,4,5-TP)	1.105	7.490	13.500	6.385	0.0048	0.00006			4.91		-----	0	0	-----	-	20
Toluene	1.105	7.490	13.500	6.385	0.0048	0.00185		0.1700	74.01		-----	0	0.00681	-----	-	20

[a] Pollutant concentrations in italics are non-detect (reported as the method detection limit). Values in red are literature values.

[b] If the domestic and commercial background concentration was greater than the pollutant loading, the pollutant loading was used as the domestic and commercial background concentration. If the domestic and commercial background concentration was greater than a non-detect pollutant loading, the domestic and commercial background concentration was assumed to be negligible.

[c] Values in red are literature values from Appendix B from the USEPA Local Limits Development Guidance Document Appendices.

(Q_{IND})	Industrial flow in mgd.	(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{NPDES})	NPDES monthly average permit limit for a particular pollutant in mg/L.	8.34	Unit conversion factor.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{NPDES})	Allowable headworks pollutant loading to the WPCP in lb/day.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.		
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.		
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{NPDES})	Allowable industrial loading to the WPCP in lb/day.		
(PL)	Pollutant concentration in influent in mg/L.	($C_{LIM-NPDES}$)	Local limits for industrial users in mg/L.		

Table D4. Local Limits Determination Based on Activated Sludge Inhibition Threshold Levels for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{PRIM})	A.S. Inhibition Level (mg/L) (C_{INHIB1})	Allowable Headworks Loading (lb/day) (AHL_{SEC1})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC1})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC1}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia (Current)	1.105	7.490	13.500	6.620		0.0048			480	29984	0	0	23987	2603	20
Ammonia (July 2023)	1.105	7.490	13.500	6.620		0.0048			480	29984	0	0	23987	2603	20
Biochemical Oxygen Demand (BOD)	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Chemical Oxygen Demand (COD)	1.105	7.490	13.500	6.620		0.0048	21247.95			-----	0	850.59797	-----	-----	20
Phosphorus, Total (as P)	1.105	7.490	13.500	6.620	0.700	0.0048				-----	39	0	-----	-----	20
Suspended Solids, Total (TSS)	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Inorganic Pollutants															
Antimony	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Arsenic	1.105	7.490	13.500	6.620	0.0022	0.0048	0.14		0.1	6	0.12	0.00564	4.9	0.53	20
Cadmium	1.105	7.490	13.500	6.620	0.0002	0.0048	0.10	15	5.5	404	0.012	0.00388	323	35.09	20
Chromium VI	1.105	7.490	13.500	6.620		0.0048			1.0	62	0	0	50	5.4	20
Chromium, Total	1.105	7.490	13.500	6.620	0.034	0.0048	0.49	27	50.5	4321	1.877	0.01962	3455	374.98	20
Copper	1.105	7.490	13.500	6.620	0.0267	0.0048	4.84	22	1	80	1.47	0.19355	62	6.77	20
Cyanide	1.105	7.490	13.500	6.620	0.0035	0.0048	0.47	27	2.55	218	0.2	0.01878	174	18.92	20
Lead	1.105	7.490	13.500	6.620	0.0029	0.0048	1.21	57	2.55	370	0.2	0.04844	296.14	32.14	20
Mercury	1.105	7.490	13.500	6.620	0.0001	0.0048	0.01	10	0.55	38	0.0	0.00020	30.54	3.31	20
Nickel	1.105	7.490	13.500	6.620	0.00302	0.0048	0.53	14	1.75	127	0.166562	0.02106	101.5	11.02	20
Selenium	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Silver	1.105	7.490	13.500	6.620	0.0006	0.0048	0.10	20	2.625	205	0.03	0.00396	164	17.79	20
Zinc	1.105	7.490	13.500	6.620	0.231	0.0048	9.97	27	2.9	248	12.75	0.399	185.37	20.12	20
Organic Pollutants															
BHC-Alpha, a-	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Lindane (BHC-Delta, d-)	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Bis(2-ethylhexyl)Phthalate	1.105	7.490	13.500	6.620	0.0038	0.0048				-----	0.209	0	-----	-----	20
Butylbenzyl Phthalate	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Chlorobenzene	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Chlorodibromomethane	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Chloroform	1.105	7.490	13.500	6.620	0.0018	0.0048		14		-----	0.10	0	-----	-----	20
Dichlorobenzene, 1,4-	1.105	7.490	13.500	6.620		0.0048			5	312	0	0	250	27	20
Dichlorobromomethane	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Diethyl phthalate	1.105	7.490	13.500	6.620		0.0048		56		-----	0	0	-----	-----	20
Di-n-butyl phthalate	1.105	7.490	13.500	6.620		0.0048		36		-----	0	0	-----	-----	20
Ethylbenzene	1.105	7.490	13.500	6.620		0.0048	0.07	13	200	14360	0	0.00268	11488	1247	20
Formaldehyde	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Heptachlor	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Methoxychlor	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Naphthalene	1.105	7.490	13.500	6.620		0.0048		44	500	55774	0	0	44619	4842	20
Phenols	1.105	7.490	13.500	6.620	0.0000	0.0048		8	125	8487	0.00	0	6790	737	20
Silvex (2,4,5-TP)	1.105	7.490	13.500	6.620		0.0048				-----	0	0	-----	-----	20
Toluene	1.105	7.490	13.500	6.620		0.0048	0.17		200	12493	0	0.00681	9995	1085	20

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor

Table D6. Local Limits Determination Based on Sludge Disposal for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Dry Sludge to Disposal (lbs/day) (Q_{SLUDGE})	Removal Efficiency[a] (%) (R_{WPCP})	Sludge Criteria (mg/kg) (C_{SLUDGE})	Allowable Headworks Loading (lbs/day) (AHL_{SLUDGE})	Domestic & Commercial Loading (lbs/day) (L_{UNC})	Septic/Hauled Waste Loading (lbs/day) (L_{HW})	Allowable Industrial Loading (lbs/day) (AIL_{SLUDGE})	Industrial Local Limit (mg/L) ($C_{LIM-SLUDGE}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia (Current)	1.105	7.490	6.620		0.0048		7,272	53.43		-----	0	0	-----	-----	20
Ammonia (July 2023)	1.105	7.490	6.620		0.0048		7,272	53.43		-----	0	0	-----	-----	20
Biochemical Oxygen Demand (BOD)	1.105	7.490	6.620		0.0048		7,272	95.64		-----	0	0	-----	-----	20
Chemical Oxygen Demand (COD)	1.105	7.490	6.620		0.0048	21247.95	7,272	85.86		-----	0	850.59797	-----	-----	20
Phosphorus, Total (as P)	1.105	7.490	6.620	0.700	0.0048		7,272	61.07		-----	39	0	-----	-----	20
Suspended Solids, Total (TSS)	1.105	7.490	6.620		0.0048		7,272	93.03		-----	0	0	-----	-----	20
Inorganic Pollutants															
Antimony	1.105	7.490	6.620		0.0048		7,272	7.02		-----	0	0	-----	-----	20
Arsenic	1.105	7.490	6.620	0.0022	0.0048	0.14	7,272	16.8	41	1.773	0.12	0.00564	1.47	0.159	10
Cadmium	1.105	7.490	6.620	0.0002	0.0048	0.10	7,272	24	39	1.180	0.01	0.00388	0.93	0.10	20
Chromium VI	1.105	7.490	6.620		0.0048		7,272	66.55		-----	0	0	-----	-----	20
Chromium, Total	1.105	7.490	6.620	0.034	0.0048	0.49	7,272	43.68		-----	1.88	0.01962	-----	-----	20
Copper	1.105	7.490	6.620	0.0267	0.0048	4.84	7,272	83.5	1500	13.05	1.47	0.19355	8.77	0.95	20
Cyanide	1.105	7.490	6.620	0.0035	0.0048	0.47	7,272	0		-----	0.2	0.01878	-----	-----	20
Lead	1.105	7.490	6.620	0.0029	0.0048	1.21	7,272	69.3	300	3.14	0.2	0.04844	2.31	0.25	20
Mercury	1.105	7.490	6.620	0.0001	0.0048	0.01	7,272	21.96	17	0.56	0.0	0.00020	0.45	0.05	20
Nickel	1.105	7.490	6.620	0.00302	0.0048	0.53	7,272	11.6	420	26.300	0.166562	0.02106	20.85	2.26	20
Selenium	1.105	7.490	6.620		0.0048		7,272	36.73	100	1.98	0	0	1.58	0.17	20
Silver	1.105	7.490	6.620	0.0006	0.0048	0.10	7,272	81.32		-----	0.03	0.00396	-----	-----	20
Zinc	1.105	7.490	6.620	0.231	0.0048	9.97	7,272	80.85	2800	25.156	12.75	0.399	6.97	0.76	20
Organic Pollutants															
BHC-Alpha, a-	1.105	7.490	6.620		0.0048		7,272	93.06		-----	0	0	-----	-----	20
Lindane (BHC-Delta, d-)	1.105	7.490	6.620		0.0048		7,272	0		-----	0	0	-----	-----	20
Bis(2-ethylhexyl)Phthalate	1.105	7.490	6.620	0.0038	0.0048		7,272	57.2		-----	0.21	0	-----	-----	20
Butylbenzyl Phthalate	1.105	7.490	6.620		0.0048		7,272	57.93		-----	0	0	-----	-----	20
Chlorobenzene	1.105	7.490	6.620		0.0048		7,272	61.95		-----	0	0	-----	-----	20
Chlorodibromomethane	1.105	7.490	6.620		0.0048		7,272	43.75		-----	0	0	-----	-----	20
Chloroform	1.105	7.490	6.620	0.0018	0.0048		7,272	0		-----	0.10	0	-----	-----	20
Dichlorobenzene, 1,4-	1.105	7.490	6.620		0.0048		7,272	69.01		-----	0	0	-----	-----	20
Dichlorobromomethane	1.105	7.490	6.620		0.0048		7,272	6.1		-----	0	0	-----	-----	20
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	1.105	7.490	6.620		0.0048		7,272	82.5		-----	0	0	-----	-----	20
Diethyl phthalate	1.105	7.490	6.620		0.0048		7,272	64.7		-----	0	0	-----	-----	20
Di-n-butyl phthalate	1.105	7.490	6.620		0.0048		7,272	56.83		-----	0	0	-----	-----	20
Ethylbenzene	1.105	7.490	6.620		0.0048	0.07	7,272	40.72		-----	0	0.00268	-----	-----	20
Formaldehyde	1.105	7.490	6.620		0.0048		7,272	24		-----	0	0	-----	-----	20
Heptachlor	1.105	7.490	6.620		0.0048		7,272	0		-----	0	0	-----	-----	20
Methoxychlor	1.105	7.490	6.620		0.0048		7,272	0		-----	0	0	-----	-----	20
Naphthalene	1.105	7.490	6.620		0.0048		7,272	58.8		-----	0	0	-----	-----	20
Phenols	1.105	7.490	6.620	0.0000	0.0048		7,272	25.16		-----	0.00	0	-----	-----	20
Silvex (2,4,5-TP)	1.105	7.490	6.620		0.0048		7,272	4.91		-----	0	0	-----	-----	20
Toluene	1.105	7.490	6.620		0.0048	0.17	7,272	74.01		-----	0	0.00681	-----	-----	20

[a] Polluant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lbs/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lbs/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lbs/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lbs/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM-SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in r	8.34	Unit conversion factor

Table D6. Local Limits Determination Based on Acute State Water Quality Standards for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WPCP})	Tidal Flow (mgd) (Q_{ASTR})	Upstream Conc. (mg/L) (C_{STR})	Acute State WQS[a] (mg/L) (CA_{WQS})	Allowable Headworks (lb/day) ($AHLA_{WQS}$)	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) ($AILA_{WQS}$)	Industrial Local Limit (mg/L) ($C_{LIM-AWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia (Current)	1.105	7.490	13.500	6.620		0.0048		53	96		44	81421.47	0	0	65137.173	7069.1672	20
Ammonia (July 2023)	1.105	7.490	13.500	6.620		0.0048		53	96		44	81421.47	0	0	65137.173	7069.1672	20
Biochemical Oxygen Demand (BOD)	1.105	7.490	13.500	6.620		0.0048		95.64	96			-----	0	0	-----	-----	20
Chemical Oxygen Demand (COD)	1.105	7.490	13.500	6.620		0.0048	21247.95	85.86	96			-----	0	850.59797	-----	-----	20
Phosphorus, Total (as P)	1.105	7.490	13.500	6.620	0.700	0.0048		61.07	96			-----	39	0	-----	-----	20
Suspended Solids, Total (TSS)	1.105	7.490	13.500	6.620		0.0048		93.03	96			-----	0	0	-----	-----	20
Inorganic Pollutants																	
Antimony	1.105	7.490	13.500	6.620		0.0048			96			-----	0	0	-----	-----	20
Arsenic	1.105	7.490	13.500	6.620	0.0022	0.0048	0.14	16.8	96		0.069	71	0.12	0.00564	57	6	20
Cadmium	1.105	7.490	13.500	6.620	0.0002	0.0048	0.10	24	96		0.033	37.64	0.01	0.00388	30.10	3.267	20
Chromium VI	1.105	7.490	13.500	6.620		0.0048		66.55	96		1.108	2854	0	0	2283	248	20
Chromium, Total	1.105	7.490	13.500	6.620	0.034	0.0048	0.49	43.68	96		1.11	1695.01	1.88	0.01962	1354.11	146.958	20
Copper	1.105	7.490	13.500	6.620	0.0267	0.0048	4.84	83.5	96		0.006	30.20	1.47	0.19355	22.50	2.44	20
Cyanide	1.105	7.490	13.500	6.620	0.0035	0.0048	0.47	0	96		0.001	0.86	0.19	0.01878	0.48	0.05	20
Lead	1.105	7.490	13.500	6.620	0.003	0.0048	1.21	69.3	96		0.147	413.24	0.16	0.04844	330.381	35.86	20
Mercury	1.105	7.490	13.500	6.620	0.000	0.0048	0.01	21.96	96		0.002	2.3	0.00	0.00020	1.9	0.20	20
Nickel	1.105	7.490	13.500	6.620	0.00302	0.0048	0.53	11.6	96		0.075	72.9	0.17	0.02106	58.1	6.31	20
Selenium	1.105	7.490	13.500	6.620		0.0048		36.73	96		0.291	395.7875	0	0	316.6300	34.3630	20
Silver	1.105	7.490	13.500	6.620	0.0006	0.0048	0.10	81.32	96		0.002	10	0.03	0.00396	8	1	20
Zinc	1.105	7.490	13.500	6.620	0.231	0.0048	9.97	80.85	96		0.095	428.129	12.75	0.39916	329	36	20
Organic Pollutants																	
BHC-Alpha, a-	1.105	7.490	13.500	6.620		0.0048		93.06	96			-----	0	0	-----	-----	20
Lindane (BHC-Delta, d-)	1.105	7.490	13.500	6.620		0.0048		0	96		0.00016	0	0	0	0	0	20
Bis(2-ethylhexyl)Phthalate	1.105	7.490	13.500	6.620	0.0038	0.0048		57.2	96			-----	0.21	0	-----	-----	20
Butylbenzyl Phthalate	1.105	7.490	13.500	6.620		0.0048		57.93	96			-----	0	0	-----	-----	20
Chlorobenzene	1.105	7.490	13.500	6.620		0.0048		61.95	96			-----	0	0	-----	-----	20
Chlorodibromomethane	1.105	7.490	13.500	6.620		0.0048		43.75	96			-----	0	0	-----	-----	20
Chloroform	1.105	7.490	13.500	6.620	0.0018	0.0048		0	96			-----	0.10	0	-----	-----	20
Dichlorobenzene, 1,4-	1.105	7.490	13.500	6.620		0.0048		69.01	96			-----	0	0	-----	-----	20
Dichlorobromomethane	1.105	7.490	13.500	6.620		0.0048		6.1	96			-----	0	0	-----	-----	20
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	1.105	7.490	13.500	6.620		0.0048		82.5	96			-----	0	0	-----	-----	20
Diethyl phthalate	1.105	7.490	13.500	6.620		0.0048		64.7	96			-----	0	0	-----	-----	20
Di-n-butyl phthalate	1.105	7.490	13.500	6.620		0.0048		56.83	96			-----	0	0	-----	-----	20
Ethylbenzene	1.105	7.490	13.500	6.620		0.0048	0.07	40.72	96			-----	0	0.00268	-----	-----	20
Formaldehyde	1.105	7.490	13.500	6.620		0.0048		24	96			-----	0	0	-----	-----	20
Heptachlor	1.105	7.490	13.500	6.620		0.0048		0	96		0.00005	0	0	0	0	0	20
Methoxychlor	1.105	7.490	13.500	6.620		0.0048		0	96			-----	0	0	-----	-----	20
Naphthalene	1.105	7.490	13.500	6.620		0.0048		58.8	96			-----	0	0	-----	-----	20
Phenols	1.105	7.490	13.500	6.620	0.0000	0.0048		25.16	96			-----	0.00	0	-----	-----	20
Silvex (2,4,5-TP)	1.105	7.490	13.500	6.620		0.0048		4.91	96			-----	0	0	-----	-----	20
Toluene	1.105	7.490	13.500	6.620		0.0048	0.17	74.01	96			-----	0	0.00681	-----	-----	20

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WPCP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WPCP's average flow.	($C_{LIM-WQS}$)	Local limits for industrial users in mg/L.
(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D7. Local Limits Determination Based on Chronic State Water Quality Standards for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{POTW})	Stream Flow (mgd) (Q_{CSTR})	Upstream Conc. (mg/L) (C_{STR})	Chronic State WQS[a] (mg/L) (C_{CWQS})	Allowable Headworks (lb/day) (AHL_{CWQS})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{CWQS})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}CWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia (Current)	1.105	7.490	13.500	6.620		0.0048		53	96	0	6.60	12213.22	0	0	9770.576	1060.3751	20
Ammonia (July 2023)	1.105	7.490	13.500	6.620		0.0048		53	96	0	6.60	12213.22	0	0	9770.576	1060.3751	20
Biochemical Oxygen Demand (BOD)	1.105	7.490	13.500	6.620		0.0048		95.64	96	0		-----	0	0	-----	-----	20
Chemical Oxygen Demand (COD)	1.105	7.490	13.500	6.620		0.0048	21247.95	85.86	96	0		-----	0	850.59797	-----	-----	20
Phosphorus, Total (as P)	1.105	7.490	13.500	6.620	0.700	0.0048		61.07	96	0		-----	39	0	-----	-----	20
Suspended Solids, Total (TSS)	1.105	7.490	13.500	6.620		0.0048		93.03	96	0		-----	0	0	-----	-----	20
Inorganic Pollutants																	
Antimony	1.105	7.490	13.500	6.620		0.0048			96	0	0.6400	552	0	0	441	47.89	20
Arsenic	1.105	7.490	13.500	6.620	0.0022	0.0048	0.14	16.8	96	0	0.0360	37.29	0.12	0.00564	29.704	3.22	20
Cadmium	1.105	7.490	13.500	6.620	0.0002	0.0048	0.10	24	96	0	0.0079	9.012	0.0119	0.00388	7.194	0.78	20
Chromium VI	1.105	7.490	13.500	6.620		0.0048		66.55	96	0	0.0504	130	0	0	103.778	11.2628	20
Chromium, Total	1.105	7.490	13.500	6.620	0.034	0.0048	0.49	43.68	96	0	0.0504	77.05	1.88	0.01962	59.74	6.48	20
Copper	1.105	7.490	13.500	6.620	0.0267	0.0048	4.84	83.5	96	0	0.0037	19.51	1.47	0.19355	13.94	1.51	20
Cyanide	1.105	7.490	13.500	6.620	0.0035	0.0048	0.47	0	96	0	0.0010	0.862	0.2	0.01878	0.48	0.0518	20
Lead	1.105	7.490	13.500	6.620	0.003	0.0048	1.21	69.3	96	0	0.0059	16.5	0.2	0.04844	13.013	1.412	20
Mercury	1.105	7.490	13.500	6.620	0.000	0.0048	0.01	21.96	96	0	0.000029	0.0325	0.0	0.00020	0.02	0.00	20
Nickel	1.105	7.490	13.500	6.620	0.00302	0.0048	0.53	11.6	96	0	0.0083	8.075	0.17	0.02106	6.2720	0.6807	20
Selenium	1.105	7.490	13.500	6.620		0.0048		36.73	96	0	0.0711	96.8997	0	0	77.5198	8.4130	20
Silver	1.105	7.490	13.500	6.620	0.0006	0.0048	0.10	81.32	96	0	0.0022	10.312	0.03	0.00396	8.212	0.89	20
Zinc	1.105	7.490	13.500	6.620	0.231	0.0048	9.97	80.85	96	0	0.0856	385.316	12.75	0.39916	295.10	32.026	20
Organic Pollutants																	
BHC-Alpha, a-	1.105	7.490	13.500	6.620		0.0048		93.06	96	0	0.0000049	0	0	0	0	0.01	20
Lindane (BHC-Delta, d-)	1.105	7.490	13.500	6.620		0.0048		0	96	0	0.0002	0	0	0	0	0.01	20
Bis(2-ethylhexyl)Phthalate	1.105	7.490	13.500	6.620	0.0038	0.0048		57.2	96	0	0.0022	4	0.209	0	3	0.36	20
Butylbenzyl Phthalate	1.105	7.490	13.500	6.620		0.0048		57.93	96	0	1.9000	3892	0	0	3114	337.91	20
Chlorobenzene	1.105	7.490	13.500	6.620		0.0048		61.95	96	0	1.6000	3624	0	0	2899	314.62	20
Chlorodibromomethane	1.105	7.490	13.500	6.620		0.0048		43.75	96	0	0.0130	20	0	0	16	1.73	20
Chloroform	1.105	7.490	13.500	6.620	0.0018	0.0048		0	96	0	0.4700	405	0.10	0	324	35.15	20
Dichlorobenzene, 1,4-	1.105	7.490	13.500	6.620		0.0048		69.01	96	0	0.1900	528	0	0	423	45.87	20
Dichlorobromomethane	1.105	7.490	13.500	6.620		0.0048		6.1	96	0	0.0170	16	0	0	12	1.35	20
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	1.105	7.490	13.500	6.620		0.0048		82.5	96	0	0.0700	345	0	0	276	29.93	20
Diethyl phthalate	1.105	7.490	13.500	6.620		0.0048		64.7	96	0	44.0	107416	0	0	85933	9326.09	20
Di-n-butyl phthalate	1.105	7.490	13.500	6.620		0.0048		56.83	96	0	4.5000	8983	0	0	7186	779.92	20
Ethylbenzene	1.105	7.490	13.500	6.620		0.0048	0.07	40.72	96	0	2.1000	3053	0	0.00268	2442	265.05	20
Formaldehyde	1.105	7.490	13.500	6.620		0.0048		24	96	0		-----	0	0	-----	-----	20
Heptachlor	1.105	7.490	13.500	6.620		0.0048		0	96	0	0.00000008	0	0	0	0	0.00	20
Methoxychlor	1.105	7.490	13.500	6.620		0.0048		0	96	0	0.00003	0	0	0	0	0.00	20
Naphthalene	1.105	7.490	13.500	6.620		0.0048		58.8	96	0		-----	0	0	-----	-----	20
Phenols	1.105	7.490	13.500	6.620	0.0000	0.0048		25.16	96	0	0.3000	345	0.00	0	276	29.99	20
Silvex (2,4,5-TP)	1.105	7.490	13.500	6.620		0.0048		4.91	96	0	0.0500	45	0	0	36	3.93	20
Toluene	1.105	7.490	13.500	6.620		0.0048	0.17	74.01	96	0	5.9800	19828	0	0.00681	15863	1721.54	20

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WPCP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WPCP's average flow.	($C_{LIM\text{-}WQS}$)	Local limits for industrial users in mg/L.
(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D8. Summary of Allowable Headworks Loadings (AHLs) for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	Allowable Headworks Loadings (lb/day)					
	Design Criteria (AHL_{Dc})	NPDES Discharge Permit Limits (AHL_{NPDES})	Activated Sludge Treatment Inhibition (AHL_{SEC1})	Sludge Disposal (AHL_{SLUDGE})	Acute Water Quality Standards (AHL_{AWQS})	Chronic Water Quality Standards (AHL_{CWQS})
Conventional Pollutants						
Ammonia (Current)	4,183	4,207	29,984	-----	81,421	12,213
Ammonia (July 2023)	4,183	242	29,984	-----	81,421	12,213
Biochemical Oxygen Demand (BOD)	25,823	19,368	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	54,941.4	-----	-----	-----	-----	-----
Phosphorus, Total (as P)	2,776.4	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	32,307	32,307	-----	-----	-----	-----
Inorganic Pollutants						
Antimony	-----	-----	-----	-----	-----	552
Arsenic	-----	-----	6.25	1.77	71.5	37.3
Cadmium	-----	-----	404	1.18	37.6	9.01
Chromium VI	-----	-----	62.5	-----	2,854	130
Chromium, Total	-----	-----	4321	-----	1,695	77.0
Copper	-----	-----	80.1	13.0	30.2	19.5
Cyanide	-----	-----	218	-----	0.862	0.862
Lead	-----	-----	370	3.14	413	16.5
Mercury	-----	-----	38.2	0.562	2.34	0.032
Nickel	-----	-----	127	26.3	72.9	8.07
Selenium	-----	-----	-----	1.98	396	96.9
Silver	-----	-----	205	-----	10.3	10.3
Zinc	-----	-----	248	25.2	428	385
Organic Pollutants						
BHC-Alpha, a-	-----	-----	-----	-----	-----	0.061
Lindane (BHC-Delta, d-)	-----	-----	-----	-----	0.138	0.138
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	4.43
Butylbenzyl Phthalate	-----	-----	-----	-----	-----	3892
Chlorobenzene	-----	-----	-----	-----	-----	3624
Chlorodibromomethane	-----	-----	-----	-----	-----	19.9
Chloroform	-----	-----	-----	-----	-----	405
Dichlorobenzene, 1,4-	-----	-----	312	-----	-----	528
Dichlorobromomethane	-----	-----	-----	-----	-----	15.6
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	-----	-----	-----	-----	-----	345
Diethyl phthalate	-----	-----	-----	-----	-----	107416
Di-n-butyl phthalate	-----	-----	-----	-----	-----	8983
Ethylbenzene	-----	-----	14,360	-----	-----	3053
Formaldehyde	-----	-----	-----	-----	-----	-----
Heptachlor	-----	-----	-----	-----	0.046	0.00007
Methoxychlor	-----	-----	-----	-----	-----	0.026
Naphthalene	-----	-----	55,774	-----	-----	-----
Phenols	-----	-----	8,487	-----	-----	345
Silvex (2,4,5-TP)	-----	-----	-----	-----	-----	45.3
Toluene	-----	-----	12,493	-----	-----	19828

Table D9. Summary of Allowable Industrial Loadings (AILs) for Academy Creek WPCP Industrial Pretreatment Program: Local Limits Evaluation Brunswick-Glynn County Joint Water and Sewer Commission						
Pollutant	Allowable Industrial Loadings (lb/day)					
	Design Criteria	NPDES Discharge Permit Limits	Activated Sludge Treatment Inhibition	Sludge Disposal	Acute Water Quality Standards	Chronic Water Quality Standards
	(AIL_{DC})	(AIL_{NPDES})	(AIL_{SEC1})	(AIL_{SLUDGE})	(AHL_{AWQS})	(AHL_{CWQS})
Conventional Pollutants						
Ammonia (Current)	3,346	3,365	23,987	-----	65,137	9,771
Ammonia (July 2023)	3,346	193	23,987	-----	65,137	9,771
Biochemical Oxygen Demand (BOD)	20,659	15,494	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	43,953	-----	-----	-----	-----	-----
Phosphorus, Total (as P)	2,184	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	25,846	25,846	-----	-----	-----	-----
Inorganic Pollutants						
Antimony	-----	-----	-----	-----	-----	441
Arsenic	-----	-----	4.87	1.47	57.0	29.7
Cadmium	-----	-----	323	0.929	30.1	7.19
Chromium VI	-----	-----	50.0	-----	2,283	104
Chromium, Total	-----	-----	3455	-----	1354	59.7
Copper	-----	-----	62.4	8.77	22.50	13.9
Cyanide	-----	-----	174	-----	0.477	0.477
Lead	-----	-----	296	2.31	330	13.0
Mercury	-----	-----	30.5	0.446	1.87	0.022
Nickel	-----	-----	102	20.9	58.1	6.272
Selenium	-----	-----	-----	1.58	317	77.5
Silver	-----	-----	164	-----	8.21	8.21
Zinc	-----	-----	185	6.97	329	295
Organic Pollutants						
BHC-Alpha, a-	-----	-----	-----	-----	-----	0.049
Lindane (BHC-Delta, d-)	-----	-----	-----	-----	0.11	0.110
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	3.33
Butylbenzyl Phthalate	-----	-----	-----	-----	-----	3,114
Chlorobenzene	-----	-----	-----	-----	-----	2,899
Chlorodibromomethane	-----	-----	-----	-----	-----	15.9
Chloroform	-----	-----	-----	-----	-----	323.9
Dichlorobenzene, 1,4-	-----	-----	250	-----	-----	423
Dichlorobromomethane	-----	-----	-----	-----	-----	12.5
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	-----	-----	-----	-----	-----	276
Diethyl phthalate	-----	-----	-----	-----	-----	85,933
Di-n-butyl phthalate	-----	-----	-----	-----	-----	7,186
Ethylbenzene	-----	-----	11,488	-----	-----	2,442
Formaldehyde	-----	-----	-----	-----	-----	-----
Heptachlor	-----	-----	-----	-----	0.04	0.0001
Methoxychlor	-----	-----	-----	-----	-----	0.021
Naphthalene	-----	-----	44,619	-----	-----	-----
Phenols	-----	-----	6,790	-----	-----	276
Silvex (2,4,5-TP)	-----	-----	-----	-----	-----	36.3
Toluene	-----	-----	9,995	-----	-----	15,863

Table D10. Maximum Allowable Headworks Loadings and Local Limits for Academy Creek WPCP
Industrial Pretreatment Program: Local Limits Evaluation
Brunswick-Glynn County Joint Water and Sewer Commission

Pollutant	Most Stringent Criterion	Maximum Allowable Headworks Loadings			Maximum Allowable Industrial Loadings			Local Limit Needed?	Calculated Industrial Local Limit (mg/L)	Worker Protection Screening Level[c] (mg/L)	2014 Local Limits	Final Industrial Local Limit[e] (mg/L)
		Calculated MAHL (lbs/day)	Current Influent Loading Based on Actual Flow[a] (lb/day)	Percent of MAHL Currently in Use[b] (%)	Calculated MAIL (lbs/day)	Current Industrial Loading Based on Actual Flow[a] (lb/day)	Percent of MAIL Currently in Use[b] (%)					
Conventional Pollutants												
Ammonia (Current)	Design Criteria	4,183	1,207	29%	3,346	24.5	0.7%	Yes	363	-----	37	37
Ammonia (July 2023)	NPDES Permit Limits	242	1,207	499%	193	24.5	12.7%	Yes	21	-----	37	37
Biochemical Oxygen Demand (BOD)	NPDES Permit Limits	19,368	12,181	62.9%	15,494	2801	18.1%	Yes	1,682	-----	1000	1000
Chemical Oxygen Demand (COD)	Design Criteria	54,941	27,610	50.3%	43,953	5283	12.02%	Yes	4770	-----	2000	2000
Phosphorus, Total (as P)	Design Criteria	2,776	694	25.0%	2,184	201	9.19%	Yes	237	-----	6	20
Suspended Solids, Total (TSS)	Design Criteria	32,307	12,551	38.8%	25,846	781	3.02%	Yes	2,805	-----	1000	1000
Inorganic Pollutants												
Antimony	Chronic State WQS	552	0.050	0.009%	441	0.005	0.001%	Yes	47.9	-----	22	22
Arsenic	Sludge Disposal	1.77	0.136	7.69%	1.47	0.021	1.431%	Yes	0.159	-----	0.05	0.05
Cadmium	Sludge Disposal	1.18	0.013	1.14%	0.929	0.002	0.171%	Yes	0.101	-----	0.03	0.03
Chromium VI	Activated Sludge Treatment Inhibition	62.5	0.604	0.967%	50.0	0.050	0.100%	Yes	5.42	-----	1.70	1.70
Chromium, Total	Chronic State WQS	77.0	0.198	0.257%	59.7	0.038	0.064%	Yes	6.48	-----	3.37	3.37
Copper	Sludge Disposal	13.0	1.666	12.8%	8.77	0.126	1.434%	Yes	0.95	-----	0.30	0.30
Cyanide	Acute State WQS	0.862	0.219	25.4%	0.477	0.063	13.146%	Yes	0.052	-----	0.110	0.110
Lead	Sludge Disposal	3.14	0.183	5.83%	2.31	0.056	2.424%	Yes	0.250	-----	0.160	0.160
Mercury	Chronic State WQS	0.032	0.004	13.6%	0.022	0.001	3.371%	Yes	0.002	-----	0.0019	0.0019
Nickel	Chronic State WQS	8.07	0.188	2.33%	6.27	0.108	1.718%	Yes	0.681	-----	0.49	0.49
Selenium	Sludge Disposal	1.98	0.102	5.16%	1.58	0.009	0.595%	Yes	0.172	-----	0.10	0.10
Silver	Acute State WQS	10.3	0.038	0.367%	8.21	0.001	0.012%	Yes	0.891	-----	0.30	0.30
Zinc	Sludge Disposal	25.2	7.829	31.1%	6.97	0.550	7.888%	Yes	0.757	-----	0.54	0.54
Organic Pollutants												
BHC-Alpha, a-	Chronic State WQS	0.061	0.0026	4.19%	0.049	*0.00002*	0.046%	Yes	0.005	-----	0.00017	0.00017
Lindane (BHC-Delta, d-)	Acute State WQS	0.138	*0.0004*	0.278%	0.110	0.0003	0.304%	No	0.012	-----		
Bis(2-ethylhexyl)Phthalate	Chronic State WQS	4.43	0.2363	5.34%	3.33	0.101	3.040%	Yes	0.362	-----	0.270	0.270
Butylbenzyl Phthalate	Chronic State WQS	3,892	0.1812	0.005%	3,114	*0.026*	0.001%	Yes	338	-----	195	195
Chlorobenzene	Chronic State WQS	3,624	0.0427	0.001%	2,899	*0.099*	0.003%	Yes	315	2.29	2.29	2.29
Chlorodibromomethane	Chronic State WQS	19.9	*0.0500*	0.251%	15.9	0.035	0.218%	Yes	1.73	-----	0.320	0.320
Chloroform	Chronic State WQS	405	0.1142	0.028%	324	0.117	0.036%	Yes	35.2	0.060	0.060	0.060
Dichlorobenzene, 1,4-	Activated Sludge Treatment Inhibition	312	0.1169	0.037%	250	*0.093*	0.037%	Yes	27.1	3.55	3.55	3.55
Dichlorobromomethane	Chronic State WQS	15.6	*0.0687*	0.440%	12.5	0.048	0.381%	Yes	1.35	-----	0.250	0.250
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	Chronic State WQS	345	0.0895	0.026%	276	0.005	0.002%	Yes	29.9	-----	39.6	29.9
Diethyl phthalate	Chronic State WQS	107,416	0.1523	0.0001%	85,933	*0.094*	0.000%	Yes	9326	107	107	107
Di-n-butyl phthalate	Chronic State WQS	8,983	0.1273	0.001%	7,186	*0.093*	0.001%	Yes	780	-----	153	153
Ethylbenzene	Chronic State WQS	3,053	0.0348	0.001%	2,442	0.110	0.005%	Yes	265	1.59	1.59	1.59
Formaldehyde[f]			1.5617			2.249		Yes		0.060	0.060	0.300
Heptachlor	Chronic State WQS	0.000068	0.0004	534%	0.00005	*0.00006*	106.322%	No	0.000006	0.003	0.000003	Prohibited
Methoxychlor	Chronic State WQS	0.026	0.0005	1.949%	0.021	0.00007	0.323%	No	0.0022	-----		
Naphthalene	Activated Sludge Treatment Inhibition	55,774	0.1062	0.0002%	44,619	0.091	0.000%	Yes	4842	2.65	2.65	2.65
Phenols	Chronic State WQS	345	0.2988	0.086%	276	0.685	0.248%	Yes	30.0	1024	20.78	20.78
Silvex (2,4,5-TP)	Chronic State WQS	45	0.0040	0.009%	36.3	0.0007	0.002%	No	3.93	-----		
Toluene	Activated Sludge Treatment Inhibition	12,493	0.1154	0.001%	9,995	0.241	0.002%	Yes	1085	2.08	2.08	2.08

[a] Influent loadings are provided only for those parameters detected in influent samples.

[b] MAHL and MAIL utilizations are calculated only for those pollutants detected in the influent and industrial effluent, respectively.

[c] Worker Protection Screening Levels are the most stringent of discharge screening levels based on fume toxicity and explosivity. Refer to Table D6. Secondary source for worker protection screening level is provided in Table D7.

[d] Domestic/commercial background levels are provided only for those parameters with negative calculated local limits.

[e] Industrial local limits are the more stringent of the calculated industrial local limits and Worker Protection Screening Levels. In the case of negative local limits where domestic/commercial background levels are not available, the laboratory practical quantitation limit was used.

[f] Due to a lack of regulatory limits for formaldehyde, a local limit was not able to be calculated.