FINAL (REVISED)

Headworks Analysis and Local Limits Evaluation

Prepared for:

City of Cartersville Water Department

June 2020 (Revised)

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EXECUTIVE SUMMARY

The City of Cartersville owns and operates the 15 million gallon per day (mgd) Water Pollution Control Plant (WPCP) located in Cartersville, Georgia. The City's WPCP provides wastewater service to approximately 20,000 residents and businesses. The City's collection system consists of 114 miles of sanitary sewer ranging in size from 8 to 48 inches and five sanitary sewer pump stations. The City manages the Industrial Pretreatment Program for industrial users (IUs) discharging to the collection system.

The City is required to update their Industrial Pretreatment Program per the requirements of National Pollutant Discharge Elimination System (NPDES) permit GA0024091 upon renewal in March 2018. The current NPDES permit expires on February 28, 2023. The City commissioned Hazen and Sawyer for technical assistance in preparing an updated headworks analysis model and local limits evaluation. The scope of work included data review and compilation, preparation of the headworks analysis mass balance model, and determination of local limits. The EPA Region 3 headworks analysis spreadsheet model was used.

Table ES-1 provides a summary of the maximum allowable headworks load (MAHL), the basis for the MAHL, the domestic load, and the resulting maximum allowable industrial load (MAIL) for each pollutant of concern (POC). The MAIL is the load that a POTW may distribute among SIUs. A 10 percent safety factor was applied to the MAHL to account for variability in the headworks analysis results. The domestic load calculation is based on the WPCP average influent flow in 2017, which was the last full year of data prior to the report being written. The MAIL for 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), ammonia, total Kjeldahl nitrogen (TKN), and total phosphorus (TP) is provided for informational purposes.

Table ES-1: Summary of MAHL, Domestic Load, Hauled Waste, and MAIL

Pollutant	MAHL, lb/d	Basis for MAHL	Domestic Load, lb/d	Hauled Waste Load, lb/d	MAIL, lb/d [2]
Arsenic	3.1	Sludge Disposal	0.10	----	2.7
Cadmium	1.7	Water Quality	0.014	----	1.5
Chromium	56	Inhibition, Sludge	0.12	----	50.2
Copper	27	Inhibition, Nitrification	1.73	----	22.4
Cyanide	19	Inhibition, Nitrification	0.00021	----	17.1
Lead	7.7	Water Quality	0.06	----	6.9
Mercury	0.046	Water Quality	0.000005	----	0.042
Molybdenum	2.5	Sludge Disposal	0.10	----	2.1
Nickel	7.7	Sludge Disposal	0.13	----	6.8
Selenium	3.8	Sludge Disposal	0.10	----	3.3
Silver	----	----	0.024	----	----
Zinc	28	Inhibition, Nitrification	7.9	----	17.3

Table ES-1: Summary of MAHL, Domestic Load, Hauled Waste, and MAIL

Pollutant	MAHL, lb/d	Basis for MAHL	Domestic Load, lb/d	Hauled Waste Load, lb/d	MAIL, lb/d [2]
Phenol	224	Inhibition, Nitrification	0.0	----	201
BOD_5, summer [1]	25,800	Design	8,501	----	14,719
TSS [1]	27,600	Design	9,120	----	15,720
Ammonia, summer [1]	2,800	Design	908	----	1,612
TKN [1]	4,600	Design	1,527	----	2,613
TP [1]	1,376	Design	454	----	785

[1] Provided for informational purposes.
[2] Calculation of the MAIL includes a 10% safety factor applied to the MAHL.

Recommended Local Limits

The City's local limits were last updated in 1999. The City has historically used the IU contributory flow method in lieu of the uniform concentration (UC) method to determine local limits. The UC method evenly divides the MAIL among SIUs by using the total annual average industrial flow. The IU contributory flow method allows a local limit to be developed based on the contribution of individual POCs from each SIU.

Recommended local limits are summarized in Table ES-2.The recommended local limits for metals were selected based on the results of the UC method, the IU contributory flow method, and the current local limit. With the exception of chromium, all of the local limits for metals are recommended for an increase as a result of this headworks analysis update. Recommended local limits for arsenic, cadmium, copper, cyanide, lead, mercury, and selenium are based on the UC method. Recommended local limits for molybdenum and nickel are based on the IU contributory flow method. The recommendation for zinc is based on both the UC and IU contributory flow method, as the results are identical. Zinc is present in all of the industrial discharges. A limit is not recommended for silver as there is not a basis for a MAHL.

Table ES-2: Summary of Recommended Local Limits

Pollutant	Uniform Concentration Local Limit, mg/L	IU Contributory Flow Local Limit, mg/L	Current Local Limit (1999-2018), mg/L	Recom-mended Local Limit (2018), mg/L	Recom-mended Local Limit Type	Local Limit Change Indicated by "•"
Arsenic	0.185	1.9	0.02	0.185	Uniform concentration	•
Cadmium	0.105	0.57	0.01	0.105	Uniform concentration	•
Chromium	3.43	6.35	0.67	0.67	Current local limit	
Copper	1.53	1.54	0.11	1.53	Uniform concentration	•

Table ES-2: Summary of Recommended Local Limits

Pollutant	Uniform Concentration Local Limit, mg/L	IU Contributory Flow Local Limit, mg/L	Current Local Limit (1999-2018), mg/L	Recom-mended Local Limit (2018), mg/L	Recom-mended Local Limit Type	Local Limit Change Indicated by "•"
Cyanide	1.17	5.90	0.13	1.17	Uniform concentration	•
Lead	0.47	0.64	0.12	0.47	Uniform concentration	•
Mercury	0.0028	0.03	0.002	0.0028	Uniform concentration	•
Molybdenum	0.146	0.23	0.13	0.23	IU contributory	•
Nickel	0.47	0.52	0.26	0.52	IU contributory	•
Selenium	0.23	0.34	0.02	0.23	Uniform concentration	•
Silver	----	9.24	0.7	----	No limit	•
Zinc	1.18	1.19	0.3	1.18	Uniform concentration and IU contributory	•
Phenol	13.8	16.5	2.13	2.13	Current local limit	
BOD_5, summer	1,007		300 / 850	300 / 850	Current local limit	
TSS	1,076		300 / 1,500	300 / 1,500	New local limit	
COD			750 / 2,500	750 / 2,500	Current local limit	
Ammonia, summer						
TKN						
Phosphorus						
O&G-AV (FOG)			100	100	Current local limit	
O&G-TPH			Narrative standard	100	New local limit	•
pH			5.5 – 10.0	5.5 – 10.0	Current local limit	
Flashpoint			< 140°F	< 140°F	Current local limit	
Temperature			< 150°F	< 150°F	Current local limit	

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ACF	Acute conversion factor
BOD_5	Biochemical oxygen demand, 5-day
CCC	Criterion chronic concentration
CCF	Chronic conversion factor
CMC	Criterion maximum concentration
COD	Chemical oxygen demand
CWA	Clean Water Act
DMR	Discharge monitoring reports
DO	Dissolved oxygen
EPA	United States Environmental Protection Agency
EPD	Georgia Environmental Protection Divisions
FOG	Fats, oils, and grease (animal vegetable fraction)
gpd	Gallons per day
HASL	Headworks analysis sludge addendum
IAT	Industrial allocation table
IU	Industrial user
IUP	Industrial user permit
lb/d	Pounds per day
MAHL	Maximum allowable headworks load
MAIL	Maximum allowable industrial load
MDL	Minimum detection level
mgd	Million gallons per day
mg/L	Milligram per liter
NOEC	No observed effect concentration
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and maintenance
POC	Pollutant of concern
POTW	Publically owned treatment works
PPA	Priority pollutant analysis
RCRA	Resource Conservation and Recovery Act
SIU	Significant industrial users
SSO	Sanitary sewer overflow

List of Acronyms

SUO	Sewer Use Ordinance
TKN	Total Kjeldahl nitrogen
TP	Total phosphorus
TPH	Total petroleum hydrocarbon
TSS	Total suspended solids
UC	Uniform concentration
WET	Whole effluent toxicity
WLA	Wasteload allocation
WPCP	Water pollution control plant
WQS	Water quality standards

1. Introduction

The City of Cartersville owns and operates the 15 million gallon per day (mgd) James R. Stafford Water Pollution Control Plant (WPCP) located in Cartersville, Georgia. The City's WPCP provides wastewater service to approximately 20,000 residents and businesses. The City's collection system consists of 114 miles of sanitary sewer ranging in size from 8 to 48 inches and five sanitary sewer pump stations. The City manages the Industrial Pretreatment Program for industrial users (IUs) discharging to the collection system.

1.1 Scope of Work

The City of Cartersville is required to update their Industrial Pretreatment Program per the requirements of National Pollutant Discharge Elimination System (NPDES) permit GA0024091 upon renewal in March 2018. The current NPDES permit expires on February 28, 2023. The City commissioned Hazen and Sawyer (Hazen) for technical assistance in preparing an updated headworks analysis model and local limits evaluation. The scope of work included data review and compilation, preparation of the headworks analysis mass balance model, and determination of local limits.

1.2 Description of Wastewater Treatment System

The City's WPCP is rated for 15 mgd of treatment capacity. The WPCP was originally constructed in 1967. The WPCP has undergone four major upgrades since original construction, with the most recent upgrade being completed in 2008. The current average day flow is approximately 7 mgd. The existing treatment process consists of influent screening and grit removal, activated sludge biological treatment, final clarification, chlorination, and dechlorination. Many of the plant's facilities are nearing the end of their anticipated service life with 25 to 30 years of service. Treated effluent is discharged to the Etowah River. Plant residuals are currently aerobically digested, dewatered, and land applied via Class B land application.

Table 1-1 provides a summary of the average monthly effluent permit limits for the Cartersville WPCP, effective March 1, 2018. The NPDES permit contains effluent limits for 5-day biochemical oxygen demand (BOD_5), dissolved oxygen (DO), and ammonia on a seasonal basis, total suspended solids (TSS), total phosphorus (TP), pH, fecal coliform, and total residual chlorine. The NPDES permit includes three effluent limits milestones to allow for a phased approach to the new phosphorus limit. The City's NPDES permit does not contain limits for metals. Whole effluent toxicity (WET) must be reported at the no observed effect level (NOEC).

Table 1-1: Summary of NPDES Effluent Permit Limits

Parameter [1]	Unit	B.1 Limit for 24 Months From Effective Permit Date *Monthly Average (Weekly Average)*	B.2 Limit for 24 to 46 Months From Effective Permit Date *Monthly Average (Weekly Average)*	B.3 Limit for 46 Months From Effective Permit Date *Monthly Average (Weekly Average)*
Flow	mgd	15 (18.75)	15 (18.75)	15 (18.75)
BOD_5 (June – September)	mg/L	10 (15)	10 (15)	10 (15)
BOD_5 (October – May)	mg/L	20 (30)	20 (30)	20 (30)
TSS	mg/L	20 (30)	20 (30)	20 (30)
Ammonia (June – September)	mg/L	2.0 (3.0)	2.0 (3.0)	2.0 (3.0)
Ammonia (October – May)	mg/L	5.0 (7.5)	5.0 (7.5)	5.0 (7.5)
Fecal coliform	cfu / 100 mL	200 (400)	200 (400)	200 (400)
Total residual chlorine	ug/L	0.14 (0.14)	0.14 (0.14)	0.14 (0.14)
Total phosphorus	mg/L	Report	----	1.0 (1.5)
Total phosphorus	kg/d	----	324 (405)	57 (71)
pH	s.u.	6 .0 – 9.0	6 .0 – 9.0	6 .0 – 9.0
Dissolved oxygen (June – September)	mg/L	6.0	6.0	6.0
Dissolved oxygen (October – May)	mg/L	5.0	5.0	5.0
Orthophosphate	mg/L	Report	Report	Report
Organic nitrogen	mg/L	Report	Report	Report
Nitrate-nitrite	mg/L	Report	Report	Report
TKN	mg/L	Report	Report	Report
Whole effluent toxicity	----	Report NOEC	Report NOEC	Report NOEC
BOD, long term	mg/L	Report	Report	Report

[1] NPDES Permit limits effective March 1, 2018 to February 28, 2023.

1.3 Summary of Pretreatment Regulations

The National Pretreatment Program implements Clean Water Act (CWA) requirements to control pollutants of concern (POCs) that are discharged to publicly owned treatment works (POTWs). The Environmental Protection Agency (EPA) promulgated 40 CFR 403 *General Pretreatment Regulations for Existing and New Sources of Pollution* to regulated pretreatment and discharges to collection systems. The Georgia Environmental Protection Division (EPD) has developed pretreatment regulations consistent with 40 CFR 403. Rules 391-3-6-.08 and 391-3-6-.09 of the Georgia Administrative Code contain specific parts related to pretreatment.

A POC is defined as any pollutant reasonably anticipated to be discharged to a POTW in sufficient amounts to interfere with the treatment and collection system. POCs include organic and inorganic priority pollutants and plant-specific parameters. POCs include metals (priority pollutants), ammonia, TSS, and BOD_5. Plant specific (e.g., conventional) parameters include total Kjeldahl nitrogen (TKN), total phosphorus, the total petroleum hydrocarbon (TPH) fraction of total oil and grease, and the animal vegetable fraction of total oil and grease, which is commonly referred to as fats, oils, and grease (FOG).

POTWs must develop and enforce specific limits on prohibited discharges or demonstrate that limits are not necessary (40 CFR 403.5(c)(1)). Local limits must be defensible and technically based. POTWs must develop local limits based on site-specific conditions to include compliance history with NPDES permit limits (if applicable), receiving stream water quality standards (if applicable), wastewater treatment efficiency, sludge disposal, operation and maintenance (collection system and wastewater treatment facility), and worker health and safety (EPA, 2004). Local limits are typically re-evaluated every five years in accordance with the NPDES permit cycle or if significant changes have occurred in the system that would warrant a re-evaluation (e.g., a treatment plant expansion or process change). Industries are obligated by 40 CFR 403 to comply with all federal, state, and local pretreatment regulations to discharge POCs.

The pretreatment regulations also require states and POTWs to control POCs that may cause pass through or interference with the wastewater treatment process or sludge disposal. Per 40 CFR 403.3(k), pass through or interference either inhibits or disrupts a POTW's treatment processes, operation, use, or disposal or causes a violation of any NPDES permit requirement. Under federal law, POTWs are required to monitor and enforce these prohibitions. Georgia Rule 391-3-6-.08 also mandates that POTWs develop and enforce specific limits to implement specific discharge prohibitions and prevent pass through or interference.

1.4 Headworks Analysis Definitions

A headworks analysis provides the technical basis for the development of local limits in a Pretreatment Program. Figure 1-1 provides an illustration of the components of a headworks analysis mass balance. The maximum allowable headworks load (MAHL) is the most stringent load calculated for an individual POC through a POTW treatment facility and collection system. A MAHL is determined based on NPDES limits, water quality standards, biological inhibition in activated sludge, biological inhibition in sludge digestion, sludge disposal criteria or other site-specific factors that may cause pass through or interference, such as reclaimed water use, corrosion, and worker health and safety.

The uncontrollable load, or the domestic load, is the portion of the load entering the plant that cannot be accounted for by a specific source (e.g., an industrial discharger). Typically, uncontrollable loads are attributed to residential, commercial, and non-significant industry sources. Uncontrollable loads may be determined using a mass balance between a POTW influent and the sum of the industrial loads, site-specific sampling, or literature values.

The maximum allowable industrial loading (MAIL) is the difference between the MAHL, the uncontrollable load, and the load from hauled waste into the treatment facility. The MAIL is the load allocated to industrial users in the development of local limits. A POTW has a range of options for allocating the MAIL to industrial users to include the uniform concentration method, the wasteload allocation method, the IU contributory flow method, the mass-proportion method, and the wasteload allocation method.

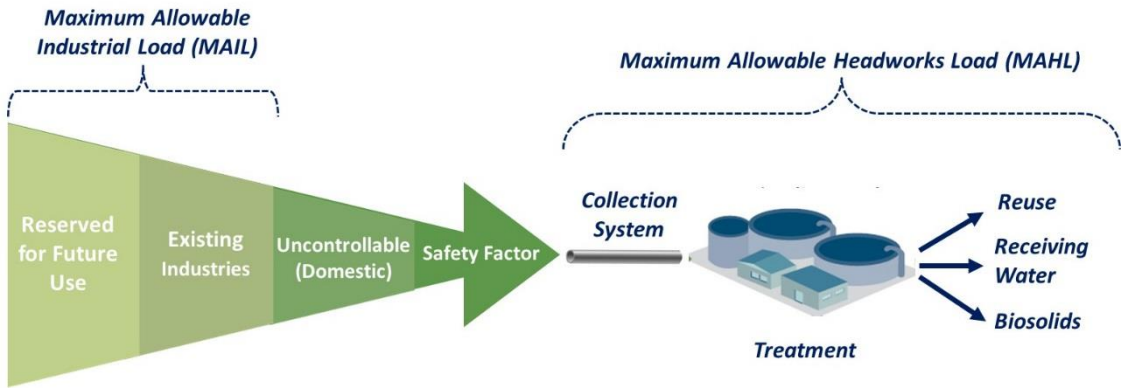

Figure 1-1: Illustration of Headworks Analysis Components

1.5 Current Local Limits

Table 1-3 provides a summary of the City of Cartersville's local limits. The City's local limits include metals, phenol, BOD_5, TSS, chemical oxygen demand (COD), oil and grease, flashpoint, and temperature. The City's original local limits were established in 1981. Local limits were updated in 1991 and 1996. The City's 2018 Sewer Use Ordinance (SUO) outlines the prohibited discharge standards and local limits.

The City levies surcharges for BOD_5, TSS, and COD. The domestic threshold concentrations for BOD_5, TSS, and COD are 300 milligrams per liter (mg/L), 300 mg/L, and 750 mg/L, respectively, per the City's SUO. If the average industrial discharge COD is greater than 2.5 times average BOD_5, then the surcharge is based on the COD concentration. The City reserves the right to apply a surcharge to industrial discharges for TSS and BOD_5 between 300 and 600 mg/L with the option for enforcement action at discharge concentrations greater than 600 mg/L. The City levies surcharges for COD at industrial discharge concentrations greater than 750 mg/L with enforcement action at 2,500 mg/L. The maximum allowable surcharge is 850 mg/L for BOD_5 and 1,500 mg/L for TSS.

The SUO also provides guidance on hauled waste to the WPCP. Septic tank waste haulers may discharge into the WPCP only at locations designated by the City. Industrial haulers must obtain a wastewater discharge permit and may discharge only at designated locations. The City's SUO also requires that industrial haulers provide a waste tracking form for every load.

Table 1-3: Summary of Previous (1996) and Current (1999 – Present) Local Limits

Pollutant	Prior Local Limit (1996 – 1999), mg/L	Current Local Limit (1999 – Present), mg/L
Arsenic, total	0.03	0.02
Cadmium, total	0.01	0.01
Chromium, total	0.64	0.67
Copper, total	0.18	0.11
Cyanide, total	0.21	0.13
Lead, total	0.05	0.12
Mercury, total	0.0003	0.002
Molybdenum, total	0.13	0.13
Nickel, total	0.31	0.26
Selenium, total	0.03	0.02
Silver, total	0.007	0.7
Zinc, total	0.21	0.3
Phenol	2.13	2.13
BOD_5 [1]	300 / 850	850
TSS [1]	300 / 1,500	1,500
COD [1]	750 / 2,500	2,500
Oil and grease, FOG	100	100
Oil and grease, TPH	Narrative standard	Narrative standard
pH	5.5 – 10.0	5.5 – 10.0
Flashpoint	< 140°F	< 140°F
Temperature	< 150°F	< 150°F

[1] Surcharge rates are applied to industrial discharges greater than the City's Sewer Use Ordinance (2018) threshold concentrations. The higher threshold value indicates the concentration at which the City applies enforcement action.

2. Summary of Industrial Users

The City of Cartersville has issued Industrial Use Permits (IUPs) to 15 significant industrial users (SIUs) discharging to the City's collection system. To be classified as an SIU, as defined in the National Pretreatment Program regulations, an IU must discharge to a POTW and meet one or more of the following criteria:

- Subject to federal categorical pretreatment standards.
- Discharges an average of 25,000 gallons per day (gpd) or more of process wastewater to the POTW.
- Contributes a process waste stream of 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW.
- Has a reasonable potential to adversely affect the POTW's operation or violate any pretreatment standard or requirement (e.g., local sewer use ordinance and/or federal pretreatment regulations).

Table 2-1 provides a summary of the City's SIUs, industry type, and monthly average industrial flow. The monthly average industrial flow is based on 2017 monitoring data. Nine of the City's SIUs are categorical. Four industries are categorical for textile manufacturing, two industries are categorical for plastics molding and forming, two industries are categorical for chemical manufacturing (organic and inorganic), and one industry is categorical for tire manufacturing. The City also receives leachate from the Bartow County landfill. Two non-categorical industries are of the food processing type. One industry treats wastewater from septic tanks and other non-significant waste.

The headworks analysis spreadsheet model contains an Industrial Allocation Table (IAT) to record each industry's monthly average flow and uniform concentration limit. The IAT includes the industry name, permit number, category type, and IUP renewal and modification dates.

Table 2-1: Summary of Significant Industrial User Category Type and Monthly Average Flow

Industry	Permit Number	Categorical	Industry Type	Monthly Average Flow, gpd [1]
Absolute Environmental Solutions	0712	No	Septic tank treatment, car wash bays, grease trap treatment	50,000
Ampacet	0060	Yes	Plastics manufacturer (40 CFR Part 463, Plastics Molding and Forming)	39,200
Anheuser-Busch	3163	No	Brewery waste	834,000
Anheuser-Busch	3163	No	Non-process brewery waste	25,000

Table 2-1: Summary of Significant Industrial User Category Type and Monthly Average Flow

Industry	Permit Number	Categorical	Industry Type	Monthly Average Flow, gpd [1]
Aquafil	8126	Yes	Carpet yarn dying (40 CFR Part 463, Plastics Molding and Forming)	111,300
ATCO Rubber Products, Inc.	7968	No	Flexible air duct assembly	4
Bartow County Landfill	5145	No	Landfill leachate	35,000
Doehler Beverage House	0451	No	Food processing (tea and coffee)	45,480
Innovative Chemical Technologies	9340	Yes	Chemical manufacturing of specialty chemicals/ polymers (40 CFR Part 414, Organic Chemicals, Synthetics, and Plastic Fibers)	1,500
Linde Gas North America, LLC	8018	Yes	Liquid gas manufacturer (40 CFR Part 415, Inorganic Chemicals Manufacturing Subpart AW)	86,400
Shaw 11: Philadelphia Plant	5200-8275	Yes	Carpet manufacturing (40 CFR Part 410, Textile Mills)	99,900
Shaw 13: Stratton Plant	5200-8706	Yes	Carpet manufacturing (40 CFR Part 410, Textile Mills)	52,300
Southern Yarn Dyers	3880	Yes	Yarn manufacturing (40 CFR Part 410, Textile Mills)	90,700
Tintoria	1395	Yes	Manufacturing of fire retardant textiles (40 CFR Part 410, Textile Mills)	184,700
Toyo Tire	8404	Yes	Tire manufacturing (40 CFR Part 1228 Subpart A, Tire and Inner Tube Plants Subcategory)	92,500

[1] *Data compiled from 2017 industrial discharge records, surcharge records, and NPDES Permit Application EPA Form 2A.*

3. Headworks Analysis Data Summary

Hazen collected monitoring data from the City to input into the headworks analysis model. Monitoring data was compiled from the City's monthly Discharge Monitoring Reports (DMRs), Priority Pollutant Analysis (PPA) scans, and the City's laboratory analytical database. Monitoring data was collected for raw influent, primary effluent, domestic contribution, liquid hauled waste, and biosolids. Data was compiled from 2011 to 2018. The average annual 2017 flow to the WPCP was 6.7 mgd. The year 2017 was the most recent year in which a full year of data was available at the time the report was prepared. The industrial flow is approximately 1.75 mgd.

The compiled data was entered into the EPA Region 3 headworks analysis spreadsheet model. The EPA Region 3 model was used as EPA Region 4 has not developed a similar spreadsheet tool for headworks loading evaluations. One spreadsheet tab is dedicated to metals and a second spreadsheet tab is dedicated to conventional pollutants. Various statistics were calculated for each of the monitoring data POCs to include the number of data points, average, maximum, minimum, standard deviation, and the percent of data less than detection. If a data point was less than the detection limit, then half of the minimum detection level (MDL) was used in the calculations. The calculations also flag if the maximum sample point of a POC is twice the standard deviation from the average of the data set, which indicates potential data outliers.

Appendix A provides the metal and conventional pollutant monitoring data summary from the headworks analysis spreadsheet model. Tables 3-1 through 3-7 summarize the monitoring data statistics delineated in the following tables:

- Table 3-1: Summary of Influent Data
- Table 3-2: Summary of Effluent Data
- Table 3-3: Summary of Sludge Data by Mass
- Table 3-4: Summary of Sludge Data by Concentration
- Table 3-5: Summary of Domestic Data

3.1 Metals

The number of raw influent data points ranged between 7 and 10 for each pollutant. The arsenic, cadmium, and silver analytical results were 100 percent less than the analytical detection level. The chromium and selenium sample results were 90 percent of the analytical detection level. The copper, cyanide, lead, molybdenum, nickel, and zinc analytical results were 0 percent, 70 percent, 10 percent, 57 percent, 20 percent, and 0 percent less than the detection limit, respectively. The City has historically used EPA Standard Method 200.8 for metals analysis.

The number of effluent metal data points ranged between 7 and 14 for each pollutant. Similar to the raw influent data results, the majority of the effluent metal results were less than the analytical detection level, ranging between 88 percent and 100 percent of samples less than detection. The exceptions were copper,

lead, molybdenum, nickel, and zinc sample results at 55 percent, 65 percent, 64 percent, 46 percent, and 8 percent less than detection, respectively.

Two biosolids data points were collected for a metals evaluation. The percent solids of the biosolids ranged from 14 percent to 15.7 percent. The sludge data by mass in Table 3-3 was converted to a concentration basis in Table 3-4 using the average percent solids. Arsenic, cadmium, copper, lead, mercury, nickel, selenium, and zinc were detected in the biosolids samples. The influent and effluent sample results indicated less than detection of metals; however, the biosolids metals data confirms the presence of metals through the WPCP and the adsorption of metals in activated sludge prior to solids handling.

The City conducted site-specific sampling in residential and commercial areas to determine the domestic, or uncontrollable load, into the WPCP in lieu of an unpaired analysis. An unpaired analysis subtracts the raw influent load from the monthly average industrial contribution to determine the uncontrollable load. Nine samples were analyzed for the domestic contribution. Similar to the influent and effluent data, the domestic samples were analyzed using EPA Standard Method 200.8. The majority of the metals sample results were less than the detection limit with the exception of copper, lead, and zinc at 0 percent, 44 percent, and 0 percent, respectively. Approximately 89 percent of the chromium, mercury, nickel, and silver sample results were less than the detection limit.

3.2 Conventional Pollutants

The City has historically collected more data for conventional pollutants than metals. Approximately 82 data points were available for influent and effluent BOD_5, TSS, and ammonia. Fifteen data points were available for influent TP and 75 data points were available for effluent TP. No data points were available for influent and effluent TKN. The effluent data indicates that BOD_5, TSS, ammonia, TKN, and TP are sufficiently removed in the secondary activated sludge process.

Table 3-1: Summary of Influent Data

Parameter	Count	Average, mg/L	Maximum, mg/L	Minimum, mg/L	Standard Deviation	Influent Load, lb/d	% Samples < Detection
Arsenic	10	0.004	0.020	0.003	0.005	0.24	100%
Cadmium	10	0.002	0.020	0.000	0.006	0.13	100%
Chromium	10	0.005	0.020	0.003	0.005	0.27	90%
Copper	9	0.039	0.056	0.018	0.012	2.16	0%
Cyanide	10	0.004	0.013	0.000	0.005	0.20	70%
Lead	10	0.003	0.020	0.001	0.006	0.19	10%
Mercury	10	0.000	0.000	0.000	0.000	0.00	90%
Molybdenum	7	0.004	0.007	0.003	0.002	0.22	57%
Nickel	10	0.008	0.020	0.001	0.005	0.44	20%
Selenium	10	0.005	0.020	0.003	0.005	0.25	90%
Silver	10	0.003	0.020	0.001	0.006	0.16	100%
Zinc	10	0.142	0.216	0.090	0.037	7.9	0%
BOD_5	82	170	286	99	37.6	9,488	0%
TSS	82	230	458	130	65.5	12,848	0%
Ammonia	82	22.6	35.1	12.1	5.5	1,263	0%
TKN	0	----	----	----	----	----	----
Nitrate & Nitrite	0	----	----	----	----	----	----
Phosphorus	15	11.4	15.7	7.8	2.2	636	0%
O&G-AV	0	----	----	----	----	----	----
O&G-TPH	0	----	----	----	----	----	----
pH	75	7.2	7.4	6.8	0.096	----	----
TTO	0	----	----	----	----	----	----

Table 3-2: Summary of Effluent Data

Parameter	Count	Average, mg/L	Maximum, mg/L	Minimum, mg/L	Standard Deviation	Effluent Load, lb/d	% Samples < Detection
Arsenic	14	0.004	0.020	0.003	0.005	0.21	100%
Cadmium	14	0.002	0.020	0.000	0.005	0.10	100%
Chromium	14	0.004	0.020	0.003	0.005	0.21	96%
Copper	13	0.004	0.019	0.003	0.005	0.21	55%
Cyanide	14	0.005	0.013	0.000	0.006	0.29	88%
Lead	13	0.002	0.020	0.001	0.005	0.11	65%
Mercury	14	0.000	0.002	0.000	0.000	0.01	92%
Molybdenum	7	0.003	0.005	0.003	0.001	0.18	64%
Nickel	14	0.005	0.020	0.003	0.005	0.28	46%
Selenium	13	0.004	0.020	0.003	0.005	0.21	96%
Silver	14	0.003	0.020	0.001	0.005	0.15	100%
Zinc	14	0.050	0.084	0.020	0.018	2.8	8%
BOD_5	82	5.3	15.2	2.0	2.4	294	0%
TSS	82	4.6	25.8	1.8	3.5	257	0%
Ammonia	82	0.853	4.6	0.117	0.886	48	0%
TKN	0	----	----	----	----	----	----
Nitrate & Nitrite	0	----	----	----	----	----	----
Phosphorus	75	7.8	17.5	1.4	3.0	437	0%
O&G-AV	0	----	----	----	----	----	----
O&G-TPH	0	----	----	----	----	----	----
pH	75	7.3	7.5	7.1	0.1	408	0%
TTO	0	----	----	----	----	----	----

Table 3-3: Summary of Sludge Data by Mass

Parameter	Count	Average, mg/kg	Maximum, mg/kg	Minimum, mg/kg	Standard Deviation	Sludge Load, lb/d	% Results < Detection
Arsenic	2	5.3	5.7	4.8	0.64		
Cadmium	2	3.4	3.4	3.3	0.071		
Chromium	0	----	----	----	----		
Copper	2	366	421	312	77		
Cyanide	0	----	----	----	----		
Lead	2	18.9	19.8	17.9	1.3		
Mercury	2	0.60	0.60	0.60	0.000		
Molybdenum	2	10.6	11.0	10.1	0.64		
Nickel	2	23.80	24.20	23.40	0.57		
Selenium	2	6.5	6.6	6.3	0.21		
Silver	0	----	----	----	----		
Zinc	2	724	790	658	94		
BOD_5	0	----	----	----	----		
TSS	0	----	----	----	----		
Ammonia	0	----	----	----	----		
TKN	0	----	----	----	----		
Nitrate & Nitrite	0	----	----	----	----		
Phosphorus	0	----	----	----	----		
O&G-AV	0	----	----	----	----		
O&G-TPH	0	----	----	----	----		
pH	0	----	----	----	----		
TTO	0	----	----	----	----		

Table 3-4: Summary of Sludge Data by Concentration

Parameter	Count	Average, mg/L	Maximum, mg/L	Minimum, mg/L	Standard Deviation	Sludge Load, lb/d	% Results < Detection
Arsenic	2	0.788	0.893	0.684	0.148	44	0
Cadmium	2	0.501	0.532	0.470	0.044	28	0
Chromium	0	----	----	----	----	----	0
Copper	2	55	66	44	15	3,082	0
Cyanide	0	----	----	----	----	----	0
Lead	2	2.8	3.1	2.6	0.39	158	0
Mercury	2	0.090	0.094	0.085	0.006	5	0
Molybdenum	2	1.6	1.7	1.4	0.201	88	0
Nickel	2	1.9	3.8	0.0	2.7	106	0
Selenium	2	0.965	1.0	0.897	0	54	0
Silver	0	----	----	----	----	----	0
Zinc	2	109	124	94	21	6,074	0
BOD_5	0	----	----	----	----	----	0
TSS	0	----	----	----	----	----	0
Ammonia	0	----	----	----	----	----	0
TKN	0	----	----	----	----	----	0
Nitrate & Nitrite	0	----	----	----	----	----	0
Phosphorus	0	----	----	----	----	----	0
O&G-AV	0	----	----	----	----	----	0
O&G-TPH	0	----	----	----	----	----	0
pH	0	----	----	----	----	----	0
TTO	0	----	----	----	----	----	0

Table 3-5: Summary of Domestic Data

Parameter	Count	Average, mg/L	Maximum, mg/L	Minimum, mg/L	Standard Deviation	Domestic Load, lb/d	% Results < Detection
Arsenic	9	0.003	0.003	0.003	0.000	0.013	100%
Cadmium	9	0.000	0.000	0.000	0.000	0.002	100%
Chromium	9	0.003	0.007	0.003	0.001	0.016	89%
Copper	9	0.042	0.080	0.016	0.019	0.22	0%
Cyanide	9	0.000	0.000	0.000	0.000	0.000	100%
Lead	9	0.001	0.004	0.001	0.001	0.007	44%
Mercury	9	0.000	0.000	0.000	0.000	0.000	89%
Molybdenum	9	0.003	0.003	0.003	0.000	0.013	100%
Nickel	9	0.003	0.008	0.003	0.002	0.016	89%
Selenium	9	0.003	0.003	0.003	0.000	0.013	100%
Silver	9	0.001	0.001	0.001	0.000	0.003	89%
Zinc	9	0.190	0.585	0.063	0.173	1.01	0%
BOD_5	9	273	349	156	62	8,501	0%
TSS	9	144	217	98.00	43	9,120	0%
Ammonia	9	26	39	17	6.2	908	0%
TKN	0	----	----	----	----	----	----
Nitrate & Nitrite	0	----	----	----	----	----	----
Phosphorus	0	----	----	----	----	----	----
O&G-AV	0	----	----	----	----	----	----
O&G-TPH	0	----	----	----	----	----	----
pH	0	----	----	----	----	----	----
TTO	0	----	----	----	----	----	----

3.3 Whole Effluent Toxicity

As part of the City's new NPDES permit requirements, the City will be required to conduct annual WET tests using *C. dubia* and *P. promelas.* The NOEC must be greater than 8 percent. The WPCP has a history of successfully passing annual WET tests; therefore, the WPCP influent does not appear to contain constituents that contribute to toxicity. The City's WET reports were reviewed for 2014. All chronic WET tests passed for *C. dubia* and *P. promelas*. The 2014 WET test results are summarized as follows:

- February 2014: Chronic test, *C. dubia* passed in 100% effluent
- February 2014: Chronic test, *P. promelas* passed in 100% effluent
- June 2014: Chronic test, *C. dubia* passed in 100% effluent
- June 2014: Chronic test, *P. promelas* passed in 100% effluent
- August 2014: Chronic test, *C. dubia* passed in 100% effluent
- August 2014: Chronic test, *P. promelas* passed in 100% effluent
- October 2014: Chronic test, C. dubia passed in 100% effluent
- October 2014: Chronic test, *P. promelas* passed in 100% effluent

3.4 Collection System

The City's collection system consists of approximately 114 miles of sanitary sewer ranging in size from 8 to 48 inches. The City also operates five sanitary sewer pump stations. The City maintains operation and maintenance (O&M) logs of sanitary sewer overflows (SSOs) in the collection system. The City has documented cases of FOG as the primary cause for numerous SSO events.

4. Maximum Allowable Headworks Load

The headworks analysis model determines the most stringent threshold, or MAHL, for an individual POC through a POTW treatment facility and collection system. A MAHL is determined using NPDES thresholds, water quality based thresholds, inhibition thresholds through various treatment processes (e.g., nitrification, anaerobic digestion), and biosolids disposal thresholds. The calculation of a water quality and inhibition allowable headworks threshold requires the use of a POC removal efficiency through primary clarification (if applicable) or the entire treatment facility process. Table 4-1 provides a summary of the applicable pollutant limit criteria for the City's headworks analysis. Allowable loads for metals may be based on either water quality, inhibition, or biosolids disposal. Ammonia, BOD_5, TSS, TP, and TN are based on the design load of the wastewater treatment facility. Oil and grease are based on collection system operation and maintenance.

The EPA Region 3 headworks analysis spreadsheet was used for the City's headworks analysis and local limits development model. All of the data in the model is linked to the data in the monitoring spreadsheet tabs. The headworks analysis calculations are located in Appendix B. The following sections provide a summary of each POC removal efficiency and allowable headworks load calculations from the headworks analysis model.

Table 4-1: Summary of Applicable Pollutant Limit Criteria

Pollutant Category	Pollutant	Applicable Pollutant Limit Criteria				
		Inhibition	Water Quality	Biosolids Disposal	Collection System	Design Load
National pollutants of concern	Arsenic	X	X	X		
	Cadmium	X	X			
	Chromium	X	X			
	Copper	X	X	X		
	Cyanide	X	X			
	Lead	X	X	X		
	Mercury	X	X	X		
	Molybdenum			X		
	Nickel	X	X	X		
	Selenium					
	Silver	X	X	X		
	Zinc	X	X	X		
	Ammonia	X				X
	BOD_5					X
	TSS					X
Plant specific parameters	Total phosphorus					X
	TKN					X
	Oil and grease, FOG				X	
	Oil and grease, TPH				X	
Organic priority pollutants	Phenol		X		X	

4.1 Pollutant Removal Efficiency

The headworks analysis model uses an unpaired analysis to calculate pollutant removal efficiency. The unpaired removal efficiency method uses the average of influent and effluent data to calculate the percentage of pollutant adsorbed to sludge versus the percentage of pollutant passing through the WPCP to the receiving stream. The City has not conducted a site-specific metals removal study at the WPCP.

Table 4-2 provides a summary of the basis of selection for the pollutant removal efficiency through the entire wastewater treatment facility. Table 4-2 includes the pollutant removal efficiency used in the 1999 headworks analysis, the 2018 unpaired analysis, EPA's literature removal rates through wastewater treatment facilities, and the selected removal efficiency. The unpaired values were used where substantial data greater than the analytical detection level was available to use the unpaired results. EPA literature values were used in cases where the majority of the sample results were less than the analytical detection level. Literature values were used for arsenic, cadmium, chromium, cyanide, mercury, selenium, and silver. Unpaired values were used for copper, lead, molybdenum, nickel, and zinc.

Many of the 2018 unpaired results are artificially low and indicate one of two phenomena. For several of the metals, the analytical method MDL was not low enough to capture the actual metal concentration entering and leaving the WPCP. Per the discussion in Section 3, many of the metals results were less than the analytical detection level. The negative pollutant removal efficiencies indicate the use of different analytical method MDLs for influent and effluent sampling. If an influent sample is analyzed using an analytical method at a lower MDL than the effluent sample, then more metal will artificially appear to be leaving than entering the treatment facility.

Artificially low unpaired analysis results are not atypical in a headworks analysis model. In many cases, the concentration of metals entering a treatment facility is low enough such that the use of a Standard Method with ultra-low MDL will still indicate a non-detect sample. However, the use of a Standard Method with a lower MDL (e.g., EPA Standard Method 200.8) will provide more accuracy in identifying how much metal is entering and leaving a treatment facility. The City's data indicated less than detection for many of the metals; however, the biosolids metals data confirms the presence of metals through the WPCP and the adsorption of metals in activated sludge prior to solids handling. A site-specific metals removal study with the use of minimum levels is an option for fine-tuning metal removal efficiencies through the WPCP.

Table 4-2: Basis of Selection for Pollutant Removal Efficiency through WPCP Process

Parameter	1999 Removal Efficiency [1, 2]	2018 Unpaired Analysis [1]	Literature Removal Rate [1, 3]	Selection	Basis
Arsenic	45.0 %	11.8 %	45.0 %	45.0 %	Literature
Cadmium	67.0 %	24.3 %	67.0 %	67.0 %	Literature
Chromium	82.0 %	21.2 %	82.0 %	82.0 %	Literature
Copper	84.0 %	90.3 %	86.0 %	90.3 %	Unpaired Value
Cyanide	69.0 %	-46.6 %	69.0 %	69.0 %	Literature
Lead	61.0 %	41.7 %	61.0 %	41.7 %	Unpaired Value

Table 4-2: Basis of Selection for Pollutant Removal Efficiency through WPCP Process

Parameter	1999 Removal Efficiency [1, 2]	2018 Unpaired Analysis [1]	Literature Removal Rate [1, 3]	Selection	Basis
Mercury	60.0 %	-178.9 %	60.0 %	60.0 %	Literature
Molybdenum	21.0 %	19.1 %	33.0 %	19.1 %	Unpaired Value
Nickel	42.0 %	37.3 %	42.0 %	37.3 %	Unpaired Value
Selenium	50.0 %	14.5 %	50.0 %	50.0 %	Literature
Silver	75.0 %	3.5 %	75.0 %	75.0 %	Literature
Zinc	50.0 %	64.5 %	79.0 %	64.5 %	Unpaired Value

[1] Removal efficiency through preliminary and secondary treatment.
[2] From Technical Report Headworks Loading Evaluation for City of Cartersville (Jordan, Jones, & Goulding, 1999).
[3] EPA Local Limits Development Guidance, 833-R-04-002A (2004).

4.2 Uncontrollable Load Determination

The City conducted site-specific sampling in residential and commercial areas to determine the uncontrollable, or domestic, pollutant concentrations. Similar to pollutant removal efficiencies, EPA allows the use of literature values to determine the domestic load. However, the EPA literature values are conservative and may overestimate the amount of pollutant from domestic sources. All of the site-specific metals monitoring data was used in the headworks analysis in lieu of the EPA literature values for the uncontrollable load analysis. The site-specific sampling data demonstrated less pollutant present in the samples than the EPA literature values. The majority of the domestic concentration analytical results were less than the MDL, so one-half of the MDL was used in the calculations per EPA policy. Table 4-3 provides a summary and basis for the domestic contribution.

Table 4-3: Basis of Selection for Domestic Contribution

Parameter	2013 Uncontrollable Concentration, mg/L [1]	2018 Site Specific Sampling Data, mg/L [2]	Literature Value, mg/L	Selection, mg/L	Basis
Arsenic	0.007	0.0025	0.007	0.0025	Sampling Data
Cadmium	0.008	0.0004	0.008	0.00035	Sampling Data
Chromium	0.034	0.0030	0.034	0.003	Sampling Data
Copper	0.109	0.0415	0.14	0.042	Sampling Data
Cyanide	0.082	0.0000	0.01	0.000005	Sampling Data
Lead	0.116	0.0014	0.058	0.0014	Sampling Data
Mercury	0.002	0.00000012	0.002	0.00000012	Sampling Data
Molybdenum	----	0.0025	----	0.0025	Sampling Data
Nickel	0.047	0.0031	0.047	0.0031	Sampling Data
Selenium	0.004	0.0025	----	0.0025	Sampling Data

Table 4-3: Basis of Selection for Domestic Contribution

Parameter	2013 Uncontrollable Concentration, mg/L [1]	2018 Site Specific Sampling Data, mg/L [2]	Literature Value, mg/L	Selection, mg/L	Basis
Silver	0.019	0.0006	0.019	0.0006	Sampling Data
Zinc	0.212	0.1904	0.231	0.1904	Sampling Data

[1] From Technical Report Headworks Loading Evaluation for City of Cartersville (Jordan, Jones, & Goulding, 1999).
[2] Average of unpaired data set.

4.3 WPCP Design Capacity

The allowable headworks load for conventional pollutants is typically based on NPDES permit requirements or the influent design capacity of the treatment facility. Table 4-4 summarizes the NPDES load and influent design criteria load for BOD_5, TSS, ammonia, TKN, total nitrogen, and total phosphorus. Except for total nitrogen, the conventional pollutant allowable loads are based on the WPCP design criteria. Headworks analyses are not typically based on influent total nitrogen. Rather, influent TKN is used as a surrogate for influent total nitrogen.

Table 4-4: Summary of Allowable NPDES and Influent Design Loads

Pollutant	NPDES Concentration, mg/L	NPDES Load, lb/d	Influent Design Criteria Concentration, mg/L [1]	Influent Design Criteria Load, lb/d	Minimum Pass-Through Basis
BOD_5, summer	10	18,025	206	25,800	Design
TSS	20	55,878	221	27,600	Design
Ammonia, summer	2	2,941	22	2,800	Design
Total Kjeldahl nitrogen	----	----	37	4,600	Design
Total phosphorus	1	56	11	1,376	Design

[1] From Cartersville Water Pollution Control Plant Facility Evaluation Report (Hazen and Sawyer, 2017).

4.4 Water Quality Based Headworks Load

Water quality based headworks analysis thresholds are based on the protection of aquatic life and human health. Georgia EPD issued a permit renewal in March 2018 with the associated Fact Sheet and Reasonable Potential Analysis output. The data was used to populate the headworks analysis model with condition-specific allowable acute water quality and chronic water quality water quality standards (WQS). The stream 7Q10 and 1Q10 were used to calculate the applicable chronic and acute water quality based allowable headworks loads, respectively. Georgia EPD has adopted criteria for various organic pollutants; however, none of the organic pollutant criteria apply to the Cartersville NPDES permit.

The condition-specific water quality standards were calculated using data provided by Georgia EPD in the NPDES permit Fact Sheet and the Reasonable Potential Analysis output. An instream hardness of 25 mg/L was used per the Fact Sheet. This value was verified by reviewing EPA's Storet data at two ambient water quality stations near the Cartersville WPCP discharge in the Etowah River. An effluent hardness value of 25 mg/L was also used in absence of available data. An effluent TSS of 9.78 mg/L was used per the Fact Sheet to calculate the translator for conversion to dissolved to total recoverable criteria. Additionally, the EPD Reasonable Potential Spreadsheet output indicated the instream concentrations of metals are zero. The City does not have any permit limits for metals in this current permit cycle.

The acute and chronic condition-specific criteria were then used in the wasteload allocation (WLA) calculations to determine the allowable maximum day and the monthly average effluent discharge, respectively. The WLA is the assimilative capacity in a receiving stream for a particular pollutant. The WLA considers the mass balance of pollutant load between the receiving stream and the effluent discharge and the removal efficiency through the treatment facility. The following provides the equations for the criterion maximum concentration (CMC), the criterion chronic concentration (CCC), and the WLA:

Criterion Maximum Concentration (CMC), or acute criteria:

Published criterion, total recoverable = $\exp\{m_A * \ln[\text{hardness}]+b_A\}$

Where m_A and b_A are toxicant-specific

Published criterion, toxic form, dissolved = Published criterion, total recoverable * Acute conversion factor (ACF)

Where ACF has a toxicant-specific equation

Condition-specific criterion, total recoverable, $C_{s,acute}$ = Published acute criterion, toxic form / translator

Criterion Chronic Concentration (CCC), or chronic criteria:

Published criterion, total recoverable = $\exp\{m_C * \ln[\text{hardness}] + b_C\}$

Where m_C and b_C are toxicant-specific

Published criterion, toxic form, dissolved = Published criterion, total recoverable * Chronic conversion factor (CCF)

Where CCF has a toxicant-specific equation

Condition-specific criterion, total recoverable, $C_{s,chronic}$ = Published chronic criterion, toxic form / translator

Wasteload allocation:

Acute (daily maximum) WLA, $C_{WLA,acute} = [(1Q10 + Q_{WWTP}) \times C_{s,acute} - 1Q10 \times C_b] / Q_{WWTP}$

Chronic (monthly average) WLA, $C_{WLA,chronic} = [(7Q10 + Q_{WWTP}) \times C_{s,chronic} - 7Q10 \times C_b] / Q_{WWTP}$

Where: 1Q10 = Lowest 1-day average flow that occurs once every 10 years
7Q10 = Lowest 7-day average flow that occurs once every 10 years
Q_{WWTP} = Permitted NPDES discharge
C_b = Receiving stream pollutant concentration (also background concentration)
$C_{s,acute}$ and $C_{s,chronic}$ = Condition-specific acute and chronic criterion, total recoverable

Table 4-5 provides a summary of the allowable chronic, acute, and human health headworks loads. The allowable water quality load is the minimum of the chronic, acute, and human health loads. Eleven metals and phenol are limited based on the condition-specific allowable chronic water quality based headworks load. The exception is copper, which is limited based on the condition-specific allowable acute water quality based headworks load.

Table 4-5: Summary of Condition-Specific Allowable Water Quality Based Headworks Loads

Pollutant	Allowable Chronic WQS, lb/d [1, 2]	Allowable Acute WQS, lb/d [1, 2]	Allowable Human Health, lb/d	Allowable Water Quality Threshold, lb/d
Arsenic	2,388	3,802	223	223
Cadmium	1.7	6.8	----	1.7
Chromium	94	96	----	94
Copper	124	116	----	116
Cyanide	----	----	----	----
Lead	7.7	139	----	7.7
Mercury	0.05	3.8	----	0.05
Molybdenum	----	----	----	----
Nickel	91	574	----	91
Selenium	15.4	----	----	15.4
Silver	----	----	----	----
Zinc	546	380	----	380
Phenol	4,614	6,696	----	4,614

[1] The following assumptions apply to the chronic and acute condition specific water quality based headworks loads: background concentration equals 0 mg/L, effluent TSS equals 9.78 mg/L, receiving stream hardness equals 25 mg/L, and effluent hardness equals 25 mg/L.

[2] Calculation of chronic and acute water quality based headworks loads used data provided in the NPDES permit Fact Sheet and Reasonable Potential Analysis output.

4.5 Inhibition Based Headworks Load

The headworks analysis model considers inhibition in activated sludge, trickling filters, nitrification, and anaerobic digestion. A summary of the allowable inhibition loads and the most stringent allowable load and basis are provided in Table 4-6. In the City's case, trickling filter and anaerobic inhibition do not apply. The most conservative EPA literature threshold was used in the inhibition based headworks loading calculations with a few exceptions. The WPCP has not historically experienced any inhibition in the activated sludge process or nitrification. Therefore, if the local limit threshold appeared to be limiting for a specific inhibition, the literature threshold rates were increased to the upper limit of EPA's threshold range. For activated sludge inhibition, the cyanide, lead, and zinc thresholds were increased to EPA's upper range. For nitrification inhibition, the chromium, copper, and zinc thresholds were increased to EPA's upper range.

Table 4-6: Summary of Allowable Inhibition Based Loads

Pollutant	Activated Sludge, lb/d	Trickling Filter, lb/d	Nitrification, lb/d	Anaerobic Digestion, lb/d	Most Stringent (Allowable) Inhibition, lb/d	Inhibition Basis
Arsenic	5.6	----	84	----	5.6	Inhib, Sludge
Cadmium	56	----	291	----	56	Inhib, Sludge
Chromium	56	----	106	----	56	Inhib, Sludge
Copper	56	----	27	----	27	Inhib, Nitrif
Cyanide	279	----	19	----	19	Inhib, Nitrif
Lead	56	----	28	----	28	Inhib, Nitrif
Mercury	5.6	----	----	----	5.6	Inhib, Sludge
Molybdenum	----	----	----	----	----	----
Nickel	56	----	14	----	14	Inhib, Nitrif
Selenium	----	----	----	----	----	----
Silver	----	----	----	----	----	----
Zinc	279	----	28	----	28	Inhib, Nitrif
Phenol	2,794	----	224	----	224	Inhib, Nitrif

4.6 Biosolids Quality Headworks Load

EPA requires that biosolids disposal thresholds be considered as a limiting factor in a headworks analysis. The City sends dewatered biosolids to Class B land application for disposal. Therefore, EPA's Class B Land Application Sludge Criteria are the limiting POC thresholds in this analysis.

If a local limit for a specific POC was determined to be limited based on biosolids disposal, then the alternate headworks addendum sludge loading (HASL) method was used. In the headworks analysis model, the mass balance assumes that the metals contribution in the influent and the percent adsorption to sludge remain constant. In reality, the metals influent concentration will vary as will the percent of metal adsorbed to sludge. The HASL calculates the biosolids threshold based on the maximum amount of metal that was land applied and the average influent metal concentration in lieu of the headworks mass balance output. The metal applied to land was less than 15 percent of the Class B sludge ceiling for each pollutant. The HASL applied to arsenic, cadmium, nickel, and selenium. Table 4-7 summarizes the Class A and B sludge criteria, the allowable biosolids headworks load, the minimum sludge loading with the HASL applied, and the allowable biosolids threshold.

Table 4-7: Summary of Allowable Biosolids Loads

Pollutant	Class A Sludge Criteria, mg/kg	Class B Sludge Criteria, mg/kg	Allowable Biosolids Headworks Load, lb/d [1]	Check if HASL Applies [2]	Minimum Sludge (HASL) Loading, lb/d	Allowable Biosolids Threshold, lb/d
Arsenic	41	75	1.1	X	3.1	3.1
Cadmium	39	85	0.8	X	3.2	3.2
Chromium	----	----	----	----	----	----
Copper	1,500	4,300	30.2	----	----	----
Cyanide	----	----	----	----	----	----
Lead	300	840	12.8	----	----	----
Mercury	17	57	0.6	----	----	----
Molybdenum	75	75	2.5	----	----	----
Nickel	420	420	7.1	X	7.7	7.7
Selenium	100	100	1.3	X	3.8	3.8
Silver	----	----	----	----	----	----
Zinc	2,800	7,500	74	----	----	----

[1] Allowable biosolids headworks load based on Class B sludge criteria.
[2] Headworks Addendum Sludge Load (HASL) only applies after pollutant MAHL is calculated and the pollutant MAHL is limited for sludge disposal.

5. Local Limits Evaluation

5.1 Summary and Basis of MAHL

The allowable thresholds from the EPA Region 3 headworks analysis model results are summarized in Table 5-1. The MAHL for arsenic, molybdenum, nickel, and selenium are based on sludge disposal. The MAHL for cadmium, lead, and mercury are water quality based. Copper, cyanide, zinc, and phenol are limited based on nitrification inhibition. Chromium is activated sludge inhibition based. There is not a basis for a MAHL for silver.

Table 5-1: Summary of Allowable Headworks Loads

Pollutant	Allowable Headworks Load				MAHL, lb/d	Basis for MAHL
	Design or NPDES, lb/d	Water Quality, lb/d	Inhibition, lb/d	Sludge Disposal, lb/d		
Arsenic	----	223	5.6	3.1	3.1	Sludge Disposal
Cadmium	----	1.7	56	3.2	1.7	Water Quality
Chromium	----	94	56	----	56	Inhibition, Sludge
Copper	----	116	27	30	27	Inhib, Nitrif
Cyanide	----	----	19	----	19	Inhib, Nitrif
Lead	----	7.7	28	12.8	7.7	Water Quality
Mercury	----	0.046	5.6	0.6	0.046	Water Quality
Molybdenum	----	----	----	2.5	2.5	Sludge Disposal
Nickel	----	91	14	7.7	7.7	Sludge Disposal
Selenium	----	15.4	----	3.8	3.8	Sludge Disposal
Silver	----	----	----	----	----	----
Zinc	----	380	28	73.7	28	Inhib, Nitrif
Phenol	----	4,614	224	----	224	Inhib, Nitrif
BOD_5, summer	25,800	----	----	----	25,800	Design
TSS	27,600	----	----	----	27,600	Design
Ammonia, summer	2,800	----	----	----	2,800	Design
TKN	4,600	----	----	----	4,600	Design
TP	1,376	----	----	----	1,376	Design

5.2 Summary of MAIL

Table 5-2 provides a summary of the MAHL, domestic load, hauled waste load, and the resulting MAIL for each POC. The MAIL is the load that a POTW may distribute among SIUs. A 10 percent safety factor was applied to the MAHL to account for variability in the headworks analysis results. The domestic load calculation is based on the site specific sampling analytical results and the average influent flow for 2017

(the most recent full year of data available). It should be noted that the MAIL for BOD_5, TSS, ammonia, TKN, and TP is provided for informational purposes.

Table 5-2: Summary of MAHL, Domestic Load, Hauled Waste, and MAIL

Pollutant	MAHL, lb/d	Domestic Load, lb/d	Hauled Waste Load, lb/d	MAIL, lb/d [2]
Arsenic	3.1	0.10	----	2.7
Cadmium	1.7	0.014	----	1.5
Chromium	56	0.12	----	50.2
Copper	27	1.73	----	22.4
Cyanide	19	0.00021	----	17.1
Lead	7.7	0.06	----	6.9
Mercury	0.046	0.000005	----	0.042
Molybdenum	2.5	0.10	----	2.1
Nickel	7.7	0.13	----	6.8
Selenium	3.8	0.10	----	3.3
Silver	----	0.024	----	----
Zinc	28	7.9	----	17.3
Phenol	224	0.0	----	201
BOD_5, summer [1]	25,800	8,508	----	14,719
TSS [1]	27,600	9,120	----	15,720
Ammonia, summer [1]	2,800	909	----	1,612
TKN [1]	4,600	1,527	----	2,613
TP [1]	1,376	454	----	785

[1] Provided for informational purposes.
[2] Calculation of the MAIL includes a 10% safety factor applied to the MAHL.

5.3 Development of Local Limits

The City's local limits were last updated in 1999. The City has historically used the uniform concentration (UC) method in lieu of the IU contributory flow method to determine local limits. The UC method evenly divides the MAIL among SIUs by using the total annual average industrial flow. The IU contributory flow method allows a local limit to be developed based on the contribution of individual POCs from each SIU.

The flow from an SIU is considered in the IU contributory flow method calculation only if that industry is discharging a specific POC. The City's industrial discharge monitoring record data was reviewed for the presence or absence of each POC from each ISU. If a POC was detected with at least one non-detect value in the database, then that industry was considered to contribute to the POC load. The domestic background concentration for each POC was used for the non-contributing industries.

Table 5-3 provides a summary of the local limits calculations and recommendations. The City should consider raising several local limits, as the current local limits are low compared to the calculated UC and IU contributory flow local limits. The UC and IU contributory flow methods are both presented in Table 5-3 in addition to the current local limits for reference. A local limit for silver is not necessary. EPA removed inhibition for silver in the 2004 Guidance. Additionally, there is not a water quality criteria and a sludge criteria standard for silver to establish a MAHL.

A summary of the headworks analysis model calculations are provided in Appendix B. The results of the IU contributory method analysis are provided in Appendix C. An overview summary of the headworks analysis model and local limits results is provided in Appendix D. The headworks addendum sludge loading calculations are provided in Appendix E. The following sections provide a discussion of the local limits summarized in Table 5-3.

Table 5-3: Summary of Recommended Local Limits

Pollutant	Uniform Concentration Local Limit, mg/L	IU Contributory Flow Local Limit, mg/L	Current Local Limit (1999-2018), mg/L	Recom-mended Local Limit (2018), mg/L	Recom-mended Local Limit Type	Local Limit Change Indicated by "•"
Arsenic	0.185	1.9	0.02	0.185	Uniform concentration	•
Cadmium	0.105	0.57	0.01	0.105	Uniform concentration	•
Chromium	3.43	6.35	0.67	0.67	Current local limit	
Copper	1.53	1.54	0.11	1.53	Uniform concentration	•
Cyanide	1.17	5.90	0.13	1.17	Uniform concentration	•
Lead	0.47	0.64	0.12	0.47	Uniform concentration	•
Mercury	0.0028	0.03	0.002	0.0028	Uniform concentration	•
Molybdenum	0.146	0.23	0.13	0.23	IU contributory	•
Nickel	0.47	0.52	0.26	0.52	IU contributory	•
Selenium	0.23	0.34	0.02	0.23	Uniform concentration	•
Silver	----	9.24	0.7	----	No limit	•
Zinc	1.18	1.19	0.3	1.18	Uniform concentration and IU contributory	•
Phenol	13.8	16.5	2.13	2.13	Current local limit	

Table 5-3: Summary of Recommended Local Limits

Pollutant	Uniform Concentration Local Limit, mg/L	IU Contributory Flow Local Limit, mg/L	Current Local Limit (1999-2018), mg/L	Recom-mended Local Limit (2018), mg/L	Recom-mended Local Limit Type	Local Limit Change Indicated by "●"
BOD_5, summer	1,007		300 / 850	300 / 850	Current local limit	
TSS	1,076		300 / 1,500	300 / 1,500	Current local limit	
COD			750 / 2,500	750 / 2,500	Current local limit	
Ammonia, summer						
TKN						
Phosphorus						
O&G-AV (FOG)			100	100	Current local limit	
O&G-TPH			Narrative standard	100	New local limit	●
pH			5.5 – 10.0	5.5 – 10.0	Current local limit	
Flashpoint			< 140°F	< 140°F	Current local limit	
Temperature			< 150°F	< 150°F	Current local limit	

5.3.1 Metals

The recommended local limits for metals were selected based on the results of the UC method, the IU contributory flow method, and the current local limit. With the exception of chromium, all of the local limits for metals could be increased as a result of this headworks analysis update. Recommended local limits for arsenic, cadmium, copper, cyanide, lead, mercury, and selenium are based on the UC method. Recommended local limits for molybdenum and nickel are based on the IU contributory flow method. The recommendation for zinc is based on both the UC and IU contributory flow method, as the results are nearly identical. Zinc is present in all of the industrial discharges. A limit is not recommended for silver as there is not a basis for a MAHL.

5.3.2 Oil and Grease

Oil and grease is a primary cause of SSO events in the City's collection system. FOG is also problematic to the treatment facilities due to preliminary treatment equipment clogging, lower wastewater treatment efficiency, and interference with biological activity within the treatment process (e.g., filamentous growth). FOG is biodegradable, absorbed by the activated sludge floc, and slowly metabolized. The TPH fraction of

oil and grease is resistant to degradation and is more likely to cause pass-through interference in a POTW. There are no recorded instances of TPH contributing to biological process upsets at the WPCP.

There is a range of approaches for establishing local limits for FOG. A technical basis for a FOG concentration-based numeric limit is not provided in 40 CFR 403. Additionally, specific approaches to local limits development are not prohibited by 40 CFR 403. Local FOG limits are based on knowledge of the specific collection and treatment system in addition to a range of management practices that have proven to reduce FOG-related SSOs or pass through interference at a wastewater treatment facility. It is recommended that the City maintain a local limit of 100 mg/L of FOG (e.g., oil and grease animal-vegetable fraction) to manage the incidences of SSOs in the collection system.

Many POTWs have adopted numeric criteria for TPH as it is well understood that TPH is resistant to biological degradation and is more likely to cause pass-through interference in a POTW. The majority of POTWs have adopted a local TPH limit of 100 mg/L, although a range of higher and lower TPH numeric limits have been documented. The technical basis of the 100 mg/L local limit for TPH originated from an EPA document titled *Treatability of Oil and Grease Discharge to Publically Owned Treatment Works* published in April 1975. The technical basis for the limit was established using influent wastewater oil and grease characteristics and subsequent dilution in a wastewater treatment facility and/or receiving stream. It is recommended that the City implement a local limit of 100 mg/L limit for TPH.

5.3.3 pH

EPA requires a specific discharge prohibition for pH per 40 CFR 403.5(b)(2). The regulation specifies a minimum pH limit of 5.0 to be discharged to a collection system. EPA determined that a minimum pH of 5.0 would not typically cause corrosive structural damage to a POTW collection and treatment system.

The regulations do not specify an upper pH limit. EPA's Local Limits Development Guidance Manual (2004) recommends that POTWs develop site-specific upper pH thresholds if corrosion damage or WWTP upset is identified. EPA suggests an upper limit pH threshold of 12.5 in lieu of specifically identified high pH corrosion concerns. A wastewater discharge with a pH greater than 12.5 has been identified in 40 CFR 261.22(a)(1) as a hazardous Resource Conservation and Recovery Act (RCRA) waste; however, EPA acknowledges that there are no prohibitions for the direct discharge of hazardous waste into a collection system.

It is recommended that the City maintain the local limit for pH in the range of 5.5 to 10.0. This pH range has demonstrated to be protective of the collection system. Events related to pH-corrosion have not been documented.

5.3.4 Flashpoint

EPA prohibits the discharge of pollutants that will create an explosion hazard per 40 CFR 403.5(b)(1). The flashpoint is the lowest temperature for vapor combustion to propagate away from an ignition source. Temperatures that are lower than the flashpoint threshold will not combust or will only ignite at the ignition

source. EPA recommends limiting the closed cup flashpoint to less than 140°F. It is recommended that the City maintain the local flash point limit of 140°F.

5.3.5 Conventional Pollutants (BOD_5, TSS, Ammonia, and Phosphorus)

Hazen compiled data on conventional pollutants (e.g., BOD_5, TSS, and ammonia) and total phosphorus for each SIU discharging to the WPCP. Table 5-4 provides a summary of MAIL scenarios for BOD_5, TSS, and ammonia. Table 5-5 provides a summary of the maximum recorded concentration of each pollutant for each industry in 2017 and the associated industrial wastewater load. Table 5-5 also provides the percent of the POC average day influent load.

The headworks analysis demonstrated that the City is almost over-allocated for BOD_5 and over-allocated for TSS at 7.5 percent and -39.2 percent, respectively, using the maximum local limit discharge concentration as written in the IUPs. If the percent MAIL available is calculated using the maximum recorded industrial discharge concentration and average annual industrial flow using the IU contributory flow method, the percent available MAIL is 57.6 percent and 79.1 percent, respectively. If the percent available MAIL is calculated using the BOD_5 and TSS thresholds of 300 mg/L specified in the City's SUO, the City has 60.5 percent and 72.2 percent available MAIL for BOD_5 and TSS, respectively. This analysis indicates that the City's SIUs are not contributing BOD_5 and TSS to the maximum permitted capacity as written in the IUPs.

Table 5-4: Summary of Maximum Allowable Industrial Load Scenarios for BOD_5, TSS, and Ammonia

	% Available (Remaining) Maximum Allowable Industrial Load (MAIL)		
Scenario	**BOD_5**	**TSS**	**Ammonia**
Current allocation based on industrial use permits	7.5 %	-39.2 %	96.8 %
Allocation based on industrial user contributory flow method	57.6 %	79.1 %	42.4 %
Allocation based on modification of industrial use permits to a domestic threshold of 300 mg/L	60.5 %	72.2 %	----
Allocation based on modification of industrial use permits to a domestic threshold of 30 mg/L	----	----	71.5 %
Allocation based on modification of industrial use permits to a domestic threshold of 50 mg/L	----	----	53.8%

The City has not currently implemented a local limit for ammonia or a threshold in the SUO, which results in a percent available MAIL of 96.8 percent. Only one SIU has a permit limit for ammonia at 50 mg/L. However, four out of the 15 SIUs are discharging ammonia greater than 50 mg/L. Six out of the 15 SIUs are discharging ammonia greater than 30 mg/L. Per the IU contributory flow method, the percent available MAIL for ammonia is 42.4 percent. If the City were to implement a 30 mg/L local limit, a 71.5 percent MAIL available would result. A local ammonia limit of 50 mg/L would result in a 53.8 percent available MAIL. The design capacity of the WPCP is 22 mg/L (Hazen and Sawyer, 2017). Due to elevated industrial discharges of ammonia, the City should consider a developing a surcharge for discharges greater than a domestic threshold.

The MAHL of 1,376 lb/d for phosphorus is based on the WPCP design criteria. The total industrial phosphorus load was calculated using the maximum recorded industrial data, which resulted in approximately 51 percent of the available MAHL, or 703 lb/d. A percent available MAIL for phosphorus may not be calculated, as a local limit for phosphorus has not been established. Due to the apparent elevated industrial loading, the City should consider implementing a surcharge for phosphorus in response to the new NPDES permit limit. A local limit for phosphorus is not recommended as a result of this evaluation.

Table 5-5: Summary of Maximum Significant Industrial User Conventional Pollutant Contribution

	Total Phosphorus		Ammonia		BOD_5		TSS	
Industry [1]	**mg/L** [1]	**lb/d** [2]	**mg/L** [1]	**lb/d** [2]	**mg/L** [1]	**lb/d** [2]	**mg/L** [1]	**lb/d** [2]
Absolute Environmental Solutions	3.5	1.46	30.6	12.8	42	17.5	48	20
Ampacet	0.51	0.167	0.18	0.059	9	2.9	28	9.2
Anheuser-Busch	16.3	113	31.5	219	272	1,892	387	2,692
Anheuser-Busch	----	----	----	----	----	----	----	----
Aquafil	0.67	0.617	1.67	1.6	20	18.6	27	24.6
ATCO Rubber Products, Inc.	----	----	76	0.003	427	0.014	275	0.009
Bartow County Landfill	3.5	1.0	210	61	209	61.0	433	126
Doehler Beverage House	14.9	5.7	20.2	7.7	5,520	2,094	451	171
Innovative Chemical Technologies	112	1.4	26.5	0.33	695	8.7	182	2.3
Linde Gas North America, LLC	----	----	2.53	1.82	30	21.6	35	25
Shaw 11: Philadelphia Plant	15	12.5	11.9	9.9	265	221	11	9.4
Shaw 13: Stratton Plant	93	40.5	78.6	34.3	462	202	57	25
Southern Yarn Dyers	2.7	2.1	12.4	9.4	486	368	12	9.1
Tintoria	339	522	370	570	840	1,294	66	102
Toyo Tire	2.9	2.2	0.313	0.24	47	36.3	87	67
Total industrial load, lb/d	----	703	----	928	----	6,236	----	3,282
Total industrial load, lb/yr	----	256,650	----	338,850	----	2,276,200	----	1,198,100
Percent of WPCP average day influent flow [3]	----	110.6 %	----	73.5 %	----	65.7 %	----	25.5 %

[1] Maximum recorded industrial concentration in 2017.
[2] Loading was calculated using annual average industrial flow in Table 2-1.

5.4 Suggestions for Further Study

In the process of updating the headworks analysis model and local limits evaluation, several items are suggested for further study in the next permit cycle and subsequent Pretreatment Program renewal, as follows:

1. Consider revisions to the IUPs to reflect the BOD_5, TSS, and COD domestic threshold concentrations in the City's SUO as a monthly average. The maximum allowable surcharge limits should be listed in IUPs as a not-to-exceed maximum value.
2. Consider conducting an annual intensive sampling event over a one to two-week period (nine samples) using Standard Method 200.8 with ultra-low detection levels. The sampling should include uncontrollable (e.g., domestic) contribution sampling, WPCP influent sampling, and WPCP effluent sampling. It is recommended to rotate the annual sampling events by season.
3. Consider a site-specific metals removal sampling study to evaluate the metals removal efficiency through the WPCP process. The site-specific study would involve the collection of composite and grab samples through the WPCP over a one to two-week intensive sampling period.
4. Consider developing a surcharge for either ammonia (or total nitrogen) and phosphorus for industrial discharges greater than the local limit domestic threshold.

6. References

American Public Health Association; American Water Works Association, Water Environment Federation. 2012. Standard Methods for the Examination of Water and Wastewater, 22nd Edition.

Cartersville, City of. 2018. Code of Ordinances, Chapter 24, Article V – Sewer Use, Pretreatment and Sewage Disposal.

Hazen and Sawyer. 2017. Cartersville Water Pollution Control Facility Evaluation Report.

Metcalf and Eddy. 2003. Wastewater Engineering, Treatment, and Reuse, Fourth Edition. Published by McGraw Hill.

United States Environmental Protection Agency. July 2012. Title 40 (Protection of Environment), Chapter I (Environmental Protection Agency), Subchapter N (Effluent Guidelines and Standards), Part 403 (General Pretreatment Regulations for Existing and New Sources of Pollution. 46 Federal Register 9439 and U.S.C. 1251 et seq.

United States Environmental Protection Agency. 2004. Local Limits Development Guidance. Office of Wastewater Management, EPA 833-R-04-002A.

United States Environmental Protection Agency. 1999. Guidance Manual for the Control of Wastes Hauled to Publically Owned Treatment Works. EPA-833-B-98-003.

United States Environmental Protection Agency. 1985. Guidance Manual for Implementing Total Toxic Organics Pretreatment Standards, Office of Water.

United States Environmental Protection Agency. 1975. Treatability of Oil and Grease Discharged to Publically Owned Treatment Works. Office of Water and Hazardous Materials Effluent Guidelines Division, EPA 440/1-75/066.

Appendix A: Summary of Metal and Conventional Pollutant Monitoring Data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1		ARSENIC																			
2	Date	<	As Inf (mg/L)	As Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	As Eff (mg/L)	As Eff (mg/L) Used in Calculation	<	As Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	AS Sludge, mg/L	<	As Domestic (mg/L)	As Domestic (mg/L) Used in Calculation	<	As Hauled to Inf (mg/L)	As Hauled to Inf (mg/L)
3	Dec-11							<	0.005	0.0025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.005	0.0025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.005	0.0025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.005	0.0025											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.005	0.0025				<	0.005	0.0025											
51	Dec-15																				
52	Jan-16											5.7	5.7	15.66 %	0.89						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16	<	0.005	0.0025				<	0.005	0.0025											
63	Dec-16																				
64	Jan-17											4.8	4.8	14.24 %	0.68						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18	<	0.005	0.0025				<	0.005	0.0025											
80	04/13/18	<	0.005	0.0025				<	0.005	0.0025											

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1		ARSENIC																			
2	Date	<	As Inf (mg/L)	As Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	As Eff (mg/L)	As Eff (mg/L) Used in Calculation	<	As Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	AS Sludge, mg/L	<	As Domestic (mg/L)	As Domestic (mg/L) Used in Calculation	<	As Hauled to Inf (mg/L)	As Hauled to Inf (mg/L)
81	04/17/18															<	0.005	0.0025			
82	04/17/18															<	0.005	0.0025			
83	04/17/18															<	0.005	0.0025			
84	04/18/18	<	0.005	0.0025				<	0.005	0.0025											
85	04/19/18															<	0.005	0.0025			
86	04/19/18															<	0.005	0.0025			
87	04/19/18															<	0.005	0.0025			
88	04/20/18	<	0.005	0.0025				<	0.005	0.0025											
89	04/25/18	<	0.005	0.0025				<	0.005	0.0025											
90	04/27/18	<	0.005	0.0025				<	0.005	0.0025											
91	05/01/18															<	0.005	0.0025			
92	05/01/18															<	0.005	0.0025			
93	05/01/18															<	0.005	0.0025			
94	05/02/18	<	0.005	0.0025				<	0.005	0.0025											
95																					
96	Count			10			0			14		2	2	2	2			9			0
97	Average			0.0043			-			0.0038		5.3	5.25	15.0 %	0.8			0.0025			-
98	Maximum			0.02			-			0.02		5.7	5.70	15.7 %	0.9			0.0025			-
99	Minimum			0.0025			-			0.0025		4.8	4.80	14.2 %	0.7			0.0025			-
100	Std. Deviation			0.005			-			0.005		0.636	0.636	1.0	0.1			0.00000			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			No	No	No			No			-
102																					
103	Load, lb/d			0.24			-			0.21					44			0.10			-
104																					
105	% of Data < Detection			100%			-			100%								100%			-
106	Unpaired Site Specific Removal Rate						-			11.8 %											
107	Literature Value						-			45.0 %								0.007			
108	Selected Value						0.0 %			45.0 %								0.0025			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											185.4									
111																					
112																					
113	Data entry																				

	A	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1		CADMIUM																			
2	Date	<	Cd Inf (mg/L)	Cd Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Cd Eff (mg/L)	Cd Eff (mg/L) Used in Calculation	<	Cd Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Cd Sludge, mg/L	<	Cd Domestic (mg/L)	Cd Domestic (mg/L) Used in Calculation	<	Cd Hauled to Inf (mg/L)	Cd Hauled to Inf (mg/L)
3	Dec-11							<	0.0007	0.00035											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.0007	0.00035											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.0007	0.00035											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.0007	0.00035											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.0007	0.00035				<	0.0007	0.00035											
51	Dec-15																				
52	Jan-16											3.4	3.4	15.66 %	0.53						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16	<	0.0007	0.00035				<	0.0007	0.00035											
63	Dec-16																				
64	Jan-17											3.3	3.3	14.24 %	0.47						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18	<	0.0007	0.00035				<	0.0007	0.00035											
80	04/13/18	<	0.0007	0.00035				<	0.0007	0.00035											

	A	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1		CADMIUM																			
2	Date	<	Cd Inf (mg/L)	Cd Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Cd Eff (mg/L)	Cd Eff (mg/L) Used in Calculation	<	Cd Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Cd Sludge, mg/L	<	Cd Domestic (mg/L)	Cd Domestic (mg/L) Used in Calculation	<	Cd Hauled to Inf (mg/L)	Cd Hauled to Inf (mg/L)
81	04/17/18															<	0.0007	0.00035			
82	04/17/18															<	0.0007	0.00035			
83	04/17/18															<	0.0007	0.00035			
84	04/18/18	<	0.0007	0.00035				<	0.0007	0.00035											
85	04/19/18															<	0.0007	0.00035			
86	04/19/18															<	0.0007	0.00035			
87	04/19/18															<	0.0007	0.00035			
88	04/20/18	<	0.0007	0.00035				<	0.0007	0.00035											
89	04/25/18	<	0.0007	0.00035				<	0.0007	0.00035											
90	04/27/18	<	0.0007	0.00035				<	0.0007	0.00035											
91	05/01/18															<	0.0007	0.00035			
92	05/01/18															<	0.0007	0.00035			
93	05/01/18															<	0.0007	0.00035			
94	05/02/18	<	0.0007	0.00035				<	0.0007	0.00035											
95																					
96	Count			10			0			14		2	2	2	2			9			0
97	Average			0.0023			-			0.0018		3.4	3.35	15.0 %	0.5			0.00035			-
98	Maximum			0.02			-			0.02		3.4	3.40	15.7 %	0.5			0.00035			-
99	Minimum			0.00035			-			0.00035		3.3	3.30	14.2 %	0.5			0.00035			-
100	Std. Deviation			0.006			-			0.005		0.071	0.071	1.0	0.0			0.00000			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			No					No			-
102																					
103	Load, lb/d			0.13			-			0.10					28			0.01			-
104																					
105	% of Data < Detection			100%			-			100%								100%			-
106	Unpaired Site Specific Removal Rate						-			24.3 %											
107	Literature Value						15.0 %			67.0 %								0.008			
108	Selected Value									67.0 %								0.00035			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											216.5									
111																					
112																					
113	Data entry																				

	A	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI
1		CHROMIUM																			
2	Date	<	Cr Inf (mg/L)	Cr Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Cr Eff (mg/L)	Cr Eff (mg/L) Used in Calculation	<	Cr Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Cr Sludge, mg/L	<	Cr Domestic (mg/L)	Cr Domestic (mg/L) Used in Calculation	<	Cr Hauled to Inf (mg/L)	Cr Hauled to Inf (mg/L)
3	Dec-11							<	0.005	0.0025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.005	0.0025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.005	0.0025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.005	0.0025											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.005	0.0025				<	0.005	0.0025											
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16		0.0076	0.0076				<	0.005	0.0025											
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18	<	0.005	0.0025				<	0.005	0.0025											
80	04/13/18	<	0.005	0.0025				<	0.005	0.0025											

	A	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI
1		CHROMIUM																			
2	Date	<	Cr Inf (mg/L)	Cr Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Cr Eff (mg/L)	Cr Eff (mg/L) Used in Calculation	<	Cr Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Cr Sludge, mg/L	<	Cr Domestic (mg/L)	Cr Domestic (mg/L) Used in Calculation	<	Cr Hauled to Inf (mg/L)	Cr Hauled to Inf (mg/L)
81	04/17/18															<	0.005	0.0025			
82	04/17/18															<	0.005	0.0025			
83	04/17/18															<	0.005	0.0025			
84	04/18/18	<	0.005	0.0025				<	0.005	0.0025											
85	04/19/18															<	0.005	0.0025			
86	04/19/18															<	0.005	0.0025			
87	04/19/18															<	0.005	0.0025			
88	04/20/18	<	0.005	0.0025				<	0.005	0.0025											
89	04/25/18	<	0.005	0.0025				<	0.005	0.0025											
90	04/27/18	<	0.005	0.0025				<	0.005	0.0025											
91	05/01/18															<	0.005	0.0025			
92	05/01/18																0.00681	0.00681			
93	05/01/18															<	0.005	0.0025			
94	05/02/18	<	0.005	0.0025				<	0.005	0.0025											
95																					
96	Count			10			0			14		0	0	0	0			9			0
97	Average			0.0048			-			0.0038		-	-	-	-			0.003			-
98	Maximum			0.02			-			0.02		-	-	-	-			0.00681			-
99	Minimum			0.0025			-			0.0025		-	-	-	-			0.0025			-
100	Std. Deviation			0.005			-			0.005		-	-	-	-			0.00144			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			-					Yes			-
102																					
103	Load, lb/d			0.27			-			0.21					-			0.12			-
104																					
105	% of Data < Detection			90%			-			96%								89%			-
106	Unpaired Site Specific Removal Rate						-			21.2 %											
107	Literature Value						27.0 %			82.0 %								0.034			
108	Selected Value									82.0 %								0.003			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											-									
111																					
112																					
113	Data entry																				

	A	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
1	COPPER																				
2	Date	<	Cu Inf (mg/L)	Cu Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Cu Eff (mg/L)	Cu Eff (mg/L) Used in Calculation	<	Cu Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Cu Sludge, mg/L	<	Cu Domestic (mg/L)	Cu Domestic (mg/L) Used in Calculation	<	Cu Hauled to Inf (mg/L)	Cu Hauled to Inf (mg/L)
3	Dec-11							<	0.005	0.0025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.005	0.0025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.005	0.0025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.005	0.0025											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15		0.0244	0.0244				<	0.005	0.0025											
51	Dec-15																				
52	Jan-16											421	421	15.66 %	65.93						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16		0.0563	0.0563				<	0.005	0.0025											
63	Dec-16																				
64	Jan-17											311.6	311.6	14.24 %	44.37						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18		0.0527	0.0527				<	0.005	0.0025											
80	04/13/18		0.0353	0.0353				<	0.005	0.0025											

	A	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
1		COPPER																			
2	Date	<	Cu Inf (mg/L)	Cu Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Cu Eff (mg/L)	Cu Eff (mg/L) Used in Calculation	<	Cu Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Cu Sludge, mg/L	<	Cu Domestic (mg/L)	Cu Domestic (mg/L) Used in Calculation	<	Cu Hauled to Inf (mg/L)	Cu Hauled to Inf (mg/L)
81	04/17/18																0.04	0.04			
82	04/17/18																0.0443	0.0443			
83	04/17/18																0.0255	0.0255			
84	04/18/18		0.0498	0.0498					0.0188	0.0188											
85	04/19/18																0.0449	0.0449			
86	04/19/18																0.0798	0.0798			
87	04/19/18																0.0505	0.0505			
88	04/20/18		0.0362	0.0362				<	0.005	0.0025											
89	04/25/18		0.0441	0.0441				<	0.005	0.0025											
90	04/27/18		0.0317	0.0317				<	0.005	0.0025											
91	05/01/18																0.047	0.047			
92	05/01/18																0.0162	0.0162			
93	05/01/18																0.0257	0.0257			
94	05/02/18		0.0175	0.0175				<	0.005	0.0025											
95																					
96	Count			9			0			13		2	2	2	2			9			0
97	Average			0.0387			-			0.0038		366.3	366.30	15.0 %	55.2			0.042			-
98	Maximum			0.0563			-			0.0188		421	421.00	15.7 %	65.9			0.0798			-
99	Minimum			0.0175			-			0.0025		311.6	311.60	14.2 %	44.4			0.0162			-
100	Std. Deviation			0.012			-			0.005		77.357	77.357	1.0	15.2			0.019			-
101	Maximum sample point > 2x Standard Deviation from Average?			No			-			Yes			No					Yes			-
102																					
103	Load, lb/d			2.16			-			0.21					3,082			1.73			-
104																					
105	% of Data < Detection			0%			-			55%								0%			-
106	Unpaired Site Specific Removal Rate						-			90.3 %											
107	Literature Value						22.0 %			86.0 %								0.140			
108	Selected Value									90.3 %								0.042			
109	Data Source (Drop down list)									Unpaired Value								Sampling Data			
110	Sludge / Influent Ratio											1,426.3									
111																					
112																					
113	Data entry																				

	A	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW
1		CYANIDE																			
2	Date	<	CN Inf (mg/L)	CN Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	CN Eff (mg/L)	CN Eff (mg/L) Used in Calculation	<	CN Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	CN Sludge, mg/L	<	CN Domestic (mg/L)	CN Domestic (mg/L) Used in Calculation	<	CN Hauled to Inf (mg/L)	CN Hauled to Inf (mg/L)
3	Dec-11							<	0.00001	0.000005											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.025	0.0125											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.025	0.0125											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.025	0.0125											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.025	0.0125				<	0.025	0.0125											
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16	<	0.025	0.0125				<	0.025	0.0125											
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.02	0.01																	
74	Nov-17							<	0.02	0.01											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18	<	0.00001	0.000005				<	0.00001	0.000005											
80	04/13/18	<	0.00001	0.000005				<	0.00001	0.000005											

	A	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW
1		CYANIDE																			
2	Date	<	CN Inf (mg/L)	CN Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	CN Eff (mg/L)	CN Eff (mg/L) Used in Calculation	<	CN Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	CN Sludge, mg/L	<	CN Domestic (mg/L)	CN Domestic (mg/L) Used in Calculation	<	CN Hauled to Inf (mg/L)	CN Hauled to Inf (mg/L)
81	04/17/18															<	0.00001	0.000005			
82	04/17/18															<	0.00001	0.000005			
83	04/17/18															<	0.00001	0.000005			
84	04/18/18		0.00016	0.00016				<	0.00001	0.000005											
85	04/19/18															<	0.00001	0.000005			
86	04/19/18															<	0.00001	0.000005			
87	04/19/18															<	0.00001	0.000005			
88	04/20/18		0.000155	0.000155				<	0.00001	0.000005											
89	04/25/18	<	0.00001	0.000005				<	0.00001	0.000005											
90	04/27/18		0.00001	0.00001				<	0.00001	0.000005											
91	05/01/18															<	0.00001	0.000005			
92	05/01/18															<	0.00001	0.000005			
93	05/01/18															<	0.00001	0.000005			
94	05/02/18	<	0.00001	0.000005				<	0.00001	0.000005											
95																					
96	Count			10			0			14		0	0	0	0			9			0
97	Average			0.0035			-			0.0052		-	-	-	-			0.000005			-
98	Maximum			0.0125			-			0.0125		-	-	-	-			0.0000			-
99	Minimum			0.000005			-			0.000005		-	-	-	-			0.000005			-
100	Std. Deviation			0.005			-			0.006		-	-	-	-			0.000			-
101	Maximum sample point > 2x Standard Deviation from Average?			No			-			No			-					No			-
102																					
103	Load, lb/d			0.20			-			0.29					-			0.00			-
104																					
105	% of Data < Detection			70%			-			88%								100%			-
106	Unpaired Site Specific Removal Rate						-			-46.6 %											
107	Literature Value						27.0 %			69.0 %								0.010			
108	Selected Value									69.0 %								0.0000050			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											-									
111																					
112																					
113	Data entry																				

	A	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ
1		LEAD																			
2	Date	<	Pb Inf (mg/L)	Pb Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Pb Eff (mg/L)	Pb Eff (mg/L) Used in Calculation	<	Pb Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Pb Sludge, mg/L	<	Pb Domestic (mg/L)	Pb Domestic (mg/L) Used in Calculation	<	Pb Hauled to Inf (mg/L)	Pb Hauled to Inf (mg/L)
3	Dec-11							<	0.001	0.0005											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.001	0.0005											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.001	0.0005											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<													
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15		0.0011	0.0011				<	0.001	0.0005											
51	Dec-15																				
52	Jan-16											19.8	19.8	15.66 %	3.10						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16		0.0019	0.0019				<	0.001	0.0005											
63	Dec-16																				
64	Jan-17											17.9	17.9	14.24 %	2.55						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18		0.00197	0.00197				<	0.001	0.0005											
80	04/13/18		0.00149	0.00149				<	0.001	0.0005											

	A	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ
1		LEAD																			
2	Date	<	Pb Inf (mg/L)	Pb Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Pb Eff (mg/L)	Pb Eff (mg/L) Used in Calculation	<	Pb Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Pb Sludge, mg/L	<	Pb Domestic (mg/L)	Pb Domestic (mg/L) Used in Calculation	<	Pb Hauled to Inf (mg/L)	Pb Hauled to Inf (mg/L)
81	04/17/18															<	0.001	0.0005			
82	04/17/18															<	0.001	0.0005			
83	04/17/18																0.00237	0.00237			
84	04/18/18		0.00248	0.00248				<	0.001	0.0005											
85	04/19/18															<	0.001	0.0005			
86	04/19/18															<	0.001	0.0005			
87	04/19/18																0.00391	0.00391			
88	04/20/18		0.00132	0.00132				<	0.001	0.0005											
89	04/25/18		0.00166	0.00166				<	0.001	0.0005											
90	04/27/18		0.00132	0.00132				<	0.001	0.0005											
91	05/01/18																0.00103	0.00103			
92	05/01/18																0.00115	0.00115			
93	05/01/18																0.00192	0.00192			
94	05/02/18		0.00106	0.00106				<	0.001	0.0005											
95																					
96	Count			10			0			13		2	2	2	2			9			0
97	Average			0.0034			-			0.0020		18.9	18.85	15.0 %	2.8			0.00138			-
98	Maximum			0.02			-			0.02		19.8	19.80	15.7 %	3.1			0.0039			-
99	Minimum			0.00106			-			0.0005		17.9	17.90	14.2 %	2.5			0.0005			-
100	Std. Deviation			0.006			-			0.005		1.344	1.344	1.0	0.4			0.001			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			No					Yes			-
102																					
103	Load, lb/d			0.19			-			0.11					158			0.06			-
104																					
105	% of Data < Detection			10%			-			65%								44%			-
106	Unpaired Site Specific Removal Rate						-			41.7 %											
107	Literature Value						57.0 %			61.0 %								0.058			
108	Selected Value									41.7 %								0.00138			
109	Data Source (Drop down list)									Unpaired Value								Sampling Data			
110	Sludge / Influent Ratio											823.6									
111																					
112																					
113	Data entry																				

	A	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK
1		MERCURY																			
2	Date	<	Hg Inf (mg/L)	Hg Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Hg Eff (mg/L)	Hg Eff (mg/L) Used in Calculation	<	Hg Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Hg Sludge, mg/L	<	Hg Domestic (mg/L)	Hg Domestic (mg/L) Used in Calculation	<	Hg Hauled to Inf (mg/L)	Hg Hauled to Inf (mg/L)
3	Dec-11							<	0.0005	0.00025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.0005	0.00025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.0005	0.00025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.0005	0.00025											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.0005	0.00025				<	0.0005	0.00025											
51	Dec-15																				
52	Jan-16											0.6	0.6	15.66 %	0.09						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16	<	0.0005	0.00025					0.0015	0.0015											
63	Dec-16																				
64	Jan-17											0.6	0.6	14.24 %	0.09						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.0005	0.00025																	
74	Nov-17							<	0.0005	0.00025											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18	<	0.0000002	0.0000001				<	0.0000002	0.0000001											
80	04/13/18		1.816E-05	1.816E-05				<	1.31E-06	0.000000655											

	A	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK
1		MERCURY																			
2	Date	<	Hg Inf (mg/L)	Hg Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Hg Eff (mg/L)	Hg Eff (mg/L) Used in Calculation	<	Hg Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Hg Sludge, mg/L	<	Hg Domestic (mg/L)	Hg Domestic (mg/L) Used in Calculation	<	Hg Hauled to Inf (mg/L)	Hg Hauled to Inf (mg/L)
81	04/17/18															<	0.0000002	0.0000001			
82	04/17/18															<	0.0000002	0.0000001			
83	04/17/18															<	0.0000002	0.0000001			
84	04/18/18	<	0.0000002	0.0000001				<	0.0000002	0.0000001											
85	04/19/18															<	0.0000002	0.0000001			
86	04/19/18															<	0.0000002	0.0000001			
87	04/19/18															<	0.0000002	0.0000001			
88	04/20/18	<	0.0000002	0.0000001				<	0.0000002	0.0000001											
89	04/25/18	<	0.0000002	0.0000001				<	0.0000002	0.0000001											
90	04/27/18	<	0.0000002	0.0000001				<	0.0000002	0.0000001											
91	05/01/18															<	0.0000002	0.0000001			
92	05/01/18																0.0000003	0.0000003			
93	05/01/18															<	0.0000002	0.0000001			
94	05/02/18	<	0.0000002	0.0000001				<	0.0000002	0.0000001											
95																					
96	Count			10			0			14		2	2	2	2			9			0
97	Average			0.0001			-			0.0002		0.6	0.60	15.0 %	0.1			0.00000012			-
98	Maximum			0.00025			-			0.0015		0.6	0.60	15.7 %	0.1			0.0000			-
99	Minimum			0.0000001			-			0.0000001		0.6	0.60	14.2 %	0.1			0.0000001			-
100	Std. Deviation			0.00011			-			0.00039		0.000	0.000	1.0	0.0			0.000			-
101	Maximum sample point > 2x Standard Deviation from Average?			No			-			Yes			No					Yes			-
102																					
103	Load, lb/d			0.00			-			0.01					5			0.000			-
104																					
105	% of Data < Detection			90%			-			92%								89%			-
106	Unpaired Site Specific Removal Rate						-			-178.9 %											
107	Literature Value						10.0 %			60.0 %								0.002			
108	Selected Value									60.0 %								0.00000012			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											1,166.8									
111																					
112																					
113	Data entry																				

	A	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE
1	MOLYBDENUM																				
2	Date	<	Mo Inf (mg/L)	Mo Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Mo Eff (mg/L)	Mo Eff (mg/L) Used in Calculation	<	Mo Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Mo Sludge, mg/L	<	Mo Domestic (mg/L)	Mo Domestic (mg/L) Used in Calculation	<	Mo Hauled to Inf (mg/L)	Mo Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16											11	11	15.66 %	1.72						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17											10.1	10.1	14.24 %	1.44						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18		0.00691	0.00691					0.00515	0.00515											
80	04/13/18	<	0.005	0.0025					0.00508	0.00508											

	A	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE
1		MOLYBDENUM																			
2	Date	<	Mo Inf (mg/L)	Mo Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Mo Eff (mg/L)	Mo Eff (mg/L) Used in Calculation	<	Mo Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Mo Sludge, mg/L	<	Mo Domestic (mg/L)	Mo Domestic (mg/L) Used in Calculation	<	Mo Hauled to Inf (mg/L)	Mo Hauled to Inf (mg/L)
81	04/17/18															<	0.005	0.0025			
82	04/17/18															<	0.005	0.0025			
83	04/17/18															<	0.005	0.0025			
84	04/18/18		0.00545	0.00545				<	0.005	0.0025											
85	04/19/18															<	0.005	0.0025			
86	04/19/18															<	0.005	0.0025			
87	04/19/18															<	0.005	0.0025			
88	04/20/18	<	0.005	0.0025				<	0.005	0.0025											
89	04/25/18		0.00572	0.00572				<	0.005	0.0025											
90	04/27/18	<	0.005	0.0025				<	0.005	0.0025											
91	05/01/18															<	0.005	0.0025			
92	05/01/18															<	0.005	0.0025			
93	05/01/18															<	0.005	0.0025			
94	05/02/18	<	0.005	0.0025				<	0.005	0.0025											
95																					
96	Count			7			0			7		2	2	2	2			9			0
97	Average			0.0040			-			0.0032		10.6	10.55	15.0 %	1.6			0.0025			-
98	Maximum			0.00691			-			0.00515		11	11.00	15.7 %	1.7			0.0025			-
99	Minimum			0.0025			-			0.0025		10.1	10.10	14.2 %	1.4			0.0025			-
100	Std. Deviation			0.002			-			0.001		0.636	0.636	1.0	0.2			0.000			-
101	Maximum sample point > 2x Standard Deviation from Average?			No			-			No			No					No			-
102																					
103	Load, lb/d			0.22			-			0.18					88			0.10			-
104																					
105	% of Data < Detection			57%			-			64%								100%			-
106	Unpaired Site Specific Removal Rate						-			19.1 %											
107	Literature Value						-			33.0 %								-			
108	Selected Value									19.1 %								0.0025			
109	Data Source (Drop down list)									Unpaired Value								Sampling Data			
110	Sludge / Influent Ratio											394.0									
111																					
112																					
113	Data entry																				

	A	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY
1		NICKEL																			
2	Date	<	Ni Inf (mg/L)	Ni Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Ni Eff (mg/L)	Ni Eff (mg/L) Used in Calculation	<	Ni Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Ni Sludge, mg/L	<	Ni Domestic (mg/L)	Ni Domestic (mg/L) Used in Calculation	<	Ni Hauled to Inf (mg/L)	Ni Hauled to Inf (mg/L)
3	Dec-11							<	0.005	0.0025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.005	0.0025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.005	0.0025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.005	0.0025											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.005	0.0025				<	0.005	0.0025											
51	Dec-15																				
52	Jan-16											24.2	24.2	15.66 %	3.79						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16		0.0099	0.0099					0.0061	0.0061											
63	Dec-16																				
64	Jan-17													14.24 %							
65	Feb-17											23.4	23.4		0.00						
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18		0.00866	0.00866					0.00532	0.00532											
80	04/13/18		0.0011	0.0011					0.00583	0.00583											

	A	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY
1		NICKEL																			
2	Date	<	Ni Inf (mg/L)	Ni Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Ni Eff (mg/L)	Ni Eff (mg/L) Used in Calculation	<	Ni Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Ni Sludge, mg/L	<	Ni Domestic (mg/L)	Ni Domestic (mg/L) Used in Calculation	<	Ni Hauled to Inf (mg/L)	Ni Hauled to Inf (mg/L)
81	04/17/18															<	0.005	0.0025			
82	04/17/18															<	0.005	0.0025			
83	04/17/18															<	0.005	0.0025			
84	04/18/18		0.00756	0.00756					0.00741	0.00741											
85	04/19/18															<	0.005	0.0025			
86	04/19/18															<	0.005	0.0025			
87	04/19/18															<	0.005	0.0025			
88	04/20/18		0.00741	0.00741					0.005	0.005											
89	04/25/18		0.00787	0.00787				<	0.005	0.0025											
90	04/27/18		0.00696	0.00696				<	0.005	0.0025											
91	05/01/18															<	0.005	0.0025			
92	05/01/18																0.0076	0.0076			
93	05/01/18															<	0.005	0.0025			
94	05/02/18		0.00735	0.00735				<	0.005	0.0025											
95																					
96	Count			10			0			14		2	2	2	2			9			0
97	Average			0.0079			-			0.0050		23.8	23.80	15.0 %	1.9			0.0031			-
98	Maximum			0.02			-			0.02		24.2	24.20	15.7 %	3.8			0.0076			-
99	Minimum			0.0011			-			0.0025		23.4	23.40	14.2 %	0.0			0.0025			-
100	Std. Deviation			0.005			-			0.005		0.566	0.566	1.0	2.7			0.002			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			No					Yes			-
102																					
103	Load, lb/d			0.44			-			0.28					106			0.13			-
104																					
105	% of Data < Detection			20%			-			46%								89%			-
106	Unpaired Site Specific Removal Rate						-			37.3 %											
107	Literature Value						14.0 %			42.0 %								0.047			
108	Selected Value									37.3 %								0.0031			
109	Data Source (Drop down list)									Unpaired Value								Sampling Data			
110	Sludge / Influent Ratio											238.9									
111																					
112																					
113	Data entry																				

	A	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS
1		SELENIUM																			
2	Date	<	Se Inf (mg/L)	Se Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Se Eff (mg/L)	Se Eff (mg/L) Used in Calculation	<	Se Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Se Sludge, mg/L	<	Se Domestic (mg/L)	Se Domestic (mg/L) Used in Calculation	<	Se Hauled to Inf (mg/L)	Se Hauled to Inf (mg/L)
3	Dec-11							<	0.005	0.0025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.005	0.0025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.005	0.0025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.005	0.0025				<	0.005	0.0025											
51	Dec-15																				
52	Jan-16											6.6	6.6	15.66 %	1.03						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16	<	0.005	0.0025				<	0.005	0.0025											
63	Dec-16																				
64	Jan-17											6.3	6.3	14.24 %	0.90						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18		0.005	0.005				<	0.005	0.0025											
80	04/13/18	<	0.005	0.0025				<	0.005	0.0025											

	A	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS
1		SELENIUM																			
2	Date	<	Se Inf (mg/L)	Se Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Se Eff (mg/L)	Se Eff (mg/L) Used in Calculation	<	Se Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Se Sludge, mg/L	<	Se Domestic (mg/L)	Se Domestic (mg/L) Used in Calculation	<	Se Hauled to Inf (mg/L)	Se Hauled to Inf (mg/L)
81	04/17/18															<	0.005	0.0025			
82	04/17/18															<	0.005	0.0025			
83	04/17/18															<	0.005	0.0025			
84	04/18/18	<	0.005	0.0025				<	0.005	0.0025											
85	04/19/18															<	0.005	0.0025			
86	04/19/18															<	0.005	0.0025			
87	04/19/18															<	0.005	0.0025			
88	04/20/18	<	0.005	0.0025				<	0.005	0.0025											
89	04/25/18	<	0.005	0.0025				<	0.005	0.0025											
90	04/27/18	<	0.005	0.0025				<	0.005	0.0025											
91	05/01/18															<	0.005	0.0025			
92	05/01/18															<	0.005	0.0025			
93	05/01/18															<	0.005	0.0025			
94	05/02/18	<	0.005	0.0025				<	0.005	0.0025											
95																					
96	Count			10			0			13		2	2	2	2			9			0
97	Average			0.0045			-			0.0038		6.5	6.45	15.0 %	1.0			0.0025			-
98	Maximum			0.02			-			0.02		6.6	6.60	15.7 %	1.0			0.0025			-
99	Minimum			0.0025			-			0.0025		6.3	6.30	14.2 %	0.9			0.0025			-
100	Std. Deviation			0.005			-			0.005		0.212	0.212	1.0	0.1			0.000			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			No					No			-
102																					
103	Load, lb/d			0.25			-			0.21					54			0.10			-
104																					
105	% of Data < Detection			90%			-			96%								100%			-
106	Unpaired Site Specific Removal Rate						-			14.5 %											
107	Literature Value						-			50.0 %								-			
108	Selected Value									50.0 %								0.0025			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											214.5									
111																					
112																					
113	Data entry																				

	A	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM
1		SILVER																			
2	Date	<	Ag Inf (mg/L)	Ag Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Ag Eff (mg/L)	Ag Eff (mg/L) Used in Calculation	<	Ag Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Ag Sludge, mg/L	<	Ag Domestic (mg/L)	Ag Domestic (mg/L) Used in Calculation	<	Ag Hauled to Inf (mg/L)	Ag Hauled to Inf (mg/L)
3	Dec-11							<	0.005	0.0025											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13							<	0.005	0.0025											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.005	0.0025											
37	Oct-14																				
38	Nov-14																				
39	Dec-14							<	0.005	0.0025											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15	<	0.005	0.0025				<	0.005	0.0025											
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16	<	0.005	0.0025				<	0.005	0.0025											
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17	<	0.04	0.02																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18	<	0.001	0.0005				<	0.001	0.0005											
80	04/13/18	<	0.001	0.0005				<	0.001	0.0005											

	A	GT	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM
1		SILVER																			
2	Date	<	Ag Inf (mg/L)	Ag Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Ag Eff (mg/L)	Ag Eff (mg/L) Used in Calculation	<	Ag Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Ag Sludge, mg/L	<	Ag Domestic (mg/L)	Ag Domestic (mg/L) Used in Calculation	<	Ag Hauled to Inf (mg/L)	Ag Hauled to Inf (mg/L)
81	04/17/18																0.0013	0.0013			
82	04/17/18															<	0.001	0.0005			
83	04/17/18															<	0.001	0.0005			
84	04/18/18	<	0.001	0.0005				<	0.001	0.0005											
85	04/19/18															<	0.001	0.0005			
86	04/19/18															<	0.001	0.0005			
87	04/19/18															<	0.001	0.0005			
88	04/20/18	<	0.001	0.0005				<	0.001	0.0005											
89	04/25/18	<	0.001	0.0005				<	0.001	0.0005											
90	04/27/18	<	0.001	0.0005				<	0.001	0.0005											
91	05/01/18															<	0.001	0.0005			
92	05/01/18															<	0.001	0.0005			
93	05/01/18															<	0.001	0.0005			
94	05/02/18	<	0.001	0.0005				<	0.001	0.0005											
95																					
96	Count			10			0			14		0	0	0	0			9			0
97	Average			0.0029			-			0.0028		-	-	-	-			0.00059			-
98	Maximum			0.02			-			0.02		-	-	-	-			0.0013			-
99	Minimum			0.0005			-			0.0005		-	-	-	-			0.0005			-
100	Std. Deviation			0.006			-			0.005		-	-	-	-			0.000			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			-					Yes			-
102																					
103	Load, lb/d			0.16			-			0.15					-			0.02			-
104																					
105	% of Data < Detection			100%			-			100%								89%			-
106	Unpaired Site Specific Removal Rate						-			3.5 %											
107	Literature Value						20.0 %			75.0 %								0.019			
108	Selected Value									75.0 %								0.00059			
109	Data Source (Drop down list)									Literature								Sampling Data			
110	Sludge / Influent Ratio											-									
111																					
112																					
113	Data entry																				

	A	HN	HO	HP	HQ	HR	HS	HT	HU	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG
1		ZINC																			
2	Date	<	Zn Inf (mg/L)	Zn Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Zn Eff (mg/L)	Zn Eff (mg/L) Used in Calculation	<	Zn Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Zn Sludge, mg/L	<	Zn Domestic (mg/L)	Zn Domestic (mg/L) Used in Calculation	<	Zn Hauled to Inf (mg/L)	Zn Hauled to Inf (mg/L)
3	Dec-11								0.0727	0.0727											
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13								0.0437	0.0437											
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14							<	0.0497	0.02485											
37	Oct-14																				
38	Nov-14																				
39	Dec-14								0.0568	0.0568											
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15		0.09	0.09					0.0453	0.0453											
51	Dec-15																				
52	Jan-16											790.1	790.1	15.66 %	123.73						
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16		0.216	0.216					0.0844	0.0844											
63	Dec-16																				
64	Jan-17											657.8	657.8	14.24 %	93.67						
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17		0.104	0.104																	
74	Nov-17							<	0.04	0.02											
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	04/11/18		0.185	0.185					0.065	0.065											
80	04/13/18		0.17	0.17					0.0556	0.0556											

	A	HN	HO	HP	HQ	HR	HS	HT	HU	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG
1		ZINC																			
2	Date	<	Zn Inf (mg/L)	Zn Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	Zn Eff (mg/L)	Zn Eff (mg/L) Used in Calculation	<	Zn Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	Zn Sludge, mg/L	<	Zn Domestic (mg/L)	Zn Domestic (mg/L) Used in Calculation	<	Zn Hauled to Inf (mg/L)	Zn Hauled to Inf (mg/L)
81	04/17/18																0.134	0.134			
82	04/17/18																0.063	0.0631			
83	04/17/18																0.093	0.0932			
84	04/18/18		0.148	0.148					0.063	0.063											
85	04/19/18																0.131	0.131			
86	04/19/18																0.082	0.0823			
87	04/19/18																0.189	0.189			
88	04/20/18		0.127	0.127					0.0486	0.0486											
89	04/25/18		0.142	0.142					0.0347	0.0347											
90	04/27/18		0.115	0.115					0.0446	0.0446											
91	05/01/18																0.357	0.357			
92	05/01/18																0.585	0.585			
93	05/01/18																0.079	0.079			
94	05/02/18		0.123	0.123					0.0457	0.0457											
95																					
96	Count			10			0			14		2	2	2	2			9			0
97	Average			0.1420			-			0.0504		724.0	723.95	15.0 %	108.7			0.1904			-
98	Maximum			0.216			-			0.0844		790.1	790.10	15.7 %	123.7			0.5850			-
99	Minimum			0.09			-			0.02		657.8	657.80	14.2 %	93.7			0.0631			-
100	Std. Deviation			0.037			-			0.018		93.550	93.550	1.0	21.3			0.173			-
101	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			No			No					Yes			-
102																					
103	Load, lb/d			7.93			-			2.81					6,074			7.86			-
104																					
105	% of Data < Detection			0%			-			8%								0%			-
106	Unpaired Site Specific Removal Rate						-			64.5 %											
107	Literature Value						27.0 %			79.0 %								0.231			
108	Selected Value									64.5 %								0.190			
109	Data Source (Drop down list)									Unpaired Value								Sampling Data			
110	Sludge / Influent Ratio											765.5									
111																					
112																					
113	Data entry																				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	BOD																				
2	Date	<	BOD Inf (mg/L)	BOD Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	BOD Eff (mg/L)	BOD Eff (mg/L) Used in Calculation	<	BOD Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	BOD Sludge, mg/L	<	BOD Domestic (mg/L)	BOD Domestic (mg/L) Used in Calculation	<	BOD Hauled to Inf (mg/L)	BOD Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12		182.00	182.00					5.10	5.10											
5	Feb-12		237.00	237.00					7.70	7.70											
6	Mar-12		208.00	208.00					8.00	8.00											
7	Apr-12		223.00	223.00					6.30	6.30											
8	May-12		193.87	193.87					4.45	4.45											
9	Jun-12		169.10	169.10					3.52	3.52											
10	Jul-12		204.95	204.95					6.66	6.66											
11	Aug-12		229.61	229.61					10.28	10.28											
12	Sep-12		172.76	172.76					6.49	6.49											
13	Oct-12		164.95	164.95					4.02	4.02											
14	Nov-12		191.86	191.86					3.91	3.91											
15	Dec-12		168.64	168.64					7.27	7.27											
16	Jan-13		163.91	163.91					5.63	5.63											
17	Feb-13		160.00	160.00					4.95	4.95											
18	Mar-13		190.10	190.10					4.70	4.70											
19	Apr-13		155.10	155.10					3.08	3.08											
20	May-13		99.74	99.74					4.43	4.43											
21	Jun-13		132.24	132.24					2.71	2.71											
22	Jul-13		153.00	153.00					6.87	6.87											
23	Aug-13		155.57	155.57					8.23	8.23											
24	Sep-13		184.90	184.90					3.33	3.33											
25	Oct-13		164.13	164.13					2.70	2.70											
26	Nov-13		163.90	163.90					5.90	5.90											
27	Dec-13		134.36	134.36					7.82	7.82											
28	Jan-14		124.65	124.65					5.68	5.68											
29	Feb-14		159.20	159.20					5.45	5.45											
30	Mar-14		151.24	151.24					3.73	3.73											
31	Apr-14		132.91	132.91					5.30	5.30											
32	May-14		149.55	149.55					3.23	3.23											
33	Jun-14		143.90	143.90					2.59	2.59											
34	Jul-14		160.65	160.65					2.01	2.01											
35	Aug-14		170.95	170.95					2.53	2.53											
36	Sep-14		157.90	157.90					2.14	2.14											
37	Oct-14		154.96	154.96					2.79	2.79											
38	Nov-14		150.24	150.24					3.16	3.16											
39	Dec-14		161.27	161.27					3.79	3.79											
40	Jan-15		126.09	126.09					4.16	4.16											
41	Feb-15		141.60	141.60					6.87	6.87											
42	Mar-15		134.09	134.09					6.55	6.55											
43	Apr-15		118.73	118.73					2.50	2.50											
44	May-15		134.50	134.50					2.33	2.33											
45	Jun-15		145.62	145.62					2.49	2.49											
46	Jul-15		150.00	150.00					2.25	2.25											
47	Aug-15		165.78	165.78					2.27	2.27											
48	Sep-15		140.59	140.59					2.20	2.20											
49	Oct-15		149.09	149.09					2.66	2.66											
50	Nov-15		98.86	98.86					2.80	2.80											
51	Dec-15		101.83	101.83					3.84	3.84											
52	Jan-16		105.77	105.77					4.30	4.30											
53	Feb-16		100.85	100.85					4.81	4.81											
54	Mar-16		128.43	128.43					5.93	5.93											
55	Apr-16		143.29	143.29					4.39	4.39											
56	May-16		230.33	230.33					8.00	8.00											
57	Jun-16		181.68	181.68					4.18	4.18											
58	Jul-16		191.27	191.27					5.49	5.49											
59	Aug-16		199.36	199.36					5.15	5.15											
60	Sep-16		286.09	286.09					5.55	5.55											
61	Oct-16		211.00	211.00					9.96	9.96											
62	Nov-16		209.05	209.05					7.95	7.95											
63	Dec-16		209.73	209.73					9.76	9.76											
64	Jan-17		179.86	179.86					8.18	8.18											
65	Feb-17		198.85	198.85					8.77	8.77											
66	Mar-17		186.91	186.91					6.60	6.60											
67	Apr-17		195.95	195.95					7.51	7.51											
68	May-17		178.27	178.27					8.53	8.53											
69	Jun-17		184.86	184.86					4.94	4.94											
70	Jul-17		151.09	151.09					5.17	5.17											
71	Aug-17		179.26	179.26					3.77	3.77											
72	Sep-17		173.00	173.00					4.55	4.55											
73	Oct-17		204.14	204.14					3.10	3.10											
74	Nov-17		192.09	192.09					3.55	3.55											
75	Dec-17		200.45	200.45					4.01	4.01											
76	Jan-18		221.68	221.68					5.15	5.15											
77	Feb-18		148.75	148.75					15.23	15.23											
78	Mar-18		144.95	144.95					8.32	8.32											
79	4/11/2018		215.00	215.00					5.50	5.50											
80	4/13/2018		225.00	225.00					8.10	8.10											

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	BOD																				
2	Date	<	BOD Inf (mg/L)	BOD Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	BOD Eff (mg/L)	BOD Eff (mg/L) Used in Calculation	<	BOD Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	BOD Sludge, mg/L	<	BOD Domestic (mg/L)	BOD Domestic (mg/L) Used in Calculation	<	BOD Hauled to Inf (mg/L)	BOD Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018		165.00	165.00					8.00	8.00											
83	4/19/2018																				
84	4/20/2018		212.00	212.00					4.90	4.90											
85	4/25/2018		106.00	106.00					5.00	5.00											
86	4/27/2018		278.00	278.00					5.10	5.10											
87	5/1/2018																				
88	5/2/2018		158.00	158.00					4.60	4.60											
89																					
90	Count			82			0			82		0	0	0	0			0			0
91	Average			169.8			-			5.261		-	-	-	-			-			-
92	Maximum			286.1			-			15.23		-	-	-	-			-			-
93	Minimum			98.9			-			2.014		-	-	-	-			-			-
94	Std. Deviation			37.6			-			2.376		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			-					-			-
96																					
97	Load, lb/d			9,488			-			294					-			-			-
98																					
99	% of Data < Detection			0%			-			0%								-			-
100	Unpaired Site Specific Removal Rate						-			96.9 %											
101	Literature Value						-			85.0 %							Design Value:	206			
102	Selected Value						50.7 %			96.9 %								206			
103	Data Source (Drop down list)									Unpaired Value								Design Value			
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1		Total Suspended Solids (TSS)																			
2	Date	<	TSS Inf (mg/L)	TSS Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TSS Eff (mg/L)	TSS Eff (mg/L) Used in Calculation	<	TSS Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TSS Sludge, mg/L	<	TSS Domestic (mg/L)	TSS Domestic (mg/L) Used in Calculation	<	TSS Hauled to Inf (mg/L)	TSS Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12		283.00	283.00					5.10	5.10											
5	Feb-12		293.00	293.00					8.60	8.60											
6	Mar-12		331.00	331.00					4.40	4.40											
7	Apr-12		361.00	361.00					2.30	2.30											
8	May-12		346.68	346.68					2.48	2.48											
9	Jun-12		319.27	319.27					2.34	2.34											
10	Jul-12		339.35	339.35					1.95	1.95											
11	Aug-12		319.94	319.94					2.77	2.77											
12	Sep-12		269.23	269.23					2.64	2.64											
13	Oct-12		278.68	278.68					2.10	2.10											
14	Nov-12		279.37	279.37					3.21	3.21											
15	Dec-12		344.87	344.87					4.62	4.62											
16	Jan-13		293.35	293.35					8.00	8.00											
17	Feb-13		287.50	287.50					8.12	8.12											
18	Mar-13		368.23	368.23					8.34	8.34											
19	Apr-13		263.77	263.77					6.19	6.19											
20	May-13		154.77	154.77					7.77	7.77											
21	Jun-13		253.53	253.53					3.16	3.16											
22	Jul-13		359.13	359.13					5.51	5.51											
23	Aug-13		304.65	304.65					4.90	4.90											
24	Sep-13		295.63	295.63					3.27	3.27											
25	Oct-13		312.06	312.06					2.50	2.50											
26	Nov-13		286.13	286.13					4.80	4.80											
27	Dec-13		230.97	230.97					6.17	6.17											
28	Jan-14		202.42	202.42					4.60	4.60											
29	Feb-14		265.96	265.96					5.81	5.81											
30	Mar-14		326.15	326.15					6.16	6.16											
31	Apr-14		208.20	208.20					25.83	25.83											
32	May-14		230.19	230.19					3.61	3.61											
33	Jun-14		210.70	210.70					2.95	2.95											
34	Jul-14		208.65	208.65					1.88	1.88											
35	Aug-14		256.65	256.65					1.92	1.92											
36	Sep-14		174.23	174.23					1.81	1.81											
37	Oct-14		194.71	194.71					1.84	1.84											
38	Nov-14		156.33	156.33					2.82	2.82											
39	Dec-14		179.73	179.73					2.28	2.28											
40	Jan-15		187.13	187.13					4.32	4.32											
41	Feb-15		197.86	197.86					4.71	4.71											
42	Mar-15		200.77	200.77					5.36	5.36											
43	Apr-15		186.70	186.70					3.60	3.60											
44	May-15		171.94	171.94					2.22	2.22											
45	Jun-15		204.17	204.17					1.76	1.76											
46	Jul-15		269.06	269.06					1.76	1.76											
47	Aug-15		238.13	238.13					2.04	2.04											
48	Sep-15		196.73	196.73					2.02	2.02											
49	Oct-15		176.34	176.34					1.82	1.82											
50	Nov-15		136.60	136.60					3.31	3.31											
51	Dec-15		129.90	129.90					3.85	3.85											
52	Jan-16		139.18	139.18					4.28	4.28											
53	Feb-16		131.62	131.62					5.00	5.00											
54	Mar-16		175.84	175.84					5.80	5.80											
55	Apr-16		161.37	161.37					4.11	4.11											
56	May-16		254.42	254.42					3.61	3.61											
57	Jun-16		203.13	203.13					3.21	3.21											
58	Jul-16		193.77	193.77					3.02	3.02											
59	Aug-16		240.68	240.68					2.04	2.04											
60	Sep-16		457.53	457.53					2.38	2.38											
61	Oct-16		206.16	206.16					2.06	2.06											
62	Nov-16		221.17	221.17					2.37	2.37											
63	Dec-16		194.90	194.90					5.88	5.88											
64	Jan-17		167.61	167.61					5.82	5.82											
65	Feb-17		232.43	232.43					3.61	3.61											
66	Mar-17		218.00	218.00					4.58	4.58											
67	Apr-17		202.23	202.23					4.19	4.19											
68	May-17		189.26	189.26					4.72	4.72											
69	Jun-17		221.00	221.00					3.63	3.63											
70	Jul-17		174.97	174.97					2.52	2.52											
71	Aug-17		179.71	179.71					2.02	2.02											
72	Sep-17		166.17	166.17					3.32	3.32											
73	Oct-17		202.58	202.58					1.90	1.90											
74	Nov-17		188.60	188.60					2.37	2.37											
75	Dec-17		183.39	183.39					4.00	4.00											
76	Jan-18		224.16	224.16					6.00	6.00											
77	Feb-18		173.82	173.82					18.29	18.29											
78	Mar-18		153.23	153.23					10.48	10.48											
79	4/11/2018		190.00	190.00					6.30	6.30											
80	4/13/2018		226.00	226.00					12.60	12.60											

	A	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1	**Total Suspended Solids (TSS)**																				
2	Date	<	TSS Inf (mg/L)	TSS Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TSS Eff (mg/L)	TSS Eff (mg/L) Used in Calculation	<	TSS Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TSS Sludge, mg/L	<	TSS Domestic (mg/L)	TSS Domestic (mg/L) Used in Calculation	<	TSS Hauled to Inf (mg/L)	TSS Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018		182.00	182.00					6.30	6.30											
83	4/19/2018																				
84	4/20/2018		188.00	188.00					3.60	3.60											
85	4/25/2018		169.00	169.00					6.30	6.30											
86	4/27/2018		174.00	174.00					5.60	5.60											
87	5/1/2018																				
88	5/2/2018		184.00	184.00					5.10	5.10											
89																					
90	Count			82			0			82		0	0	0	0			0			0
91	Average			229.9			-			4.592		-	-	-	-			-			-
92	Maximum			457.5			-			25.83		-	-	-	-			-			-
93	Minimum			129.9			-			1.76		-	-	-	-			-			-
94	Std. Deviation			65.5			-			3.55		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			-					-			-
96																					
97	Load, lb/d			12,848			-			256.6					-			-			-
98																					
99	% of Data < Detection			0%			-			0%								-			-
100	Unpaired Site Specific Removal Rate						-			98.0 %											
101	Literature Value						-			85.0 %							**Design Value:**	221.0			
102	Selected Value						56.4 %			98.0 %								221.0			
103	Data Source (Drop down list)									Unpaired Value								Design Value			
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI
1		AMMONIA																			
2	Date	<	NH3 Inf (mg/L)	NH3 Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	NH3 Eff (mg/L)	NH3 Eff (mg/L) Used in Calculation	<	NH3 Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	NH3 Sludge, mg/L	<	NH3 Domestic (mg/L)	NH3 Domestic (mg/L) Used in Calculation	<	NH3 Hauled to Inf (mg/L)	NH3 Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12		27.30	27.30					1.4	1.4											
5	Feb-12		26.10	26.10					0.9	0.9											
6	Mar-12		28.10	28.10					1.8	1.8											
7	Apr-12		32.80	32.80					1.4	1.4											
8	May-12		34.44	34.44					1.48	1.48											
9	Jun-12		32.26	32.26					1.49	1.49											
10	Jul-12		32.29	32.29					1.81	1.81											
11	Aug-12		31.68	31.68					4.63	4.63											
12	Sep-12		35.12	35.12					1.88	1.88											
13	Oct-12		33.68	33.68					2.59	2.59											
14	Nov-12		28.85	28.85					1.70	1.70											
15	Dec-12		29.65	29.65					2.47	2.47											
16	Jan-13		20.44	20.44					0.96	0.96											
17	Feb-13		19.88	19.88					1.31	1.31											
18	Mar-13		18.21	18.21					0.23	0.23											
19	Apr-13		21.05	21.05					0.46	0.46											
20	May-13		16.20	16.20					0.61	0.61											
21	Jun-13		22.05	22.05					1.01	1.01											
22	Jul-13		18.93	18.93					2.87	2.87											
23	Aug-13		23.08	23.08					2.28	2.28											
24	Sep-13		22.99	22.99					0.55	0.55											
25	Oct-13		25.24	25.24					0.25	0.25											
26	Nov-13		25.87	25.87					4.19	4.19											
27	Dec-13		18.34	18.34					2.08	2.08											
28	Jan-14		19.40	19.40					0.96	0.96											
29	Feb-14		19.85	19.85					0.62	0.62											
30	Mar-14		16.83	16.83					0.23	0.23											
31	Apr-14		17.50	17.50					0.41	0.41											
32	May-14		20.78	20.78					0.23	0.23											
33	Jun-14		21.72	21.72					0.18	0.18											
34	Jul-14		26.72	26.72					0.25	0.25											
35	Aug-14		24.71	24.71					0.32	0.32											
36	Sep-14		25.91	25.91					0.25	0.25											
37	Oct-14		26.59	26.59					0.35	0.35											
38	Nov-14		22.76	22.76					0.28	0.28											
39	Dec-14		21.67	21.67					0.89	0.89											
40	Jan-15		18.46	18.46					1.03	1.03											
41	Feb-15		21.26	21.26					1.05	1.05											
42	Mar-15		21.28	21.28					0.31	0.31											
43	Apr-15		19.10	19.10					0.19	0.19											
44	May-15		22.36	22.36					0.15	0.15											
45	Jun-15		22.83	22.83					0.22	0.22											
46	Jul-15		22.25	22.25					0.28	0.28											
47	Aug-15		24.63	24.63					0.19	0.19											
48	Sep-15		22.93	22.93					0.21	0.21											
49	Oct-15		20.61	20.61					0.19	0.19											
50	Nov-15		15.16	15.16					0.23	0.23											
51	Dec-15		14.34	14.34					0.21	0.21											
52	Jan-16		13.35	13.35					0.50	0.50											
53	Feb-16		14.91	14.91					0.45	0.45											
54	Mar-16		15.00	15.00					0.50	0.50											
55	Apr-16		19.82	19.82					0.33	0.33											
56	May-16		22.10	22.10					0.24	0.24											
57	Jun-16		24.66	24.66					0.32	0.32											
58	Jul-16		27.67	27.67					0.74	0.74											
59	Aug-16		27.00	27.00					0.94	0.94											
60	Sep-16		27.02	27.02					0.99	0.99											
61	Oct-16		34.86	34.86					2.54	2.54											
62	Nov-16		31.55	31.55					1.02	1.02											
63	Dec-16		23.33	23.33					0.35	0.35											
64	Jan-17		21.85	21.85					0.88	0.88											
65	Feb-17		26.60	26.60					1.08	1.08											
66	Mar-17		22.28	22.28					0.46	0.46											
67	Apr-17		22.43	22.43					1.15	1.15											
68	May-17		22.51	22.51					0.47	0.47											
69	Jun-17		20.67	20.67					0.29	0.29											
70	Jul-17		20.49	20.49					0.71	0.71											
71	Aug-17		20.92	20.92					0.27	0.27											
72	Sep-17		20.52	20.52					0.60	0.60											
73	Oct-17		19.04	19.04					0.22	0.22											
74	Nov-17		24.01	24.01					0.31	0.31											
75	Dec-17		24.01	24.01					0.22	0.22											
76	Jan-18		19.05	19.05					0.28	0.28											
77	Feb-18		13.27	13.27					2.09	2.09											
78	Mar-18		13.02	13.02					0.31	0.31											
79	4/11/2018		26.90	26.90					0.86	0.86											
80	4/13/2018		18.10	18.10					0.15	0.15											

	A	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI
1		AMMONIA																			
2	Date	<	NH3 Inf (mg/L)	NH3 Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	NH3 Eff (mg/L)	NH3 Eff (mg/L) Used in Calculation	<	NH3 Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	NH3 Sludge, mg/L	<	NH3 Domestic (mg/L)	NH3 Domestic (mg/L) Used in Calculation	<	NH3 Hauled to Inf (mg/L)	NH3 Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018		13.98	13.98					0.12	0.12											
83	4/19/2018																				
84	4/20/2018		23.10	23.10					0.13	0.13											
85	4/25/2018		12.10	12.10					0.31	0.31											
86	4/27/2018		12.55	12.55					0.24	0.24											
87	5/1/2018																				
88	5/2/2018		20.48	20.48					0.27	0.27											
89																					
90	Count			82			0			82		0	0	0	0			0			0
91	Average			22.6			-			0.8527		-	-	-	-			-			-
92	Maximum			35.1			-			4.63		-	-	-	-			-			-
93	Minimum			12.1			-			0.117		-	-	-	-			-			-
94	Std. Deviation			5.5			-			0.886		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			Yes			-					-			-
96																					
97	Load, lb/d			1,263			-			47.65					-			-			-
98																					
99	% of Data < Detection			0%			-			0%								-			-
100	Unpaired Site Specific Removal Rate						-			96.2 %											
101	Literature Value						-			85.0 %							Design Value:	22.0			
102	Selected Value									96.2 %								22.0			
103	Data Source (Drop down list)									Unpaired Value								Design Value			
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
1		Total Kjeldahl Nitrogen (TKN)																			
2	Date	<	TKN Inf (mg/L)	TKN Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TKN Eff (mg/L)	TKN Eff (mg/L) Used in Calculation	<	TKN Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TKN Sludge, mg/L	<	TKN Domestic (mg/L)	TKN Domestic (mg/L) Used in Calculation	<	TKN Hauled to Inf (mg/L)	TKN Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	4/11/2018																				
80	4/13/2018																				

	A	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
1		Total Kjeldahl Nitrogen (TKN)																			
2	Date	<	TKN Inf (mg/L)	TKN Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TKN Eff (mg/L)	TKN Eff (mg/L) Used in Calculation	<	TKN Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TKN Sludge, mg/L	<	TKN Domestic (mg/L)	TKN Domestic (mg/L) Used in Calculation	<	TKN Hauled to Inf (mg/L)	TKN Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			0			0			0		0	0	0	0			0			0
91	Average			-			-			-		-	-	-	-			-			-
92	Maximum			-			-			-		-	-	-	-			-			-
93	Minimum			-			-			-		-	-	-	-			-			-
94	Std. Deviation			-			-			-		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			-			-			-			-					-			-
96																					
97	Load, lb/d			-			-			-					-			-			-
98																					
99	% of Data < Detection			-			-			-								-			-
100	Unpaired Site Specific Removal Rate						-			-											
101	Literature Value						-			76.0 %							Design Value:	37.0			
102	Selected Value																	37.0			
103	Data Source (Drop down list)									Unpaired Value								Design Value			
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW
1		Nitrate and Nitrite (NOx)																			
2	Date	<	NOx Inf (mg/L)	NOx Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	NOx Eff (mg/L)	NOx Eff (mg/L) Used in Calculation	<	NOx Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	NOx Sludge, mg/L	<	NOx Domestic (mg/L)	NOx Domestic (mg/L) Used in Calculation	<	NOx Hauled to Inf (mg/L)	NOx Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	4/11/2018																				
80	4/13/2018																				

	A	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW
1		Nitrate and Nitrite (NOx)																			
2	Date	<	NOx Inf (mg/L)	NOx Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	NOx Eff (mg/L)	NOx Eff (mg/L) Used in Calculation	<	NOx Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	NOx Sludge, mg/L	<	NOx Domestic (mg/L)	NOx Domestic (mg/L) Used in Calculation	<	NOx Hauled to Inf (mg/L)	NOx Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			0			0			0		0	0	0	0			0			0
91	Average			-			-			-		-	-	-	-			-			-
92	Maximum			-			-			-		-	-	-	-			-			-
93	Minimum			-			-			-		-	-	-	-			-			-
94	Std. Deviation			-			-			-		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			-			-			-			-					-			-
96																					
97	Load, lb/d			-			-			-					-			-			-
98																					
99	% of Data < Detection			-			-			-								-			-
100	Unpaired Site Specific Removal Rate						-			-											
101	Literature Value						-			N/A								0.0			
102	Selected Value									0.0 %								0.0			
103	Data Source (Drop down list)																				
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ
1		Total Nitrogen																			
2	Date	<	TN Inf (mg/L)	TN Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TN Eff (mg/L)	TN Eff (mg/L) Used in Calculation	<	TN Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TN Sludge, mg/L	<	TN Domestic (mg/L)	TN Domestic (mg/L) Used in Calculation	<	TN Hauled to Inf (mg/L)	TN Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	4/11/2018																				
80	4/13/2018																				

	A	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ
1	**Total Nitrogen**																				
2	Date	<	TN Inf (mg/L)	TN Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TN Eff (mg/L)	TN Eff (mg/L) Used in Calculation	<	TN Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TN Sludge, mg/L	<	TN Domestic (mg/L)	TN Domestic (mg/L) Used in Calculation	<	TN Hauled to Inf (mg/L)	TN Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			0			0			0		0	0	0	0			0			0
91	Average			-			-			-		-	-	-	-			-			-
92	Maximum			-			-			-		-	-	-	-			-			-
93	Minimum			-			-			-		-	-	-	-			-			-
94	Std. Deviation			-			-			-		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			-			-			-			-					-			-
96																					
97	Load, lb/d			-			-			-					-			-			-
98																					
99	% of Data < Detection			-			-			-								-			-
100	Unpaired Site Specific Removal Rate						-			-											
101	Literature Value						-			76.0 %							**Design Value:**	37.0		*(Assume equal to Influent TKN)*	
102	Selected Value																	37.0			
103	Data Source (Drop down list)																	Design Value			
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK
1		PHOSPHORUS																			
2	Date	<	P Inf (mg/L) Used in Calculation	P Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	P Eff (mg/L)	P Eff (mg/L) Used in Calculation	<	P Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	P Sludge, mg/L	<	P Domestic (mg/L)	P Domestic (mg/L) Used in Calculation	<	P Hauled to Inf (mg/L)	P Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12								1.40	1.40											
5	Feb-12								4.00	4.00											
6	Mar-12								4.60	4.60											
7	Apr-12								10.00	10.00											
8	May-12								10.16	10.16											
9	Jun-12								9.32	9.32											
10	Jul-12								10.66	10.66											
11	Aug-12								7.29	7.29											
12	Sep-12								9.57	9.57											
13	Oct-12								7.22	7.22											
14	Nov-12								5.89	5.89											
15	Dec-12								5.36	5.36											
16	Jan-13								6.07	6.07											
17	Feb-13								4.69	4.69											
18	Mar-13								5.57	5.57											
19	Apr-13								6.55	6.55											
20	May-13								5.84	5.84											
21	Jun-13								8.24	8.24											
22	Jul-13								4.35	4.35											
23	Aug-13								5.70	5.70											
24	Sep-13								7.49	7.49											
25	Oct-13								7.14	7.14											
26	Nov-13								8.53	8.53											
27	Dec-13								4.93	4.93											
28	Jan-14								4.84	4.84											
29	Feb-14								3.36	3.36											
30	Mar-14								4.35	4.35											
31	Apr-14								4.65	4.65											
32	May-14								6.49	6.49											
33	Jun-14								6.80	6.80											
34	Jul-14								8.70	8.70											
35	Aug-14								10.68	10.68											
36	Sep-14								11.55	11.55											
37	Oct-14								10.16	10.16											
38	Nov-14								9.60	9.60											
39	Dec-14								4.78	4.78											
40	Jan-15								8.72	8.72											
41	Feb-15								9.30	9.30											
42	Mar-15								11.85	11.85											
43	Apr-15								8.23	8.23											
44	May-15								7.30	7.30											
45	Jun-15								10.22	10.22											
46	Jul-15								8.90	8.90											
47	Aug-15								10.70	10.70											
48	Sep-15								10.03	10.03											
49	Oct-15								7.02	7.02											
50	Nov-15								5.53	5.53											
51	Dec-15								4.85	4.85											
52	Jan-16								3.22	3.22											
53	Feb-16								4.90	4.90											
54	Mar-16								5.34	5.34											
55	Apr-16								8.13	8.13											
56	May-16								8.19	8.19											
57	Jun-16								13.29	13.29											
58	Jul-16								17.48	17.48											
59	Aug-16								15.50	15.50											
60	Sep-16								12.73	12.73											
61	Oct-16								10.62	10.62											
62	Nov-16								8.02	8.02											
63	Dec-16								8.78	8.78											
64	Jan-17		12.49	12.49					9.41	9.41											
65	Feb-17		15.74	15.74					11.28	11.28											
66	Mar-17		11.02	11.02					7.36	7.36											
67	Apr-17		11.82	11.82					11.14	11.14											
68	May-17		13.12	13.12					10.55	10.55											
69	Jun-17		14.55	14.55					11.40	11.40											
70	Jul-17		11.45	11.45					11.40	11.40											
71	Aug-17		11.14	11.14					8.64	8.64											
72	Sep-17		8.70	8.70					6.87	6.87											
73	Oct-17		7.86	7.86					5.19	5.19											
74	Nov-17		12.73	12.73					6.85	6.85											
75	Dec-17		9.50	9.50					4.95	4.95											
76	Jan-18		11.14	11.14					3.83	3.83											
77	Feb-18		11.55	11.55					6.53	6.53											
78	Mar-18		7.79	7.79					5.63	5.63											
79	4/11/2018																				
80	4/13/2018																				

	A	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK
1		PHOSPHORUS																			
2	Date	<	P Inf (mg/L)	P Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	P Eff (mg/L)	P Eff (mg/L) Used in Calculation	<	P Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	P Sludge, mg/L	<	P Domestic (mg/L)	P Domestic (mg/L) Used in Calculation	<	P Hauled to Inf (mg/L)	P Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			15			0			75		0	0	0	0			0			0
91	Average			11.3730			-			7.82		-	-	-	-			-			-
92	Maximum			15.741667			-			17.48		-	-	-	-			-			-
93	Minimum			7.7857143			-			1.40		-	-	-	-			-			-
94	Std. Deviation			2.186			-			2.96		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			No			-			Yes			-					-			-
96																					
97	Load, lb/d			636			-			436.88					-			-			-
98																					
99	% of Data < Detection			0%			-			0%								-			-
100	Unpaired Site Specific Removal Rate						-			31.3 %											
101	Literature Value						-			N/A							Design Value:	11.0			
102	Selected Value																	11.0			
103	Data Source (Drop down list)																	Design Value			
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE
1		OIL & GREASE - A/V																			
2	Date	<	O&G-AV Inf (mg/L)	O&G-AV Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	O&G-AV Eff (mg/lL)	O&G-AV Eff (mg/L) Used in Calculation	<	O&G-AV Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	O&G-AV Sludge, mg/L	<	O&G-AV Domestic (mg/L)	O&G-AV Domestic (mg/L) Used in Calculation	<	O&G-AV Hauled to Inf (mg/L)	O&G-AV Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	4/11/2018																				
80	4/13/2018																				

	A	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE
1		OIL & GREASE - A/V																			
2	Date	<	O&G-AV Inf (mg/L)	O&G-AV Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	O&G-AV Eff (mg/lL)	O&G-AV Eff (mg/L) Used in Calculation	<	O&G-AV Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	O&G-AV Sludge, mg/L	<	O&G-AV Domestic (mg/L)	O&G-AV Domestic (mg/L) Used in Calculation	<	O&G-AV Hauled to Inf (mg/L)	O&G-AV Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			0			0			0		0	0	0	0			0			0
91	Average			-			-			-		-	-	-	-			-			-
92	Maximum			-			-			-		-	-	-	-			-			-
93	Minimum			-			-			-		-	-	-	-			-			-
94	Std. Deviation			-			-			-		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			-			-			-			-					-			-
96																					
97	Load, lb/d			-			-			-					-			-			-
98																					
99	% of Data < Detection			-			-			-								-			-
100	Unpaired Site Specific Removal Rate						-			-											
101	Literature Value						-			N/A								40.0			
102	Selected Value																				
103	Data Source (Drop down list)																				
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY
1		OIL & GREASE - TPH																			
2	Date	<	O&G-TPH Inf (mg/L)	O&G-TPH Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	O&G-TPH Eff (mg/L)	O&G-TPH Eff (mg/L) Used in Calculation	<	O&G-TPH Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	O&G-TPH Sludge, mg/L	<	O&G-TPH Domestic (mg/L)	O&G-TPH Domestic (mg/L) Used in Calculation	<	O&G-TPH Hauled to Inf (mg/L)	O&G-TPH Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	4/11/2018																				
80	4/13/2018																				

	A	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY
1		OIL & GREASE - TPH																			
2	Date	<	O&G-TPH Inf (mg/L)	O&G-TPH Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	O&G-TPH Eff (mg/L)	O&G-TPH Eff (mg/L) Used in Calculation	<	O&G-TPH Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	O&G-TPH Sludge, mg/L	<	O&G-TPH Domestic (mg/L)	O&G-TPH Domestic (mg/L) Used in Calculation	<	O&G-TPH Hauled to Inf (mg/L)	O&G-TPH Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			0			0			0		0	0	0	0			0			0
91	Average			-			-			-		-	-	-	-			-			-
92	Maximum			-			-			-		-	-	-	-			-			-
93	Minimum			-			-			-		-	-	-	-			-			-
94	Std. Deviation			-			-			-		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			-			-			-			-					-			-
96																					
97	Load, lb/d			-			-			-					-			-			-
98																					
99	% of Data < Detection			-			-			-								-			-
100	Unpaired Site Specific Removal Rate						-			-											
101	Literature Value						-			N/A								40.0			
102	Selected Value																				
103	Data Source (Drop down list)																				
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

	A	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GU
1		pH																					
2	Date	<	pH Inf (mg/L)	pH Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	pH Eff (mg/L)	pH Eff (mg/L) Used in Calculation	<	pH Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	pH Sludge, mg/L	Sludge % solids	pH Sludge, mg/L	<	pH Domestic (mg/L)	pH Domestic (mg/L) Used in Calculation	<	pH Hauled to Inf (mg/L)	pH Hauled to Inf (mg/L)
3	Dec-11																						
4	Jan-12		7.31	7.31					7.35	7.35													
5	Feb-12		7.37	7.37					7.47	7.47													
6	Mar-12		7.30	7.30					7.41	7.41													
7	Apr-12		7.25	7.25					7.26	7.26													
8	May-12		7.19	7.19					7.15	7.15													
9	Jun-12		7.21	7.21					7.21	7.21													
10	Jul-12		7.12	7.12					7.19	7.19													
11	Aug-12		7.20	7.20					7.25	7.25													
12	Sep-12		7.15	7.15					7.13	7.13													
13	Oct-12		7.19	7.19					7.15	7.15													
14	Nov-12		7.18	7.18					7.20	7.20													
15	Dec-12		7.24	7.24					7.29	7.29													
16	Jan-13		7.26	7.26					7.28	7.28													
17	Feb-13		7.22	7.22					7.26	7.26													
18	Mar-13		7.26	7.26					7.24	7.24													
19	Apr-13		7.29	7.29					7.30	7.30													
20	May-13		7.21	7.21					7.29	7.29													
21	Jun-13		7.35	7.35					7.42	7.42													
22	Jul-13		7.25	7.25					7.39	7.39													
23	Aug-13		7.27	7.27					7.44	7.44													
24	Sep-13		7.23	7.23					7.43	7.43													
25	Oct-13		7.25	7.25					7.32	7.32													
26	Nov-13		7.22	7.22					7.35	7.35													
27	Dec-13		7.14	7.14					7.13	7.13													
28	Jan-14		7.17	7.17					7.25	7.25													
29	Feb-14		7.16	7.16					7.23	7.23													
30	Mar-14		7.15	7.15					7.28	7.28													
31	Apr-14		7.19	7.19					7.32	7.32													
32	May-14		7.27	7.27					7.36	7.36													
33	Jun-14		7.26	7.26					7.40	7.40													
34	Jul-14		7.22	7.22					7.38	7.38													
35	Aug-14		7.27	7.27					7.46	7.46													
36	Sep-14		7.30	7.30					7.48	7.48													
37	Oct-14		7.23	7.23					7.40	7.40													
38	Nov-14		7.19	7.19					7.28	7.28													
39	Dec-14		7.16	7.16					7.25	7.25													
40	Jan-15		7.03	7.03					7.12	7.12													
41	Feb-15		7.13	7.13					7.22	7.22													
42	Mar-15		7.18	7.18					7.29	7.29													
43	Apr-15		7.14	7.14					7.28	7.28													
44	May-15		7.11	7.11					7.30	7.30													
45	Jun-15		7.04	7.04					7.18	7.18													
46	Jul-15		7.06	7.06					7.23	7.23													
47	Aug-15		7.12	7.12					7.24	7.24													
48	Sep-15		7.12	7.12					7.25	7.25													
49	Oct-15		7.10	7.10					7.32	7.32													
50	Nov-15		7.04	7.04					7.24	7.24													
51	Dec-15		7.08	7.08					7.28	7.28													
52	Jan-16		7.03	7.03					7.26	7.26													
53	Feb-16		6.96	6.96					7.20	7.20													
54	Mar-16		7.14	7.14					7.37	7.37													
55	Apr-16		7.18	7.18					7.40	7.40													
56	May-16		7.21	7.21					7.41	7.41													
57	Jun-16		7.09	7.09					7.37	7.37													
58	Jul-16		7.09	7.09					7.31	7.31													
59	Aug-16		7.09	7.09					7.31	7.31													
60	Sep-16		7.01	7.01					7.24	7.24													
61	Oct-16		7.01	7.01					7.10	7.10													
62	Nov-16		6.84	6.84					7.21	7.21													
63	Dec-16		7.07	7.07					7.27	7.27													
64	Jan-17		7.01	7.01					7.19	7.19													
65	Feb-17		7.10	7.10					7.26	7.26													
66	Mar-17		7.31	7.31					7.48	7.48													
67	Apr-17		7.27	7.27					7.40	7.40													
68	May-17		7.29	7.29					7.44	7.44													
69	Jun-17		7.19	7.19					7.36	7.36													
70	Jul-17		7.17	7.17					7.32	7.32													
71	Aug-17		7.25	7.25					7.45	7.45													
72	Sep-17		7.15	7.15					7.34	7.34													
73	Oct-17		7.13	7.13					7.26	7.26													
74	Nov-17		7.32	7.32					7.48	7.48													
75	Dec-17		7.20	7.20					7.37	7.37													
76	Jan-18		7.23	7.23					7.45	7.45													
77	Feb-18		7.20	7.20					7.37	7.37													
78	Mar-18		7.17	7.17					7.37	7.37													
79	4/11/2018																						
80	4/13/2018																						

	A	FZ	GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GU
1		pH																					
2	Date	<	pH Inf (mg/L)	pH Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	pH Eff (mg/L)	pH Eff (mg/L) Used in Calculation	<	pH Sludge (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	pH Sludge, mg/L	Sludge % solids	pH Sludge, mg/L	<	pH Domestic (mg/L)	pH Domestic (mg/L) Used in Calculation	<	pH Hauled to Inf (mg/L)	pH Hauled to Inf (mg/L)
81	4/17/2018																						
82	4/18/2018																						
83	4/19/2018																						
84	4/20/2018																						
85	4/25/2018																						
86	4/27/2018																						
87	5/1/2018																						
88	5/2/2018																						
89																							
90	Count			75			0			75		0	0	0	0	0	0			0			0
91	Average			7.17			-			7.3058		-	-	-	-	-	-			-			-
92	Maximum			7.37			-			7.483333333		-	-	-	-	-	-			-			-
93	Minimum			6.84			-			7.096774194		-	-	-	-	-	-			-			-
94	Std. Deviation			0.10			-			0.096		-	-	-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			Yes			-			No			-							-			-
96																							
97	Load, lb/d			-			-			408.23					-		-			-			-
98																							
99	% of Data < Detection			-			-			0%										-			-
100	Unpaired Site Specific Removal Rate						-			-1.8 %													
101	Literature Value						-			N/A										N/A			
102	Selected Value									N/A										N/A			
103	Data Source (Drop down list)																						
104	Sludge / Influent Ratio											-											
105																							
106																							
107	Data entry																						

	A	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO
1		Total Toxic Organics (TTO)																			
2	Date	<	TTO Inf (mg/L)	TTO Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TTO Eff (mg/L)	TTO Eff (mg/L) Used in Calculation	<	TTO Sl (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TTO Sludge, mg/L	<	TTO Domestic (mg/L)	TTO Domestic (mg/L) Used in Calculation	<	TTO Hauled to Inf (mg/L)	TTO Hauled to Inf (mg/L)
3	Dec-11																				
4	Jan-12																				
5	Feb-12																				
6	Mar-12																				
7	Apr-12																				
8	May-12																				
9	Jun-12																				
10	Jul-12																				
11	Aug-12																				
12	Sep-12																				
13	Oct-12																				
14	Nov-12																				
15	Dec-12																				
16	Jan-13																				
17	Feb-13																				
18	Mar-13																				
19	Apr-13																				
20	May-13																				
21	Jun-13																				
22	Jul-13																				
23	Aug-13																				
24	Sep-13																				
25	Oct-13																				
26	Nov-13																				
27	Dec-13																				
28	Jan-14																				
29	Feb-14																				
30	Mar-14																				
31	Apr-14																				
32	May-14																				
33	Jun-14																				
34	Jul-14																				
35	Aug-14																				
36	Sep-14																				
37	Oct-14																				
38	Nov-14																				
39	Dec-14																				
40	Jan-15																				
41	Feb-15																				
42	Mar-15																				
43	Apr-15																				
44	May-15																				
45	Jun-15																				
46	Jul-15																				
47	Aug-15																				
48	Sep-15																				
49	Oct-15																				
50	Nov-15																				
51	Dec-15																				
52	Jan-16																				
53	Feb-16																				
54	Mar-16																				
55	Apr-16																				
56	May-16																				
57	Jun-16																				
58	Jul-16																				
59	Aug-16																				
60	Sep-16																				
61	Oct-16																				
62	Nov-16																				
63	Dec-16																				
64	Jan-17																				
65	Feb-17																				
66	Mar-17																				
67	Apr-17																				
68	May-17																				
69	Jun-17																				
70	Jul-17																				
71	Aug-17																				
72	Sep-17																				
73	Oct-17																				
74	Nov-17																				
75	Dec-17																				
76	Jan-18																				
77	Feb-18																				
78	Mar-18																				
79	4/11/2018																				
80	4/13/2018																				

	A	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO
1		Total Toxic Organics (TTO)																			
2	Date	<	TTO Inf (mg/L)	TTO Inf (mg/L) Used in Calculation	<	Pri Eff (mg/L)	Pri Eff (mg/L) Used in Calculation	<	TTO Eff (mg/L)	TTO Eff (mg/L) Used in Calculation	<	TTO Sl (mg/kg dry)	Sludge (mg/kg) Used in Calculation	Sludge % solids	TTO Sludge, mg/L	<	TTO Domestic (mg/L)	TTO Domestic (mg/L) Used in Calculation	<	TTO Hauled to Inf (mg/L)	TTO Hauled to Inf (mg/L)
81	4/17/2018																				
82	4/18/2018																				
83	4/19/2018																				
84	4/20/2018																				
85	4/25/2018																				
86	4/27/2018																				
87	5/1/2018																				
88	5/2/2018																				
89																					
90	Count			0			0			0		0	0	0	0			0			0
91	Average			-			-			-		-	-	-	-			-			-
92	Maximum			-			-			-		-	-	-	-			-			-
93	Minimum			-			-			-		-	-	-	-			-			-
94	Std. Deviation			-			-			-		-	-	-	-			-			-
95	Maximum sample point > 2x Standard Deviation from Average?			-			-			-			-					-			-
96																					
97	Load, lb/d			-			-			-					-			-			-
98																					
99	% of Data < Detection			-			-			-								-			-
100	Unpaired Site Specific Removal Rate						-			-											
101	Literature Value						-			N/A								0.0			
102	Selected Value									N/A								0.0			
103	Data Source (Drop down list)																				
104	Sludge / Influent Ratio											-									
105																					
106																					
107	Data entry																				

Appendix B: Headworks Analysis Calculations

HEADWORKS AND LOCAL LIMITS ANALYSIS

Client:	City of Cartersville Water Department
VPDES Permit No.	GA0024091
Date:	December-2019

Note = Data entry cells

TABLE 1 - General Data

	POTW Design Flow mgd Qpotw	POTW Avg. Annual Flow mgd Qpotw	Industrial User (IU) Flow mgd Qind	Sludge Flow to Digester mgd Qdig	Sludge Flow to Disposal MTD Qsldg	Stream Flow for Chronic WQS mgd Qstr1	Stream Flow for Acute WQS mgd Qstr2	Stream Flow for Human Health WQS mgd Qstr3	Receiving Stream Hardness mg/L H	Hauled Waste Flow mgd Qhw	Class A or B Sludge
	15	6.7	1.752	0.09	2.88	177.7	122.8	1,461	25		B
Source		Hazen and Sawyer Facility Evaluation Report (September 2017)	Ref. Ind Allocation Table Tab	WIMS: PS Solids + GBT TWAS Flow	2017 Annual Biosolids Report	7Q10	1Q10	Typically 30Q10 (Request by GAEPD to use mean annual stream flow)	NPDES Fact Sheet	No Hauled Waste Flow to Facility, Leave Blank	Enter "A" or "B"

Qpotw POTW's average flow in million gallons per day (mgd).
Qind Average Industrial User total discharge flow in mgd.
Qdig Average sludge flow to digester in mgd.
Qsldg Average sludge flow to disposal in dry metric tons per day (MTD).
Qstr1 Receiving stream (upstream) flow used with chronic water quality standards in mgd.
Qstr2 Receiving stream (upstream) flow used with acute water quality standards in mgd.
Qstr3 Receiving stream (upstream) flow used with human health water quality standards in mgd.
H Receiving stream hardness in mg/L.
Qhw Hauled waste flow in mgd.

TABLE 2 - Local Limits Determination Based on NPDES Effluent Limits

	LOCAL LIMITS CALCULATION DATA					NPDES LOADING		DESIGN CRITERIA LOADING	DESIGN CRITERIA LOADING	PASS-THROUGH LOADING	MINIMUM PASS THROUGH BASIS
Pollutant	POTW Flow mgd Qpotw	NPDES Limit mg/L Ccrit	Removal Efficiency % Rpotw	Removal Efficiency Basis	Removal Rate Source	Allowable Headworks lb/d Lhw	Use "x" to Use Design Criteria Loading	Allowable Headworks mg/L Lhw	Allowable Headworks lb/d Lhw	Allowable Headworks lb/d Lhw	Allowable Headworks lb/d Lhw
Arsenic	6.7		45.00	Inf and eff	Literature	-				-	-
Cadmium	6.7		67.00	Inf and eff	Literature	-				-	-
Chromium	6.7		82.00	Inf and eff	Literature	-				-	-
Copper	6.7		90.30	Inf and eff	Unpaired Value	-				-	-
Cyanide	6.7		69.00	Inf and eff	Literature	-				-	-
Lead	6.7		41.70	Inf and eff	Unpaired Value	-				-	-
Mercury	6.7		60.00	Inf and eff	Literature	-				-	-
Molybdenum	6.7		19.10	Inf and eff	Unpaired Value	-				-	-
Nickel	6.7		37.30	Inf and eff	Unpaired Value	-				-	-
Selenium	6.7		50.00	Inf and eff	Literature	-				-	-
Silver	6.7		75.00	Inf and eff	Literature	-				-	-
Zinc	6.7		64.50	Inf and eff	Unpaired Value	-				-	-
BOD5, summer	6.7	10	96.90	Inf and eff	Unpaired Value	18,025	X	206	25,800	25,800	Design
TSS	6.7	20	98.00	Inf and eff	Unpaired Value	55,878	X	221	27,600	27,600	Design
Ammonia, summer	6.7	2	96.20	Inf and eff	Unpaired Value	2,941	X	22	2,800	2,800	Design
TKN	6.7		0.00	Inf and eff	Unpaired Value	-	X	37	4,600	4,600	Design
NOx	6.7		0.00	Inf and eff	0.00	-				-	-
TN	6.7		0.00	Inf and eff	0.00	-				-	-
Total Phosphorus	6.7	1	99.00	Inf and eff	Site-Specific	5,588	X	11	1,376	1,376	Design
Phenol	6.7		90.00		Literature	-				-	-
						-				-	-
						-				-	-

Qpotw POTW's average flow in mgd (from Table 1, cell C8).
Ccrit NPDES permit limit for a particular pollutant in mg/L.
Rpotw Removal efficiency across POTW as percent (Inf / Eff Removal from 'Monitoring Data' sheet or user entered).
Lhw Allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw = (8.34 * Ccrit * Qpotw) / (1 - Rpotw / 100)
8.34 Unit conversion factor

TABLE 3 - Local Limits Determination Based on Chronic Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Receiving Stream Flow mgd Qstr1	Receiving Stream Concentration mg/L Cstr	Chronic WQS mg/L Ccrit	Removal Efficiency % Rpotw	Allowable Headworks lb/d Lhw	Notes:
Arsenic	6.7	177.7	0	0.85400	45.00	2,388	1. Water quality standards from Chapter 391-3-6-.03 (Water Use Classifications and Water Quality Standards)
Cadmium	6.7	177.7	0	0.00037	67.00	1.72	2. Condition-specific standards calculated per EPA and EPD guidelines
Chromium (VI)	6.7	177.7	0	0.01100	82.00	94.0	3. Receiving Stream hardness data from GA EPD Reasonable Potential Spreadsheet and verified with STORET data
Copper	6.7	177.7	0	0.00785	90.30	124.5	4. Effluent TSS from GA EPD Reasonable Potential Spreadsheet.
Cyanide	6.7	177.7	0		69.00	-	5. Effluent hardness assumed to be 25 mg/L as CaCO3.
Lead	6.7	177.7	0	0.00293	41.70	7.73	
Mercury	6.7	177.7	0	0.000012	60.00	0.05	
Molybdenum	6.7	177.7	0		19.10	-	
Nickel	6.7	177.7	0	0.03700	37.30	90.75	
Selenium	6.7	177.7	0	0.00500	50.00	15.38	
Silver	6.7	177.7	0		75.00	-	
Zinc	6.7	177.7	0	0.12614	64.50	546.45	
Phenol	6.7	177.7	0	0.300	90.00	4,614	

Qpotw POTW's average flow in mgd (from Table 1, cell C8).
Qstr1 Receiving stream (upstream) flow used with chronic water quality standards in mgd (from Table 1, cell G8).
Cstr Receiving stream background concentration in mg/L.
Ccrit State chronic water quality standard for a particular pollutant in mg/L.
Rpotw Removal efficiency across POTW as percent (from Table 2).
Lhw Allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw = 8.34 * (Ccrit * (Qstr1 + Qpotw) - (Cstr * Qstr1)) / (1 - Rpotw / 100)
8.34 Unit conversion factor

HEADWORKS AND LOCAL LIMITS ANALYSIS

Client:	City of Cartersville Water Department
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Date:	December-2019

Note = Data entry cells

TABLE 4 - Local Limits Determination Based on Acute Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Receiving Stream Flow mgd Qstr2	Receiving Stream Concentration mg/L Cstr	Acute WQS mg/L Ccrit	Removal Efficiency % (Rpotw)	Allowable Headworks lb/d Lhw	Notes:
Arsenic	6.7	122.8	0	1.936	45.00	3,802	1. Water quality standards from Chapter 391-3-6-.03 (Water Use Classifications and Water Quality Standards)
Cadmium	6.7	122.8	0	0.00207	67.00	6.77	2. Condition-specific standards calculated per EPA and EPD guidelines
Chromium (VI)	6.7	122.8	0	0.016	82.00	96.00	3. Receiving Stream hardness data from GA EPD Reasonable Potential Spreadsheet and verified with STORET data
Copper	6.7	122.8	0	0.01043	90.30	116.13	4. Effluent TSS from GA EPD Reasonable Potential Spreadsheet.
Cyanide	6.7	122.8	0		69.00	-	5. Effluent hardness assumed to be 25 mg/L as CaCO3.
Lead	6.7	122.8	0	0.075	41.70	139	
Mercury	6.7	122.8	0	0.0014	60.00	3.78	
Molybdenum	6.7	122.8	0		19.10	-	
Nickel	6.7	122.8	0	0.33300	37.30	574	
Selenium	6.7	122.8	0		50.00	-	
Silver	6.7	122.8	0		75.00	-	
Zinc	6.7	122.8	0	0.12500	64.50	380	
Phenol	6.7	122.8	0		90.00	-	

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Qstr2	Receiving stream (upstream) flow used with acute water quality standards in mgd (from Table 1, cell H8).
Cstr	Receiving stream background concentration in mg/L (from Table 3).
Ccrit	State acute water quality standard for a particular pollutant in mg/L.
Rpotw	Removal efficiency across POTW as percent (from Table 2).
Lhw	Allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	8.34 * (Ccrit * (Qstr2 + Qpotw) - (Cstr * Qstr2)) / (1 - Rpotw / 100)
8.34	Unit conversion factor

TABLE 5 - Local Limits Determination Based on Human Health Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Receiving Stream Flow mgd Qstr3	Receiving Stream Concentration mg/L Cstr	Human Health WQS mg/L Ccrit	Removal Efficiency % Rpotw	Allowable Headworks lb/d Lhw	Notes:
Arsenic	6.7	1461.22	0	0.01	45.00	223	1. Human health criteria applicable to permit.
Cadmium	6.7	1461.22	0		67.00	-	2. HHC criteria expressed in total form in the EPD regulations
Chromium	6.7	1461.22	0		82.00	-	
Copper	6.7	1461.22	0		90.30	-	
Cyanide	6.7	1461.22	0		69.00	-	
Lead	6.7	1461.22	0		41.70	-	
Mercury	6.7	1461.22	0		60.00	-	
Molybdenum	6.7	1461.22	0		19.10	-	
Nickel	6.7	1461.22	0		37.30	-	
Selenium	6.7	1461.22	0		50.00	-	
Silver	6.7	1461.22	0		75.00	-	
Zinc	6.7	1461.22	0		64.50	-	
Phenol	6.7	1461.22	0	857	90.00	104,917,891	

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Qstr3	Receiving stream (upstream) flow used with human health water quality standards in mgd (from Table 1, cell I8).
Cstr	Receiving stream background concentration in mg/L (from Table 3).
Ccrit	State human health water quality standard for a particular pollutant in mg/L.
Rpotw	Removal efficiency across POTW as percent (from Table 2).
Lhw	Allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	8.34 * (Ccrit * (Qstr3 + Qpotw) - (Cstr * Qstr3)) / (1 - Rpotw / 100)
8.34	Unit conversion factor

TABLE 6 - Comparison of Water Quality Allowable Headworks Loadings

Pollutant	Allowable Headworks CHRONIC lb/d	Allowable Headworks ACUTE lb/d	Allowable Headworks HUMAN HEALTH lb/d	Allowable Headworks WATER QUALITY lb/d
Arsenic	2,388	3,802	223	223
Cadmium	1.7	6.8	-	1.7
Chromium	94	96	-	94
Copper	124	116	-	116
Cyanide	-	-	-	-
Lead	7.7	139	-	7.7
Mercury	0.05	3.8	-	0.05
Molybdenum	-	-	-	-
Nickel	91	574	-	91
Selenium	15.4	-	-	15.4
Silver	-	-	-	-
Zinc	546	380	-	380
Phenol	4,614	-	104,917,891	4,614
CBOD, summer	-	-	-	-
TSS	-	-	-	-
Ammonia, summer	-	-	-	-
TKN	-	-	-	-
NOx	-	-	-	-
TN	-	-	-	-
Phosphorus	-	-	-	-

HEADWORKS AND LOCAL LIMITS ANALYSIS

Client:	City of Cartersville Water Department
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Note = Data entry cells

TABLE 7 - Local Limits Determination Based on Activated Sludge Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Activated Sludge Inhibition Level mg/L Ccrit	Removal Efficiency % Rprim	Removal Efficiency Basis	Allowable Headworks lb/d Lhw	Does WRF have activated sludge? (drop down list)
						Yes
Arsenic	6.7	0.1	0.00	-	5.6	
Cadmium	6.7	1	0	-	55.9	
Chromium	6.7	1	0	-	55.9	
Copper	6.7	1	0	-	55.9	
Cyanide	6.7	5	0	-	279.4	
Lead	6.7	1	0	-	55.9	
Mercury	6.7	0.1	0	-	5.6	
Molybdenum	6.7		0	-	-	
Nickel	6.7	1	0	-	55.9	
Selenium	6.7		0	-	-	
Silver	6.7		0	-	-	
Zinc	6.7	5	0	-	279.4	
Phenol	6.7	50	0.00	-	2,794	

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Ccrit	Activated sludge threshold inhibition level, mg/L.
Rprim	Removal efficiency prior to activated sludge treatment unit as percent.
Lhw	Allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	8.34 * (Ccrit * Qpotw) / (1 - Rprim / 100)
8.34	Unit conversion factor

TABLE 8 - Local Limits Determination Based on Trickling Filter Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA			MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Trickling Filter Inhibition Level mg/L Ccrit	Removal Efficiency % Rprim	Allowable Headworks lb/d Lhw	Does WRF have Trickling Filters? (drop down list)
					No
Arsenic	6.7		0	-	
Cadmium	6.7		0	-	
Chromium	6.7	3.5	0	-	
Copper	6.7		0	-	
Cyanide	6.7	30	0	-	
Lead	6.7		0	-	
Mercury	6.7		0	-	
Molybdenum	6.7		0	-	
Nickel	6.7		0	-	
Selenium	6.7		0	-	
Silver	6.7		0	-	
Zinc	6.7		0	-	
Phenol	6.7		0	-	

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Ccrit	Trickling filter threshold inhibition level, mg/L.
Rprim	Removal efficiency prior to trickling filter treatment unit as percent.
Lhw	Allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	8.34 * (Ccrit * Qpotw) / (1 - Rprim / 100)
8.34	Unit conversion factor

TABLE 9 - Local Limits Determination Based on Nitrification Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA			MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Nitrification Inhibition Level mg/L Ccrit	Removal Efficiency % Rprim	Allowable Headworks lb/d Lhw	Does WRF Nitrify? (drop down list)
					Yes
Arsenic	6.7	1.5	0	83.8	
Cadmium	6.7	5.2	0	291	
Chromium	6.7	1.9	0	106.2	
Copper	6.7	0.48	0	26.8	
Cyanide	6.7	0.34	0	19.0	
Lead	6.7	0.5	0	27.9	
Mercury	6.7		0	-	
Molybdenum	6.7		0	-	
Nickel	6.7	0.25	0	14.0	
Selenium	6.7		0	-	
Silver	6.7		0	-	
Zinc	6.7	0.5	0	27.9	
Phenol	6.7	4	0	223.5	

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Ccrit	Nitrification threshold inhibition level, mg/L.
Rprim	Removal efficiency prior to nitrification treatment unit as percent.
Lhw	Maximum allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	(8.34 * Ccrit * Qpotw) / (1 - Rsec / 100)
8.34	Unit conversion factor

HEADWORKS AND LOCAL LIMITS ANALYSIS

Client:	City of Cartersville Water Department
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Note = Data entry cells

TABLE 10 - Local Limits Determination Based on Anaerobic Digester Inhibition Level (Conservative Pollutants)

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Sludge Flow to Digester mgd Qdig	Anaerobic Digester Inhibition Level mg/L Ccrit	Removal Efficiency % Rpotw	Allowable Headworks lb/d Lhw	Does WRF have anaerobic digestion? (drop down list)
						No
Arsenic	6.7	0.087	1.6	45.00	-	
Cadmium	6.7	0.087	20	67.00	-	
Chromium	6.7	0.087	130	82.00	-	
Copper	6.7	0.087	40	90.30	-	
Cyanide					-	
Lead	6.7	0.087	340	41.70	-	
Mercury	6.7	0.087		60.00	-	
Molybdenum	6.7	0.087		19.10	-	
Nickel	6.7	0.087	10	37.30	-	
Selenium	6.7	0.087		50.00	-	
Silver	6.7	0.087	13	75.00	-	
Zinc	6.7	0.09	400	64.50	-	
Phenol	6.7	0.09		90.00	-	

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Qdig	Average sludge flow to digester in mgd (from Table 1, cell E8).
Ccrit	Anaerobic digester threshold inhibition level in mg/L.
Rpotw	Removal efficiency across POTW as percent (from Table 2).
Lhw	Maximum allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	(8.34 * Ccrit * Qdig) / (Rpotw / 100)
8.34	Unit conversion factor

TABLE 11 - Local Limits Determination Based on Anaerobic Digester Inhibition Level (Non-Conservative Pollutants)

	LOCAL LIMITS CALCULATIONS DATA					MAXIMUM LOADING	
Pollutant	POTW Flow mgd Qpotw	Average Influent Concentration mg/L Cinf	Average Influent Load lb/d Linf	Digester Pollutant Concentration mg/L Cdig	Anaerobic Digester Inhibition Level mg/L Ccrit	Allowable Headworks lb/d Lhw	Does WRF have anaerobic digestion? (drop down list)
							No
Cyanide	6.7	0.004	0.20		1	-	
BOD5, summer	6.7	-	#VALUE!			-	
TSS	6.7	-	#VALUE!			-	
Ammonia, summer	6.7	-	#VALUE!		1,500	-	
TKN	6.7	-	#VALUE!			-	
	6.7		0			-	
	6.7		0			-	
	6.7		0			-	
	6.7		0			-	
	6.7		0			-	
	6.7		0			-	
	6.7		0			-	

Qpotw	POTW's average flow in mgd (from Table 1, cell B8).
Cinf	POTW's average influent concentration in mg/L.
Linf	POTW's average influent loading in pounds per day (lb/d).
Linf =	Cinf * Qpotw * 8.34
Cdig	Average pollutant concentration in sludge sent to the digester in mg/L.
Ccrit	Anaerobic digester threshold inhibition level in mg/L.
Lhw	Maximum allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	Linf * (Ccrit / Cdig)
8.34	Unit conversion factor

TABLE 12 - Comparison of Inhibition Allowable Headworks Loadings

Pollutant	Allowable Headworks ACT. SLUDGE lb/d	Allowable Headworks TRICK. FILTER lb/d	Allowable Headworks NITRIFICATION lb/d	Allowable Headworks DIG. - CONSERV. lb/d	Allowable Headworks DIG. - NON-CONS. lb/d	Most Stringent INHIBITION lb/d	Inhibition Basis
Arsenic	5.6	-	84	-		5.6	Inhib, Sludge
Cadmium	56	-	291	-		56	Inhib, Sludge
Chromium	56	-	106	-		56	Inhib, Sludge
Copper	56	-	27	-		27	Inhib, Nitrif
Cyanide	279	-	19	-		19	Inhib, Nitrif
Lead	56	-	28	-		28	Inhib, Nitrif
Mercury	5.6	-	-	-		5.6	Inhib, Sludge
Molybdenum	-	-	-	-		-	-
Nickel	56	-	14	-		14	Inhib, Nitrif
Selenium	-	-	-	-		-	-
Silver	-	-	-	-		-	-
Zinc	279	-	28	-		28	Inhib, Nitrif
Phenol	2,794	-	224	-		224	Inhib, Nitrif

Maximum Influent	Concentration from 'Monitoring Data' sheet

HEADWORKS AND LOCAL LIMITS ANALYSIS

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Note = Data entry cells

TABLE 13 - Local Limits Determination Based on Sludge Disposal

	LOCAL LIMITS CALCULATIONS DATA					MAXIMUM LOADING				
Pollutant	POTW Flow mgd Qpotw	Sludge Flow to Disposal MTD Qsldg	Class A Sludge Criteria mg/kg Cslcrit	Class B Sludge Criteria mg/kg Cslcrit	Removal Efficiency % Rpotw	Allowable Headworks lb/d Lhw	Check if HASL Applies (only after MAHL is calculated)	Minimum Sludge (HASL) Loading lb/d	Is Sludge Land Applied? (drop down list	Is Sludge Class A or B? (drop down list
									Yes	B
Arsenic	6.7	2.88	41	75	45.00	1.1	X	3.1	Note:	
Cadmium	6.7	2.88	39	85	67.00	0.8	X	3.2		
Chromium	6.7	2.88			82.00	-				
Copper	6.7	2.88	1,500	4,300	90.30	30.2		-		
Cyanide	6.7	2.88			69.00	-				
Lead	6.7	2.88	300	840	41.70	12.8		-		
Mercury	6.7	2.88	17	57	60.00	0.6		-		
Molybdenum	6.7	2.88	75	75	19.10	2.5		-		
Nickel	6.7	2.88	420	420	37.30	7.1	X	7.7		
Selenium	6.7	2.88	100	100	50.00	1.3	X	3.8		
Silver	6.7	2.88			75.00	-				
Zinc	6.7	2.88	2,800	7,500	64.50	74		-		

Qpotw	POTW's average flow in mgd (from Table 1, cell C8).
Qsldg	Average sludge flow to disposal in dry metric tons per day (from Table 1, cell F8).
Cslcrit	Applicable sludge criteria in mg/kg dry sludge.
Rpotw	Removal efficiency across POTW as a percent (from Table 2).
Lhw	Maximum allowable headworks pollutant loading to the POTW in pounds per day (lb/d).
Lhw =	(0.0022 * Cslcrit * Qsldg) / (Rpotw / 100)
0.0022	Unit conversion factor

TABLE 14 - Comparison of Allowable Headworks Loadings and Calculation of Local Limit

Pollutant	Allowable Headworks DESIGN or NPDES lb/d	Allowable Headworks WATER QUALITY lb/d	Allowable Headworks INHIBITION lb/d	Allowable Headworks SLUDGE DISP. lb/d	Maximum Allowable Headworks lb/d	Basis for MAHL	Safety Factor % SF	Domestic Concentration mg/L Cdom	Domestic Flow mgd Qdom	Domestic Loading lb/d Ldom	Hauled Waste Concentration mg/L Chw	Hauled Waste Flow mgd Qhw	Hauled Waste Loading lb/d Lhw	Max Allowable Industrial Load (MAIL) lb/d	Uniform Concentration Local Limit mg/L Cind	IU Contributary Flow Local Limit mg/L Cind	Current (1999-2018) Local Limit mg/L	Prior (1996-1999) Local Limit mg/L	Recommended Local Limit mg/L Cind	Recommended Local Limit Type	Change Denoted by "X"
Arsenic	-	223	5.6	3.1	3.1	Sludge Disposal	10	0.0025	4.95	0.10	-	0	-	2.7	0.185	1.94	0.02	0.03	0.185	UC	X
Cadmium	-	1.7	56	3.2	1.7	Water Quality	10	0.0004	4.95	0.014	-	0	-	1.5	0.105	0.57	0.01	0.01	0.105	UC	X
Chromium	-	94	56	-	56	Inhib, Sludge	10	0.0030	4.95	0.12	-	0	-	50.2	3.43	6.35	0.67	0.64	0.67	Current LL	
Copper	-	116	27	30	27	Inhib, Nitrif	10	0.0420	4.95	1.73	-	0	-	22.4	1.53	1.54	0.11	0.18	1.53	UC	X
Cyanide	-	-	19	-	19	Inhib, Nitrif	10	0.0000	4.95	0.00021	-	0	-	17.1	1.17	5.90	0.13	0.21	1.17	UC	X
Lead	-	7.7	28	12.8	7.7	Water Quality	10	0.0014	4.95	0.06	-	0	-	6.9	0.47	0.64	0.12	0.05	0.47	UC	X
Mercury	-	0.05	5.6	0.60	0.046	Water Quality	10	0.00000012	4.95	0.000005	-	0	-	0.042	0.0028	0.030	0.002	0.0003	0.0028	UC	X
Molybdenum	-	-	-	2.5	2.5	Sludge Disposal	10	0.0025	4.95	0.10	-	0	-	2.1	0.146	0.230	0.13	0.13	0.230	IU Contrib	X
Nickel	-	91	14	7.7	7.7	Sludge Disposal	10	0.0031	4.95	0.13	-	0	-	6.8	0.47	0.52	0.26	0.31	0.52	IU Contrib	X
Selenium	-	15.4	-	3.8	3.8	Sludge Disposal	10	0.0025	4.95	0.10	-	0	-	3.3	0.23	0.340	0.02	0.03	0.23	UC	X
Silver	-	-	-	-	-	-	10	0.0006	4.95	0.024	-	0	-	-	-	9.24	0.7	0.007	-	UC	X
Zinc	-	380	28	73.7	28	Inhib, Nitrif	10	0.1904	4.95	7.9	-	0	-	17.3	1.18	1.19	0.3	0.21	1.18	UC and IU Contrib	X
Phenol	-	4,614	224	-	224	Inhib, Nitrif	10	0.00	4.95	0.0	-	0	-	201	13.8	16.5	2.13	2.13	2.13	Current LL	
BOD5, summer	25,800	-	-	-	25,800	Design	10	206.0	4.95	8,501	-	-	-	14,719	1,007		300 / 850	300 / 850	300 / 850	Current LL	
TSS	27,600	-	-	-	27,600	Design	10	221.0	4.95	9,120	-	-	-	15,720	1,076		300 / 1500	300 / 1500	300 / 1500	Current LL	
COD							10										750 / 2500	750 / 2500	750 / 2500	Current LL	
Ammonia, summer	2,800	-	-	-	2,800	Design	10	22.0	4.95	908	-	-	-	1,612					50	New LL	X
TKN	4,600	-	-	-	4,600	Design	10	37.0	4.95	1,527	-	-	-	2,613							
NOx	-	-	-	-	-	-	10	0.0	4.95	0	-	-	-	-							
Total Phosphorus	1,376	-	-	-	1,376	Design	10	11.0	4.95	454	-	-	-	785							
O&G, AV																	100	100	100	Current LL	
O&G, TPH																	Narrative Std	Narrative Std	100	New LL	X
pH																	5.5 - 10.0	5.5 - 10.0	5.5 - 10.0	Current LL	
Flashpoint																	< 140F	< 140F	< 140F	Current LL	
Temperature																	< 150F	< 150F	< 150F	Current LL	

SF	Safety factor as a percent.
Cdom	Average domestic/commercial background concentration for a particular pollutant in mg/L.
Qdom	Average domestic/commercial background flow in mgd.
Qdom =	Qpotw - Qind - Qhw (values from Table 1)
Ldom	Average domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lb/d).
Chw	Average hauled waste concentration for a particular pollutant in mg/L.
Qhw	Average hauled waste flow in mgd (from Table 1, cell K8).
Lhw	Average hauled waste loading to the POTW for a particular pollutant in pounds per day (lb/d).
Cind	Industrial allowable local limit for a given pollutant in mg/L.

UC =>	Uniform Concentration Method
IU Contrib =>	IU Contributory Flow Method
Current LL =>	Current Local Limit

Appendix C: Local Limit Calculations for Industrial User Contributory Flow Method

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

Notes:

1. Metals data from City pretreatment compliance reports.
2. Maximum data point recorded for reference only. Value not used in calculation.
3. Data linked to cells on industrial allocation table tab.
4. Uncontrollable load concentration and % less than detection data linked to Monitoring Data_Priority tab.
5. All data in mg/L.

			Arsenic					Cadmium				
IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Arsenic Limit?	Arsenic present?	Arsenic Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd	Cadmium Limit?	Cadmium present?	Cadmium Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	No	< 0.02	0.05	-	Yes	No	< 0.003	0.05	-
2	Ampacet	0.0392	No	No	< 0.02	-	0.0392	No	No		-	0.0392
3	Anheuser-Busch	0.834	No	No	< 0.02	-	0.834	No	No		-	0.8340
4	Anheuser-Busch	0.025	No	No	< 0.02	-	0.025	No	No		-	0.0250
5	Aquafil	0.1113	Yes	No	< 0.02	0.1113	-	Yes	No	< 0.005	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	No	No	< 0.02	-	0.000004	No	No		-	0.0000
7	Bartow County Landfill	0.035	Yes	Yes	0.028	0.035	-	No	No		-	0.0350
8	Doehler Beverage House	0.04548	No	No		-	0.04548	No	No		-	0.0455
9	Innovative Chemical Technologies	0.0015	Yes	Yes	0.0158	0.0015	-	Yes	Yes	0.00078	0.0015	-
10	Linde Gas North America, LLC	0.0864	No	No		-	0.0864	No	No		-	0.0864
11	Shaw 11: Philadelphia Plant	0.0999	No	No		-	0.0999	No	No		-	0.0999
12	Shaw 13: Stratton Plant	0.0523	No	No		-	0.0523	No	No		-	0.0523
13	Southern Yarn Dyers	0.0907	No	No		-	0.0907	No	No		-	0.0907
14	Tintoria	0.1847	No	No		-	0.1847	Yes	No	< 0.003	0.1847	-
15	Toyo Tire	0.0925	No	No		-	0.0925	No	No		-	0.0925
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
	TOTAL (mgd) =>					0.1978	1.5502				0.3475	1.4005
	Contributing Industry Count =>					4					4	
	Total Allowable for Industry (MAIL) (lb/d) =>					2.71					1.66	
	Uncontrollable Concentration (mg/L) =>					0.003					0.00	
	Uncontrollable Concentration (lb/d) =>					0.03					0.00	
	% of Uncontrollable Load Data < Detection =>					100%					100%	
	IU Contributory Conc. with Uncontrollable Load (mg/L) =>					1.62					0.57	
	IU Contributory Conc. without Uncontrollable Load (mg/L) =>					1.64					0.57	
	Selected Local Limit Concentration with IU Contributory Method (mg/L) =>					1.94					0.57	
	No. IUPs with limits and non-detects =>					2					3	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

			Chromium					Copper				
IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Chromium Limit?	Chromium present?	Chromium Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd	Copper Limit?	Copper present?	Copper Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	No	< 0.04	0.05	-	Yes	No	< 0.04	0.05	-
2	Ampacet	0.0392	Yes	No	< 0.04	0.0392	-	Yes	No	< 0.04	0.0392	-
3	Anheuser-Busch	0.834	Yes	Yes	0.59	0.834	-	Yes	Yes	0.59	0.834	-
4	Anheuser-Busch	0.025	Yes	No	< 0.04	0.025	-	Yes	No	< 0.04	0.025	-
5	Aquafil	0.1113	Yes	No	< 0.04	0.1113	-	Yes	Yes	0.1	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	No	No		-	0.0000	Yes	Yes	0.0766	0.000004	-
7	Bartow County Landfill	0.035	Yes	Yes	0.05	0.035	-	Yes	No	< 0.04	0.035	-
8	Doehler Beverage House	0.04548	Yes	No	< 0.04	0.04548	-	Yes	No	< 0.04	0.04548	-
9	Innovative Chemical Technologies	0.0015	Yes	Yes	0.011	0.0015	-	Yes	Yes	0.0465	0.0015	-
10	Linde Gas North America, LLC	0.0864	Yes	No	< 0.04	0.0864	-	Yes	No	< 0.04	0.0864	-
11	Shaw 11: Philadelphia Plant	0.0999	No	No		-	0.0999	Yes	No	< 0.05	0.0999	-
12	Shaw 13: Stratton Plant	0.0523	No	No		-	0.0523	Yes	No	< 0.05	0.0523	-
13	Southern Yarn Dyers	0.0907	Yes	No	< 0.04	0.0907	-	Yes	No	< 0.04	0.0907	-
14	Tintoria	0.1847	Yes	No	< 0.04	0.1847	-	Yes	Yes	0.046	0.1847	-
15	Toyo Tire	0.0925	Yes	No	< 0.025	0.0925	-	Yes	Yes	0.0453	0.0925	-
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
	TOTAL (mgd) =>					1.5958	0.1522				1.7480	0.0000
	Contributing Industry Count =>					12					15	
	Total Allowable for Industry (MAIL) (lb/d) =>					84.46					22.40	
	Uncontrollable Concentration (mg/L) =>					0.003					0.04	
	Uncontrollable Concentration (lb/d) =>					0.004					0.000	
	% of Uncontrollable Load Data < Detection =>					89%					0%	
	IU Contributory Conc. with Uncontrollable Load (mg/L) =>					6.3459					1.54	
	IU Contributory Conc. without Uncontrollable Load (mg/L) =>					6.3462					1.54	
	Selected Local Limit Concentration with IU Contributory Method (mg/L) =>					6.35					1.54	
	No. IUPs with limits and non-detects =>					9					9	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

			Cyanide					Lead				
IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Cyanide Limit?	Cyanide present?	Cyanide Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd	Lead Limit?	Lead present?	Lead Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	No	< 0.01	0.05	-	Yes	No	< 0.04	0.05	-
2	Ampacet	0.0392	No	No	< 0.01	-	0.0392	No	No	< 0.04	-	0.0392
3	Anheuser-Busch	0.834	No	No	< 0.01	-	0.8340	Yes	No	< 0.04	0.834	-
4	Anheuser-Busch	0.025	No	No	< 0.01	-	0.0250	No	No	< 0.04	-	0.0250
5	Aquafil	0.1113	Yes	Yes	0.043	0.1113	-	Yes	No	< 0.04	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	Yes	Yes	0.075	0.000004	-	Yes	No	< 0.04	0.000004	-
7	Bartow County Landfill	0.035	No	No		-	0.0350	No	No		-	0.0350
8	Doehler Beverage House	0.04548	No	No		-	0.0455	Yes	No	< 0.04	0.04548	-
9	Innovative Chemical Technologies	0.0015	Yes	No	< 0.01	0.0015	-	Yes	Yes	0.00374	0.0015	-
10	Linde Gas North America, LLC	0.0864	No	No		-	0.0864	No	No		-	0.0864
11	Shaw 11: Philadelphia Plant	0.0999	No	No		-	0.0999	No	No		-	0.0999
12	Shaw 13: Stratton Plant	0.0523	No	No		-	0.0523	No	No		-	0.0523
13	Southern Yarn Dyers	0.0907	No	No		-	0.0907	No	No		-	0.0907
14	Tintoria	0.1847	Yes	No	< 0.02	0.1847	-	Yes	No	< 0.04	0.1847	-
15	Toyo Tire	0.0925	No	No		-	0.0925	Yes	No	< 0.04	0.0925	-
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

TOTAL (mgd) =>			0.3475	1.4005	1.3195	0.4285
Contributing Industry Count =>			5		8	
Total Allowable for Industry (MAIL) (lb/d) =>			17.10		7.07	
Uncontrollable Concentration (mg/L) =>			0.000005		0.00	
Uncontrollable Concentration (lb/d) =>			0.00		0.00	
% of Uncontrollable Load Data < Detection =>			100%		44%	
IU Contributory Conc. with Uncontrollable Load (mg/L) =>			5.90		0.64	
IU Contributory Conc. without Uncontrollable Load (mg/L) =>			5.90		0.64	
Selected Local Limit Concentration with IU Contributory Method (mg/L) =>			5.90		0.64	
No. IUPs with limits and non-detects =>			3		7	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

			Mercury					Molybdenum				
IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Mercury Limit?	Mercury present?	Mercury Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd	Moly Limit?	Moly present?	Moly Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	No	< 0.0002	0.05	-	Yes	No	< 0 .05	0.05	-
2	Ampacet	0.0392	No	No	< 0.0002	-	0.0392	No	No	< 0 .05	-	0.0392
3	Anheuser-Busch	0.834	No	No	< 0.0002	-	0.8340	Yes	Yes	0.08	0.834	-
4	Anheuser-Busch	0.025	No	No	< 0.0002	-	0.0250	No	No	< 0 .05	-	0.0250
5	Aquafil	0.1113	Yes	No	< 0.0002	0.1113	-	Yes	No	< 0 .05	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	No	No		-	0.0000	Yes	No		0.000004	-
7	Bartow County Landfill	0.035	No	No		-	0.0350	Yes	No		0.035	-
8	Doehler Beverage House	0.04548	No	No		-	0.0455	No	No		-	0.0455
9	Innovative Chemical Technologies	0.0015	Yes	No	< 0.002	0.0015	-	Yes	Yes	0.451	0.0015	-
10	Linde Gas North America, LLC	0.0864	No	No		-	0.0864	No	No		-	0.0864
11	Shaw 11: Philadelphia Plant	0.0999	No	No		-	0.0999	No	No		-	0.0999
12	Shaw 13: Stratton Plant	0.0523	No	No		-	0.0523	No	No		-	0.0523
13	Southern Yarn Dyers	0.0907	No	No		-	0.0907	No	No		-	0.0907
14	Tintoria	0.1847	No	No		-	0.1847	No	No		-	0.1847
15	Toyo Tire	0.0925	No	No		-	0.0925	Yes	No	< 0 .05	0.0925	-
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
	TOTAL (mgd) =>					0.1628	1.5852				1.1243	0.6237
	Contributing Industry Count =>					3					7	
	Total Allowable for Industry (MAIL) (lb/d) =>					0.04					2.14	
	Uncontrollable Concentration (mg/L) =>					0.00000012					0.00	
	Uncontrollable Concentration (lb/d) =>					0.00000162					0.01	
	% of Uncontrollable Load Data < Detection =>					89%					100%	
	IU Contributory Conc. with Uncontrollable Load (mg/L) =>					0.03					0.23	
	IU Contributory Conc. without Uncontrollable Load (mg/L) =>					0.03					0.23	
	Selected Local Limit Concentration with IU Contributory Method (mg/L) =>					0.03					0.23	
	No. IUPs with limits and non-detects =>					3					5	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

			Nickel					Selenium				
IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Nickel Limit?	Nickel present?	Nickel Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd	Selenium Limit?	Selenium present?	Selenium Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	No	< 0.04	0.05	-	Yes	No	< 0.02	0.05	-
2	Ampacet	0.0392	Yes	No	< 0.04	0.0392	-	No	No	< 0.02	-	0.0392
3	Anheuser-Busch	0.834	Yes	Yes	0.13	0.834	-	Yes	No	< 0.02	0.834	-
4	Anheuser-Busch	0.025	No	No	< 0.04	-	0.0250	Yes	No	< 0.02	0.025	-
5	Aquafil	0.1113	Yes	No	< 0.04	0.1113	-	Yes	No	< 0.02	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	Yes	Yes	0.0149	0.000004	-	Yes	No	< .0005	0.000004	-
7	Bartow County Landfill	0.035	Yes	Yes	0.23	0.035	-	No	No		-	0.0350
8	Doehler Beverage House	0.04548	Yes	Yes	0.06	0.04548	-	No	No		-	0.0455
9	Innovative Chemical Technologies	0.0015	Yes	Yes	0.0159	0.0015	-	Yes	No	< 0.02	0.0015	-
10	Linde Gas North America, LLC	0.0864	Yes	No	< 0.04	0.0864	-	No	No		-	0.0864
11	Shaw 11: Philadelphia Plant	0.0999	Yes	No	< 0.04	0.0999	-	Yes	No		0.0999	-
12	Shaw 13: Stratton Plant	0.0523	Yes	No	< 0.04	0.0523	-	No	No		-	0.0523
13	Southern Yarn Dyers	0.0907	Yes	No		0.0907	-	Yes	No		0.0907	-
14	Tintoria	0.1847	Yes	No	< 0.04	0.1847	-	No	No	< 0.02	-	0.1847
15	Toyo Tire	0.0925	No	No	< 0.04	-	0.0925	No	No		-	0.0925
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
	TOTAL (mgd) =>					1.6305	0.1175				1.2124	0.5356
	Contributing Industry Count =>					13					8	
	Total Allowable for Industry (MAIL) (lb/d) =>					6.80					3.33	
	Uncontrollable Concentration (mg/L) =>					0.0031					0.0025	
	Uncontrollable Concentration (lb/d) =>					0.0030					0.0112	
	% of Uncontrollable Load Data < Detection =>					89%					100%	
	IU Contributory Conc. with Uncontrollable Load (mg/L) =>					0.4995					0.33	
	IU Contributory Conc. without Uncontrollable Load (mg/L) =>					0.4997					0.33	
	Selected Local Limit Concentration with IU Contributory Method (mg/L) =>					0.520					0.340	
	No. IUPs with limits and non-detects =>					8					8	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Silver					Zinc				
			Silver Limit?	Silver present?	Silver Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd	Zinc Limit?	Zinc present?	Zinc Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	No	< 0.04	0.05	-	Yes	No	< 0.04	0.05	-
2	Ampacet	0.0392	No	No	< 0.04	-	0.0392	Yes	Yes	0.06	0.0392	-
3	Anheuser-Busch	0.834	No	No	< 0.04	-	0.8340	Yes	Yes	1.7	0.834	-
4	Anheuser-Busch	0.025	No	No	< 0.04	-	0.0250	Yes	No	< 0.04	0.025	-
5	Aquafil	0.1113	Yes	No	< 0.04	0.1113	-	Yes	No	< 0.04	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	Yes	No	< 0.001	0.000004	-	Yes	Yes	0.15	0.000004	-
7	Bartow County Landfill	0.035	No	No		-	0.0350	Yes	Yes	0.09	0.035	-
8	Doehler Beverage House	0.04548	No	No		-	0.0455	Yes	Yes	0.08	0.04548	-
9	Innovative Chemical Technologies	0.0015	Yes	No	< 0.001	0.0015	-	Yes	Yes		0.0015	-
10	Linde Gas North America, LLC	0.0864	No	No		-	0.0864	Yes	No	< 0.04	0.0864	-
11	Shaw 11: Philadelphia Plant	0.0999	No	No		-	0.0999	Yes	No	< 0.04	0.0999	-
12	Shaw 13: Stratton Plant	0.0523	No	No		-	0.0523	Yes	No	< 0.04	0.0523	-
13	Southern Yarn Dyers	0.0907	No	No		-	0.0907	Yes	Yes	0.35	0.0907	-
14	Tintoria	0.1847	No	No		-	0.1847	Yes	Yes	0.27	0.1847	-
15	Toyo Tire	0.0925	No	No		-	0.0925	Yes	Yes	0.149	0.0925	-
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

TOTAL (mgd) =>	0.1628	1.5852		1.7480	0.0000
Contributing Industry Count =>	4			15	
Total Allowable for Industry (MAIL) (lb/d) =>	12.55			17.28	
Uncontrollable Concentration (mg/L) =>	0.00059			0.19	
Uncontrollable Concentration (lb/d) =>	0.00779			0.00	
% of Uncontrollable Load Data < Detection =>	89%			0%	
IU Contributory Conc. with Uncontrollable Load (mg/L) =>	9.24			1.19	
IU Contributory Conc. without Uncontrollable Load (mg/L) =>	9.24			1.19	
Selected Local Limit Concentration with IU Contributory Method (mg/L) =>	9.24			1.19	
No. IUPs with limits and non-detects =>	4			6	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

			Phenol				
IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	Phenol Limit?	Phenol present?	Phenol Maximum	Contributory IU Flow mgd	Non-Contributory IU Flow mgd
1	Absolute Environmental Solutions	0.05	Yes	Yes	0.0443	0.05	-
2	Ampacet	0.0392	Yes	No	< 0.005	0.0392	-
3	Anheuser-Busch	0.834	Yes	Yes	0.0120	0.834	-
4	Anheuser-Busch	0.025	Yes	No	< 0.005	0.025	-
5	Aquafil	0.1113	Yes	Yes	0.0156	0.1113	-
6	ATCO Rubber Products, Inc.	0.000004	Yes	Yes	0.0751	0.000004	-
7	Bartow County Landfill	0.035	Yes	Yes	0.0740	0.035	-
8	Doehler Beverage House	0.04548	No	No	< 0.05	-	0.0455
9	Innovative Chemical Technologies	0.0015	Yes	No	< 0.05	0.0015	-
10	Linde Gas North America, LLC	0.0864	No	No		-	0.0864
11	Shaw 11: Philadelphia Plant	0.0999	No	No		-	0.0999
12	Shaw 13: Stratton Plant	0.0523	No	No		-	0.0523
13	Southern Yarn Dyers	0.0907	Yes	No, not measured		0.0907	-
14	Tintoria	0.1847	Yes	No	< 0.05	0.1847	-
15	Toyo Tire	0.0925	Yes	No	< 0.05	0.0925	-
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

TOTAL (mgd) =>	1.4639	0.2841
Contributing Industry Count =>	4	
Total Allowable for Industry (MAIL) (lb/d) =>	201.16	
Uncontrollable Concentration (mg/L) =>	0.00	
Uncontrollable Concentration (lb/d) =>	0.00	
% of Uncontrollable Load Data < Detection =>	0%	
IU Contributory Conc. with Uncontrollable Load (mg/L) =>	16.48	
IU Contributory Conc. without Uncontrollable Load (mg/L) =>	16.48	
Selected Local Limit Concentration with IU Contributory Method (mg/L) =>	16.48	
No. IUPs with limits and non-detects =>	6	

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	TP present?	TP Maximum	TP lb/d	Ammonia present?	Ammonia Maximum	Ammonia lb/d	BOD present?	BOD Maximum	BOD lb/d	TSS present?	TSS Maximum
1	Absolute Environmental Solutions	0.05	Yes	3.5	1.460	Yes	30.6	12.76	Yes	42	17.51	Yes	48
2	Ampacet	0.0392	Yes	0.51	0.167	Yes	0.18	0.059	Yes	9	2.94	Yes	28
3	Anheuser-Busch	0.834	Yes	16.3	113.4	Yes	31.5	219.1	Yes	272	1,892	Yes	387
4	Anheuser-Busch	0.025	Yes	no data		Yes	no data		Yes	no data		Yes	no data
5	Aquafil	0.1113	Yes	0.665	0.617	Yes	1.67	1.55	Yes	20	18.6	Yes	27
6	ATCO Rubber Products, Inc.	0.000004	No			Yes	76.2	0.003	Yes	427	0.014	Yes	275
7	Bartow County Landfill	0.035	Yes	3.46	1.010	Yes	210	61.3	Yes	209	61.0	Yes	433
8	Doehler Beverage House	0.04548	Yes	14.9	5.65	Yes	20.2	7.66	Yes	5,520	2094	Yes	451
9	Innovative Chemical Technologies	0.0015	Yes	112	1.40	Yes	26.5	0.332	Yes	695	8.7	Yes	182
10	Linde Gas North America, LLC	0.0864	No			Yes	2.53	1.823	Yes	30	21.6	Yes	35
11	Shaw 11: Philadelphia Plant	0.0999	Yes	15	12.50	Yes	11.9	9.91	Yes	265	220.8	Yes	11
12	Shaw 13: Stratton Plant	0.0523	Yes	92.9	40.5	Yes	78.6	34.3	Yes	462	201.5	Yes	57
13	Southern Yarn Dyers	0.0907	Yes	2.71	2.05	Yes	12.4	9.38	Yes	486	367.6	Yes	12
14	Tintoria	0.1847	Yes	339	522	Yes	370	570	Yes	840	1,294	Yes	66
15	Toyo Tire	0.0925	Yes	2.85	2.20	Yes	0.313	0.241	Yes	47	36.3	Yes	87
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

TOTAL (mgd) =>	TOTAL (lb/d) =>	703	928	6,236
Contributing Industry Count =>	TOTAL (lb/yr) =>	256,648	338,849	2,276,194
Total Allowable for Industry (MAIL) (lb/d) =>	MAIL remaining (lbs/day) =>	----	683	8,476
Uncontrollable Concentration (mg/L) =>	Percent MAIL available (%) =>	----	42.4 %	57.6 %
Uncontrollable Concentration (lb/d) =>	Percent of WWTP avg. day Influent load = >	110.6 %	73.5 %	65.7 %
% of Uncontrollable Load Data < Detection =>				
IU Contributory Conc. with Uncontrollable Load (mg/L) =>				
IU Contributory Conc. without Uncontrollable Load (mg/L) =>				
Selected Local Limit Concentration with IU Contributory Method (mg/L) =>				
No. IUPs with limits and non-detects =>				

CONTRIBUTORY FLOW CALCULATION FOR LOCAL LIMITS

POTW=> City of Cartersville Water Department

NPDES#=> GA0024091

Data entry

IUP Count	INDUSTRY NAMES (SIUs) (please list alphabeticly)	Flow mgd	TSS lb/d	Chloroform present?	Chloroform Maximum	Xylenes present?	Xylenes Maximum	Other POCs detected
1	Absolute Environmental Solutions	0.05	20.0	No		No		
2	Ampacet	0.0392	9.2	No	< 0.005	No	< 0.005	
3	Anheuser-Busch	0.834	2,692	No		No		
4	Anheuser-Busch	0.025		No		No		
5	Aquafil	0.1113	24.6	Yes	14.0	No		Acrylonitrile, benzene, toluene, naphthalene
6	ATCO Rubber Products, Inc.	0.000004	0.009	No		No		
7	Bartow County Landfill	0.035	126.4	No		No	< .0015	Benzene, Ethylbenzend, toluene, Hex chrome
8	Doehler Beverage House	0.04548	171.1	Yes	82	No		benzyl butyl phthalate
9	Innovative Chemical Technologies	0.0015	2.3	No		No		Benzofluoranthene, ethylbenzene, 4-chlorophenyl phenyl ehter, diethylphthalate, bis(2-ethylhexyl)phthalate
10	Linde Gas North America, LLC	0.0864	25.2	No		No		bis(2-ethylhexyl)phthalate
11	Shaw 11: Philadelphia Plant	0.0999	9.4	No		No		bis(2-ethylhexyl)phthalate
12	Shaw 13: Stratton Plant	0.0523	24.9	No		No		bis(2-ethylhexyl)phthalate
13	Southern Yarn Dyers	0.0907	9.1	Yes	7	No		
14	Tintoria	0.1847	101.7	Yes	4.6	No		bis(2-ethylhexyl)phthalate, delta-BHC
15	Toyo Tire	0.0925	66.9	Yes	12	No		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

TOTAL (mgd) =>	3,282
Contributing Industry Count =>	1,198,091
Total Allowable for Industry (MAIL) (lb/d) =>	12,430
Uncontrollable Concentration (mg/L) =>	79.1 %
Uncontrollable Concentration (lb/d) =>	25.5 %
% of Uncontrollable Load Data < Detection =>	
IU Contributory Conc. with Uncontrollable Load (mg/L) =>	
IU Contributory Conc. without Uncontrollable Load (mg/L) =>	
Selected Local Limit Concentration with IU Contributory Method (mg/L) =>	
No. IUPs with limits and non-detects =>	

Appendix D: Summary of Headworks Analysis Model and Local Limits Results

SUMMARY SHEET

Headworks and Local Limits Analysis

Client:	City of Cartersville Water Department
NPDES Permit No.	GA0024091
Date:	December-2019

Note = Data entry cells

Hazen

TABLE S1: Flow Data

POTW Design Flow mgd Qpotw	POTW Avg. Annual Flow mgd Qpotw	Industrial User (IU) Flow mgd Qind	Sludge Flow to Digester mgd Qdig	Sludge Flow to Disposal MTD Qsldg	Hauled Waste Flow mgd Qhw	Class A or B Sludge
15	6.7	1.7520	0.087	2.880	-	B

TABLE S2: Summary of WWTP Pollutant Removal Efficiency Selection

	Through WWTP					Through Primary Treatment				
Parameter	1999 Removal Efficiency	2018 Unpaired Analysis	Literature Removal Rate	Selection	Basis	1999 Removal Efficiency	2018 Unpaired Analysis	Literature Removal Rate	Selection	Basis
Arsenic	45.0 %	11.8 %	45.0 %	45.0 %	Literature	N/A	-	-	0.0 %	-
Cadmium	67.0 %	24.3 %	67.0 %	67.0 %	Literature	N/A	-	15.0 %	0.0 %	-
Chromium	82.0 %	21.2 %	82.0 %	82.0 %	Literature	N/A	-	27.0 %	0.0 %	-
Copper	84.0 %	90.3 %	86.0 %	90.3 %	Unpaired Value	N/A	-	22.0 %	0.0 %	-
Cyanide	69.0 %	-46.6 %	69.0 %	69.0 %	Literature	N/A	-	27.0 %	0.0 %	-
Lead	61.0 %	41.7 %	61.0 %	41.7 %	Unpaired Value	N/A	-	57.0 %	0.0 %	-
Mercury	60.0 %	-178.9 %	60.0 %	60.0 %	Literature	N/A	-	10.0 %	0.0 %	-
Molybdenum	21.0 %	19.1 %	33.0 %	19.1 %	Unpaired Value	N/A	-	-	0.0 %	-
Nickel	42.0 %	37.3 %	42.0 %	37.3 %	Unpaired Value	N/A	-	14.0 %	0.0 %	-
Selenium	50.0 %	14.5 %	50.0 %	50.0 %	Literature	N/A	-	-	0.0 %	-
Silver	75.0 %	3.5 %	75.0 %	75.0 %	Literature	N/A	-	20.0 %	0.0 %	-
Zinc	50.0 %	64.5 %	79.0 %	64.5 %	Unpaired Value	N/A	-	27.0 %	0.0 %	-
BOD		96.9 %	85.0 %	96.9 %	Unpaired Value	N/A	-	-	50.7 %	-
TSS		98.0 %	85.0 %	98.0 %	Unpaired Value	N/A	-	-	56.4 %	-
Ammonia		96.2 %	85.0 %	96.2 %	Unpaired Value	N/A	-	-	0.0 %	-

TABLE S3: Summary of Domestic Contribution Concentration

Parameter Parameter	1999 HWA Uncontrollable mg/L	(1) Specific mg/L	Literature Value mg/L	Selection mg/L	Basis
Arsenic	0.007	0.0025	0.007	0.0025	Sampling Data
Cadmium	0.008	0.0004	0.008	0.00035	Sampling Data
Chromium	0.034	0.0030	0.034	0.003	Sampling Data
Copper	0.109	0.0415	0.14	0.042	Sampling Data
Cyanide	0.082	0.0000	0.01	0.000005	Sampling Data
Lead	0.116	0.0014	0.058	0.0014	Sampling Data
Mercury	0.002	0.00000012	0.002	0.00000012	Sampling Data
Molybdenum	-	0.0025	-	0.0025	Sampling Data
Nickel	0.047	0.0031	0.047	0.0031	Sampling Data
Selenium	0.004	0.0025	-	0.0025	Sampling Data
Silver	0.019	0.0006	0.019	0.0006	Sampling Data
Zinc	0.212	0.1904	0.231	0.1904	Sampling Data
BOD		272.6	206	206	Design Value
TSS		144.3	221	221	Design Value
Ammonia		25.6633	22	22	Design Value
Total Kjeldahl nitrogen		-	37	37	Design Value
Total phosphorus		-	11	11	Design Value

(1) Average of unpaired data set.

TABLE S4: Summary of Headworks Analysis MAHL and MAIL Results

Parameter	1999 MAHL lb/d	2018 MAHL lb/d	MAHL Basis -	Domestic Load lb/d	Hauled Waste Load lb/d	2018 MAIL lb/d	Recommended Local Limit (1) mg/L	Recommended Local Limit Type	Current Local Limit (1999-2018) mg/L	Change Denoted by "X"
Arsenic	1.37	3.12	Sludge Disposal	0.10	-	2.71	0.185	UC	0.02	X
Cadmium	0.87	1.72	Water Quality	0.01	-	1.54	0.105	UC	0.01	X
Chromium	31.275	55.88	Inhib, Sludge	0.12	-	50.17	0.67	Current LL	0.67	
Copper	12.51	26.82	Inhib, Nitrif	1.73	-	22.41	1.53	UC	0.11	X
Cyanide	12.51	19.00	Inhib, Nitrif	0.00	-	17.10	1.17	UC	0.13	X
Lead	7.38	7.73	Water Quality	0.06	-	6.90	0.47	UC	0.12	X
Mercury	0.16	0.05	Water Quality	0.00	-	0.04	0.0028	UC	0.002	X
Molybdenum	5.36	2.49	Sludge Disposal	0.10	-	2.136	0.230	IU Contrib	0.13	X
Nickel	15.01	7.69	Sludge Disposal	0.13	-	6.80	0.52	IU Contrib	0.26	X
Selenium	1.08	3.81	Sludge Disposal	0.10	-	3.33	0.23	UC	0.02	X
Silver	31.275	-	-	0.02	-	-	-	UC	0.70	X
Zinc	33.78	27.94	Inhib, Nitrif	7.86	-	17.29	1.18	UC and IU Contrib	0.30	X
Phenol	375.3	223.5	Inhib, Nitrif	0.00	-	201.16	2.13	Current LL	2.13	
BOD (Note 1)		25,800	Design	8,501	-	14,719	300 / 850	Current LL	300 / 850	
TSS (Note 2)		27,600	Design	9,120	-	15,720	300 / 1500	Current LL	300 / 1500	
COD							750 / 2500	Current LL	750 / 2500	
Ammonia		2,800	Design	908	-	1,612	50	New LL	50	X
Total Kjeldahl nitrogen		4,600	Design	1,527	-	2,613				
Total phosphorus										
O&G, AV							100	Current LL	100	
O&G, TPH							100	New LL	Narrative Std	X
pH							5.5 - 10.0	Current LL	5.5 - 10.0	
Flashpoint							< 140F	Current LL	< 140F	
Temperature							< 150F	Current LL	< 150F	

Notes:
1. BOD is over-allocated (-86.74% remaining MAIL).
2. TSS is over-allocated (-86.56% remaining MAIL).

UC => Uniform Concentration Method
IU Contrib => IU Contributory Flow Method
Current LL => Current Local Limit

SUMMARY SHEET

Headworks and Local Limits Analysis

Client:	City of Cartersville Water Department
VPDES Permit No.	GA0024091
Date:	43800

Hazen

TABLE S5: Summary of Influent Data

Parameter	Count	Average mg/L	Maximum mg/L	Minimum mg/L	Std. Dev.	Influent Load lb/d	Data < Detection %
Arsenic	10	0.004	0.020	0.003	0.005	0.24	100%
Cadmium	10	0.002	0.020	0.000	0.006	0.13	100%
Chromium	10	0.005	0.020	0.003	0.005	0.27	90%
Copper	9	0.039	0.056	0.018	0.012	2.16	0%
Cyanide	10	0.004	0.013	0.000	0.005	0.20	70%
Lead	10	0.003	0.020	0.001	0.006	0.19	10%
Mercury	10	0.000	0.000	0.000	0.000	0.00	90%
Molybdenum	7	0.004	0.007	0.003	0.002	0.22	57%
Nickel	10	0.008	0.020	0.001	0.005	0.44	20%
Selenium	10	0.005	0.020	0.003	0.005	0.25	90%
Silver	10	0.003	0.020	0.001	0.006	0.16	100%
Zinc	10	0.142	0.216	0.090	0.037	7.9	0%
BOD	82	169.8	286.1	98.9	37.6	9,488	0%
TSS	82	229.9	457.5	129.9	65.5	12,848	0%
Ammonia	82	22.6	35.1	12.1	5.5	1,263	0%
TKN	0	-	-	-	-	-	-
Nitrate & Nitrite	0	-	-	-	-	-	-
Phosphorus	15	11.4	15.7	7.8	2.2	636	0%
O&G-AV	0	-	-	-	-	-	-
O&G-TPH	0	-	-	-	-	-	-
pH	75	7.17	7.37	6.84	0.096	-	-
TTO	0	-	-	-	-	-	-

TABLE S6: Summary of Primary Effluent Data

Parameter	Count	Average mg/L	Maximum mg/L	Minimum mg/L	Std. Dev.	Pri. Infl. Load lb/d	Data < Detection %
Arsenic	0	-	-	-	-	-	-
Cadmium	0	-	-	-	-	-	-
Chromium	0	-	-	-	-	-	-
Copper	0	-	-	-	-	-	-
Cyanide	0	-	-	-	-	-	-
Lead	0	-	-	-	-	-	-
Mercury	0	-	-	-	-	-	-
Molybdenum	0	-	-	-	-	-	-
Nickel	0	-	-	-	-	-	-
Selenium	0	-	-	-	-	-	-
Silver	0	-	-	-	-	-	-
Zinc	0	-	-	-	-	-	-
BOD	0	-	-	-	-	-	-
TSS	0	-	-	-	-	-	-
Ammonia	0	-	-	-	-	-	-
TKN	0	-	-	-	-	-	-
Nitrate & Nitrite	0	-	-	-	-	-	-
Phosphorus	0	-	-	-	-	-	-
O&G-AV	0	-	-	-	-	-	-
O&G-TPH	0	-	-	-	-	-	-
pH	0	-	-	-	-	-	-
TTO	0	-	-	-	-	-	-

TABLE S7: Summary of Effluent Data

Parameter	Count	Average mg/L	Maximum mg/L	Minimum mg/L	Std. Dev.	Effluent Load lb/d	Data < Detection %
Arsenic	14	0.004	0.020	0.003	0.005	0.21	100%
Cadmium	14	0.002	0.020	0.000	0.005	0.10	100%
Chromium	14	0.004	0.020	0.003	0.005	0.21	96%
Copper	13	0.004	0.019	0.003	0.005	0.21	55%
Cyanide	14	0.005	0.013	0.000	0.006	0.29	88%
Lead	13	0.002	0.020	0.001	0.005	0.11	65%
Mercury	14	0.000	0.002	0.000	0.000	0.01	92%
Molybdenum	7	0.003	0.005	0.003	0.001	0.18	64%
Nickel	14	0.005	0.020	0.003	0.005	0.28	46%
Selenium	13	0.004	0.020	0.003	0.005	0.21	96%
Silver	14	0.003	0.020	0.001	0.005	0.15	100%
Zinc	14	0.050	0.084	0.020	0.018	2.8	8%
BOD	82	5.3	15.2	2.0	2.4	294	0%
TSS	82	4.6	25.8	1.8	3.5	257	0%
Ammonia	82	0.853	4.6	0.117	0.886	48	0%
TKN	0	-	-	-	-	-	-
Nitrate & Nitrite	0	-	-	-	-	-	-
Phosphorus	75	7.8	17.5	1.4	3.0	437	0%
O&G-AV	0	-	-	-	-	-	-
O&G-TPH	0	-	-	-	-	-	-
pH	75	7.3	7.5	7.1	0.1	408	0%
TTO	0	-	-	-	-	-	-

SUMMARY SHEET

Headworks and Local Limits Analysis

Client:	City of Cartersville Water Department
VPDES Permit No.	GA0024091
Date:	43800

Hazen

TABLE S7: Summary of Sludge Data (mg/kg)

Parameter	Count	Average mg/kg	Maximum mg/kg	Minimum mg/kg	Std. Dev.	Sludge Load lb/d	Data < Detection %
Arsenic	2	5.3	5.7	4.8	0.64		
Cadmium	2	3.4	3.4	3.3	0.071		
Chromium	0	-	-	-	-		
Copper	2	366	421	312	77		
Cyanide	0	-	-	-	-		
Lead	2	18.9	19.8	17.9	1.3		
Mercury	2	0.60	0.60	0.60	0.000		
Molybdenum	2	10.6	11.0	10.1	0.64		
Nickel	2	23.80	24.20	23.40	0.57		
Selenium	2	6.5	6.6	6.3	0.21		
Silver	0	-	-	-	-		
Zinc	2	724	790	658	94		
BOD	0	-	-	-	-		
TSS	0	-	-	-	-		
Ammonia	0	-	-	-	-		
TKN	0	-	-	-	-		
Nitrate & Nitrite	0	-	-	-	-		
Phosphorus	0	-	-	-	-		
O&G-AV	0	-	-	-	-		
O&G-TPH	0	-	-	-	-		
pH	0	-	-	-	-		
TTO	0	-	-	-	-		

TABLE S8: Summary of Sludge Data (mg/L)

Parameter	Count	Average mg/L	Maximum mg/L	Minimum mg/L	Std. Dev.	Sludge Load lb/d	Data < Detection %
Arsenic	2	0.788	0.893	0.684	0.148	44	0
Cadmium	2	0.501	0.532	0.470	0.044	28	0
Chromium	0	-	-	-	-	-	0
Copper	2	55	66	44	15	3,082	0
Cyanide	0	-	-	-	-	-	0
Lead	2	2.8	3.1	2.5	0.39	158	0
Mercury	2	0.090	0.094	0.085	0.006	5	0
Molybdenum	2	1.6	1.7	1.4	0.201	88	0
Nickel	2	1.9	3.8	0.0	2.68	106	0
Selenium	2	0.965	1.0	0.897	0	54	0
Silver	0	-	-	-	-	-	0
Zinc	2	109	124	94	21	6,074	0
BOD	0	-	-	-	-	-	0
TSS	0	-	-	-	-	-	0
Ammonia	0	-	-	-	-	-	0
TKN	0	-	-	-	-	-	0
Nitrate & Nitrite	0	-	-	-	-	-	0
Phosphorus	0	-	-	-	-	-	0
O&G-AV	0	-	-	-	-	-	0
O&G-TPH	0	-	-	-	-	-	0
pH	0	-	-	-	-	-	0
TTO	0	-	-	-	-	-	0

TABLE S9: Summary of Domestic Data (mg/L)

Parameter	Count	Average mg/L	Maximum mg/L	Minimum mg/L	Std. Dev.	Domestic Load lb/d	Data < Detection %
Arsenic	9	0.003	0.003	0.003	0.000	0.103	100%
Cadmium	9	0.000	0.000	0.000	0.000	0.014	100%
Chromium	9	0.003	0.007	0.003	0.001	0.124	89%
Copper	9	0.042	0.080	0.016	0.019	1.73	0%
Cyanide	9	0.000	0.000	0.000	0.000	0.000	100%
Lead	9	0.001	0.004	0.001	0.001	0.057	44%
Mercury	9	0.000	0.000	0.000	0.000	0.000	89%
Molybdenum	9	0.003	0.003	0.003	0.000	0.103	100%
Nickel	9	0.003	0.008	0.003	0.002	0.127	89%
Selenium	9	0.003	0.003	0.003	0.000	0.103	100%
Silver	9	0.001	0.001	0.001	0.000	0.024	89%
Zinc	9	0.190	0.585	0.063	0.173	7.86	0%
BOD	9	273	349	156	62	8,501	0%
TSS	9	144	217	98	43	9,120	0%
Ammonia	9	26	39	17	6.2	908	0%
TKN	0	-	-	-	-	-	-
Nitrate & Nitrite	0	-	-	-	-	-	-
Phosphorus	0	-	-	-	-	-	-
O&G-AV	0	-	-	-	-	-	-
O&G-TPH	0	-	-	-	-	-	-
pH	0	-	-	-	-	-	-
TTO	0	-	-	-	-	-	-

SUMMARY SHEET

Headworks and Local Limits Analysis

Client:	City of Cartersville Water Department
VPDES Permit No.	GA0024091
Date:	43800

TABLE S10: Summary of Hauled Waste Data

Parameter	Count	Average mg/L	Maximum mg/L	Minimum mg/L	Std. Dev.	Hauled Load lb/d	Data < Detection %
Arsenic	0	-	-	-	-	-	-
Cadmium	0	-	-	-	-	-	-
Chromium	0	-	-	-	-	-	-
Copper	0	-	-	-	-	-	-
Cyanide	0	-	-	-	-	-	-
Lead	0	-	-	-	-	-	-
Mercury	0	-	-	-	-	-	-
Molybdenum	0	-	-	-	-	-	-
Nickel	0	-	-	-	-	-	-
Selenium	0	-	-	-	-	-	-
Silver	0	-	-	-	-	-	-
Zinc	0	-	-	-	-	-	-
BOD	0	-	-	-	-	-	-
TSS	0	-	-	-	-	-	-
Ammonia	0	-	-	-	-	-	-
TKN	0	-	-	-	-	-	-
Nitrate & Nitrite	0	-	-	-	-	-	-
Phosphorus	0	-	-	-	-	-	-
O&G-AV	0	-	-	-	-	-	-
O&G-TPH	0	-	-	-	-	-	-
pH	0	-	-	-	-	-	-
TTO	0	-	-	-	-	-	-

Appendix E: Headworks Addendum Sludge Loading Calculations

Headworks Addendum for Sludge Loadings (HASL) worksheet

POTW Name =	City of Cartersville Water Department	
POTW VPDES # =	GA0024091	
Date =	12/1/2019	
POTW Average Flow =	6.70	mgd
Avg. sludge flow to Disposal =	2.88	MTD
Avg. sludge flow to Disposal =	0.00509	mgd
Average % Solids to Disposal =	14.95	%
Sludge Site Area permitted =	1280	acres
Sludge Site Life =	40	years
Age of Sludge Site =		years

Note = Data entry cells

A metric ton is equal to 1000 kilograms, or approximately 2204 pounds.

MAHL_sv = (Q_potw * C_inf * 8.34) / (%_adj) lbs/day

Q_potw = Average POTW flow (mgd)
C_inf = Average influent concentration (mgd)

%_adj = Per percentage of Sludge Limit as decimal (example: enter 117% as 1.17)
8.34 = Conversion Factor

Note: Data from….

POLLUTANT	CUMULATIVE SLUDGE LOADING LIMITS lbs/acre*life	CUMULATIVE SLUDGE LOADING LIMITS lb/d	CUMULATIVE LOADING data from most recent Sludge Report for the most heavily loaded field[1] lbs/acre	% of Cumulative Limit	Flag if Greater than 80%	Sludge Ceiling Concentrations Limits mg/dry kg	Enter actual MAXIMUM SLUDGE CONC. from most recent Sludge Report or LTMP Data mg/dry kg	% of Applicable Ceiling Conc. Limit %	Flag if > 80% of Applicable Ceiling Conc. Limit Flag	Flag if > 100% of the Limit Flag	Enter Average POTW Influent Conc. mg/L	Calculate MAHL_sv based on % of Monthly Average Concentration Limits to Protect Sludge Quality lbs/day
Arsenic	36	7.01				75	5.700	7.6 %			0.0043	**3.12**
Cadmium	34	4.45				85	3.400	4.0 %			0.002315	**3.23**
Chromium												
Copper	1338	129.90				4300	421.000	9.8 %			0.039	**22.07**
Lead	267	56.13				840	19.800	2.4 %			0.003	**8.13**
Mercury	15	2.19				57	0.600	1.1 %			0.0001	**0.41**
Molybdenum						75	11.000	14.7 %			0.004	**1.53**
Nickel	374	87.91				420	24.200	5.8 %			0.008	**7.69**
Selenium	89	15.61				100	6.600	6.6 %			0.005	**3.81**
Zinc	2498	339.54				7500	790.100	10.5 %			0.142	**75.32**

If Greater than 80% Flag POTW MUST SUBMIT LAND APP & METALS MANAGEMENT PLAN **n/a**

If Greater than 80% of the concentration limit POTW MUST SUBMIT METALS MANAGEMENT PLAN **n/a**

If over ceiling conc. POTW must reduce MAHL **n/a**

[1] The most heavily loaded field is determined for each polluntant indivisually, and is the field that contains the highest amount (lbs/acre) of that pollutant.