pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0093360**
Facility Type	**Non-Municipal**	APS ID	**1053881**
Major / Minor	**Minor**	Authorization ID	**1380128**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Lake Arthur Estates, LLC**	Facility Name	**Lake Arthur Estates MHP**
Applicant Address	2925 New Castle Road	Facility Address	2925 New Castle Road
	Portersville, PA 16051-1223		Portersville, PA 16051-1223
Applicant Contact	Robert Sechan, Managing Partner (rsechan@newedgecg.com)	Facility Contact	Robert Sechan, Managing Partner (rsechan@newedgecg.com)
Applicant Phone	(724) 368-8875	Facility Phone	(724) 368-8875
Client ID	329540	Site ID	244083
Ch 94 Load Status	Not Overloaded	Municipality	Muddycreek Township
Connection Status	No Limitations	County	Butler
Date Application Received	December 22, 2021	EPA Waived?	Yes
Date Application Accepted	December 28, 2021	If No, Reason	-
Purpose of Application	Renewal of an existing NPDES Permit for an existing discharge of treated sanitary wastewater from a non-municipal sewer system.		

Summary of Review

Act 14 - Proof of Notification was submitted and received.

A Part II Water Quality Management permit is not required at this time.

The applicant should be able to meet the limits of this permit, which will protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:

A. Stormwater into Sewers
B. Right of Way
C. Solids Handling
D. Public Sewerage Availability
E. Little or no assimilative capacity

SPECIAL CONDITIONS:

II. Solids Management

There are no open violations in efacts associated with the subject Client ID (329540) as of 9/6/2023. *9/6/2023 CWY*

Approve	Deny	Signatures	Date
X		Stephen A. McCauley Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	9/6/2023
X		Chad W. Yurisic Chad W. Yurisic, P.E. / Environmental Engineer Manager	9/6/2023

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.425
Latitude	40º 57' 51.70"	Longitude	-80º 08' 58.70"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent		

Receiving Waters	Muddy Creek (WWF)	Stream Code	34081
NHD Com ID	126216820	RMI	3.33
Drainage Area	0.24	Yield (cfs/mi^2)	0.0342
Q_{7-10} Flow (cfs)	0.0082	Q_{7-10} Basis	calculated
Elevation (ft)	1167	Slope (ft/ft)	0.011
Watershed No.	20-C	Chapter 93 Class.	WWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment	-		
Source(s) of Impairment	-		
TMDL Status	-	Name	-

Background/Ambient Data		Data Source
pH (SU)	-	-
Temperature (°F)	-	-
Hardness (mg/L)	-	-
Other:	-	-

Nearest Downstream Public Water Supply Intake	PA American Water Company - Ellwood City		
PWS Waters	Connoquenessing Creek	Flow at Intake (cfs)	27.6
PWS RMI	0.2	Distance from Outfall (mi)	14.5

Sludge use and disposal description and location(s): All sludge is hauled to the Dalton Processing Facility by the Dalton Service Company, where it is ultimately disposed of at an approved landfill.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the Pennsylvania Bulletin in accordance with 25 Pa. Code § 92a.82. Upon publication in the Pennsylvania Bulletin, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the Pennsylvania Bulletin at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.425 MGD of treated sewage from an existing non-municipal STP in Muddycreek Township, Butler County.

Treatment permitted under Water Quality Management (WQM) Permit No. 1096402 consists of the following: A comminutor and grit/rag screw, an aerated flow equalization tank, a 4-cell Sequential Batch Reactor (SBR), ultraviolet light disinfection, sludge thickening, and rapid sludge dewatering system.

1. Streamflow:

Unnamed Tributary to the Muddy Creek at Outfall 001:

Drainage Area:	0.24	sq. mi.	(USGS StreamStats)
Yieldrate:	0.0342	cfsm	from 1/30/2006 WQPR
% of stream allocated:	100%	Basis:	No nearby discharges
Q_{7-10}:	0.0082	cfs	(USGS StreamStats)

2. Wasteflow:

Maximum discharge: 0.425 MGD = 0.657 cfs

Runoff flow period: 24 hours Basis: STP with flow equalization

The calculated stream flow (Q7-10) is much less than 3 times the permitted discharge flow. In accordance with the SOP, since this is an existing discharge that is no capable of meeting advanced treatment, the treatment requirements in document number 391-2000-014, titled, "Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers", dated April 12, 2008, will not be added for this facility.

Flow will be required to be monitored as authorized under Chapter 92a.61, and as recommended in the SOP.

3. Parameters:

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, E. Coli, Total Phosphorus, Total Nitrogen, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Disinfection.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits.

The measurement frequency was previously set to 4/day, which will be reduced to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

b. Total Suspended Solids

Limits are 30.0 mg/l as a monthly average and 60.0 as an instantaneous maximum.

Basis: Application of Chapter 92a47 technology-based limits.

c. Fecal Coliform

05/01 - 09/30:	200/100ml	(monthly average geometric mean)
	1,000/100ml	(instantaneous maximum)

10/01 - 04/30: 2,000/100ml (monthly average geometric mean)
10,000/100ml (instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. E. Coli

Monitoring was added for E. Coli at a frequency of 1/quarter.

Basis: Application of Chapter 92a.61 as recommended by the SOP for flows between 0.05 MGD and 1.0 MGD.

e. Phosphorus

Chapter 96.5 does not apply. The previous monitoring for Total Phosphorus will be retained in accordance with the SOP, based on Chapter 92a.61. The monitoring frequency will be reduced from 2/quarter to 1/quarter since the receiving stream is not impaired for nutrients, per the SOP.

f. Total Nitrogen

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61. The monitoring frequency will be reduced from 2/quarter to 1/quarter since the receiving stream is not impaired for nutrients, per the SOP.

g. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: eDMR data from previous 12 months

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background NH_3-N concentration: 0.1 mg/l

Basis: Default value

Calculated NH_3-N Summer limits: 6.8 mg/l (monthly average)
13.6 mg/l (instantaneous maximum)

Calculated NH_3-N Winter limits: 20.4 mg/l (monthly average)
40.8 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1). The winter limits are calculated as three times the summer limits. The calculated limits are less stringent than the current limits, so the more restrictive limits will be retained.

h. $CBOD_5$

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: eDMR data from previous 12 months

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

Calculated $CBOD_5$ limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the limits above (see Attachment 1). The calculated limits are the same as the previous permit and will be retained.

i. Dissolved Oxygen (DO)

The Dissolved Oxygen minimum of 4.0 mg/l will be retained with this renewal. The technology-based minimum of 4.0 mg/l is recommended by the WQ Model (see Attachment 1) and the SOP based on Chapter 93.7, under the authority of Chapter 92a.61.

The measurement frequency was previously set to 4/day, which will be reduced to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

j. Disinfection

☒ Ultraviolet (UV) light monitoring

☐ Total Residual Chlorine (TRC) limits: _____ mg/l (monthly average)
_____ mg/l (instantaneous maximum)

Basis: UV Intensity (µw/cm²) reporting will be retained with this renewal.

The measurement frequency was previously set to 4/day, which will be reduced to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

4. Reasonable Potential Analysis for Receiving Stream:

A Reasonable Potential Analysis was performed in accordance with State practices for Outfall 001 using the Department's Toxics Management Spreadsheet (see Attachment 2) for Total Copper and Total Lead.

Result: The discharge concentrations for the following parameters were found to be greater than 10% of the calculated WQBELs:

Parameter	Discharge Conc. (mg/l)	WQBEL (mg/l)	%WQBEL
Total Copper	0.0175	0.034	>50%
Total Lead	0.00716	0.012	>50%

Per the SOP, since the maximum discharge concentration for Total Copper and Total Lead were greater than 50% of the calculated WQBELs, new limits will be added. Based on eDMR data, the limits are

attainable so no compliance schedule will be added. Both copper and lead were set in the previous permit as monitor only.

5. Reasonable Potential for Downstream Public Water Supply (PWS):

The Department's Toxics Management Spreadsheet does not calculate limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate). Since no relevant sampling was provided, mass-balance calculations were not performed.

Nearest Downstream potable water supply (PWS): PA American Water Company - Ellwood City

Distance downstream from the point of discharge: 14.5 miles (approximate)

Parameter	PWS Criteria (mg/l)	Discharge Maximum (mg/l)
TDS	500	594
Chloride	250	88.9
Bromide	1.0	0.29
Sulfate	250	22.6

Result: No limits or monitoring are necessary as there is significant dilution available.

6. Anti-Backsliding:

Since all the permit limits in this renewal are the same or more restrictive than the previous NPDES Permit, anti-backsliding is not applicable.

7. Attachment List:

Attachment 1 - WQ Modeling Printouts

Attachment 2 - Toxics Management Spreadsheet

(The Attachments above can be found at the end of this document)

Compliance History

DMR Data for Outfall 001 (from July 1, 2022 to June 30, 2023)

Parameter	JUN-23	MAY-23	APR-23	MAR-23	FEB-23	JAN-23	DEC-22	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22
Flow (MGD) Average Monthly	53.600	0.049	2.584	52684	0.05990	58820	0.075	75826	63985	65718	0.053	95248
pH (S.U.) Minimum	7.0	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	6.8	6.5	6.0
pH (S.U.) Maximum	7.6	8.7	7.7	7.6	7.6	7.6	7.8	7.7	7.7	7.6	7.6	7.9
DO (mg/L) Minimum	4.0	4.0	6.2	5.3	6.8	6.2	6.5	6.8	6.8	6.8	6.8	6.7
CBOD5 (lbs/day) Average Monthly	1.768	1.634	4.0	2.1641	1.96	7.0	2.502	2.529	2.10	2.1	1.725	3.17747
CBOD5 (mg/L) Average Monthly	4.0	4.0	2.06832	5	4.0	3.327	4.0	4.0	4.0	2.1684	4.0	4.9
TSS (lbs/day) Average Monthly	3.09	3.677	5.5	4.336	3.69	6.5	3.125	3.794	2.62	2.64	2.157	39.718
TSS (mg/L) Average Monthly	7	9	2.84394	10	6	3.08997	5.0	6	5	2.64	5.0	5.0
Fecal Coliform (No./100 ml) Geometric Mean	15	1	1.0	96	77	1.8920	4.636	2.00	146	89	187	204
Fecal Coliform (No./100 ml) Instantaneous Maximum	35	1	1.0	382	303	2.0	42	3.00	384	256	843	472
UV Intensity (µw/cm²) Average Monthly	100.00	100.00	100.0	100.00	100	100.00	100	100	100.00	100	100	88
Total Nitrogen (mg/L) Average Monthly	5.16			0.007			8.08			6.33		
Ammonia (lbs/day) Average Monthly	0.013	0.122	0.30	0.01301	0.1476	1.6975	0.31275	0.189	0.315	0.3	0.129	1.493
Ammonia (mg/L) Average Monthly	0.03	0.30	1.55124	0.3	0.30	0.8069	0.83	0.3	0.6	0.158	0.3	1.9
Total Phosphorus (mg/L) Average Monthly	1.42			0.58			2.38			1.77		
Total Copper (mg/L) Average Monthly	5.97	0.00945	0.0094	0.00951	0.00781	0.0083	0.0175	0.007	0.007	0.007	0.007	0.007
Total Lead (mg/L) Average Monthly	0.8	0.007	0.00716	0.007	0.007	0.007	0.007	0.007	0.007	0.00592	0.007	0.007

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	XXX	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
CBOD5	88.6	XXX	XXX	25.0	XXX	50	1/week	24-Hr Composite
TSS	106.0	XXX	XXX	30.0	XXX	60	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
UV Intensity (µw/cm²)	XXX	XXX	XXX	Report	XXX	XXX	1/day	Measured
Total Nitrogen	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/quarter	24-Hr Composite
Ammonia Nov 1 - Apr 30	37.2	XXX	XXX	10.5	XXX	21	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	12.4	XXX	XXX	3.5	XXX	7	1/week	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/quarter	24-Hr Composite
Total Copper	120.5	XXX	XXX	0.034	XXX	0.068	2/month	24-Hr Composite

Outfall 001, Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Total Lead	42.5	XXX	XXX	0.012	XXX	0.024	2/month	24-Hr Composite

Compliance Sampling Location: at Outfall 001, after ultraviolet (UV) light disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids (TSS), and Fecal Coliforms are technology-based on Chapter 92a.47. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. Monitoring for E. Coli, UV Intensity, Total Nitrogen, and Total Phosphorus is based on Chapter 92a.61. Limits for Total Copper and Total Lead are based on Chapter 16.

Attachment 1

WQM 7.0 Effluent Limits (Perennial Reach)

SWP Basin	Stream Code	Stream Name
20C	34081	MUDDY CREEK

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
2.990	Lake Arthur	PA0093360a	0.425	CBOD5	21.04		
				NH3-N	6.44	12.88	
				Dissolved Oxygen			2

CBOD5 and DO are the same as the Dry Reach inputs, so the Dry Reach limits are protective.

For NH3-N, the limit can be back-calculated using the equation: Ct = (Co)e-(kt), where

Ct = 6.44 mg/l
k = 0.7 days-1 = constant for NH3-N
t = 0.085 days = Dry Reach Model travel time

Therefore, 6.44 mg/l = (Ct)e-(0.7 days-1)(0.085 days)

Ct = 6.83

NH3-N = 6.8 mg/l

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20C	34081	MUDDY CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
2.990	0.425	25.000	7.045
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
26.825	0.630	42.561	0.147
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
7.04	0.803	1.71	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.073	8.759	Tsivoglou	5
Reach Travel Time (days)			
1.244			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.124	6.21	1.50	6.29
0.249	5.48	1.32	6.51
0.373	4.83	1.16	6.73
0.498	4.26	1.02	6.92
0.622	3.76	0.90	7.10
0.746	3.31	0.79	7.25
0.871	2.92	0.70	7.38
0.995	2.58	0.61	7.50
1.120	2.27	0.54	7.54
1.244	2.00	0.47	7.54

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
20C	34081	MUDDY CREEK	**2.990**	1147.00	53.70	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.034	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Lake Arthur	PA0093360a	0.4250	0.0000	0.0000	0.000	25.00	7.20

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	21.04	2.00	0.00	1.50
Dissolved Oxygen	2.00	7.54	0.00	0.00
NH3-N	22.63	0.00	0.00	0.70

(inputs from Dry Reach Model)

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
20C	34081	MUDDY CREEK	**0.000**	1059.00	58.20	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.034	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
20C	34081	MUDDY CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
2.990	1.83	0.00	1.83	.6575	0.00557	.63	26.83	42.56	0.15	1.244	25.00	7.04
Q1-10 Flow												
2.990	1.17	0.00	1.17	.6575	0.00557	NA	NA	NA	0.12	1.478	25.00	7.06
Q30-10 Flow												
2.990	2.48	0.00	2.48	.6575	0.00557	NA	NA	NA	0.17	1.091	25.00	7.03

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
20C	34081	MUDDY CREEK

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
2.990	Lake Arthur	10.46	29.06	10.46	29.06	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
2.990	Lake Arthur	1.35	6.44	1.35	6.44	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
2.99	Lake Arthur	21.04	21.04	6.44	6.44	2	2	0	0

WQM 7.0 D.O.Simulation (Dry Reach)

SWP Basin	Stream Code	Stream Name
20C	34081	MUDDY CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
3.330	0.425	25.000	7.197
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
5.329	0.510	10.440	0.245
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
24.69	1.500	24.69	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
3.975	33.011	Owens	NA
Reach Travel Time (days)			
0.085			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.008	24.30	24.48	2.00
0.017	23.91	24.27	2.00
0.025	23.53	24.05	2.00
0.034	23.16	23.85	2.00
0.042	22.79	23.64	2.00
0.051	22.43	23.43	2.00
0.059	22.07	23.23	2.00
0.068	21.72	23.03	2.00
0.076	21.38	22.83	2.00
0.085	21.04	22.63	2.00

(input into Perennial Reach Model)

WQM 7.0 Modeling Specifications

Parameters	D.O.	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	Simulation	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
20C	34081	MUDDY CREEK	**3.330**	1167.00	0.24	0.00000	0.00	☐

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.034	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Dry Reach	PA0093360	0.4250	0.0000	0.0000	0.000	25.00	7.20

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	0.00	0.00	1.50
Dissolved Oxygen	4.00	2.00	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
20C	34081	MUDDY CREEK	**2.990**	1147.00	53.70	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.034	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
20C	34081	MUDDY CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
3.330	0.01	0.00	0.01	NA	0.01114	.51	5.33	10.44	0.24	0.085	25.00	7.20
Q1-10 Flow												
3.330	0.01	0.00	0.00	NA	0.01114	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
3.330	0.01	0.00	0.00	NA	0.01114	NA	NA	NA	0.00	0.000	0.00	0.00

Attachment 2

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Lake Arthur Estates MHP** NPDES Permit No.: **PA0093360** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Non-Municipal Sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.425	100	7.2						

					0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		594									
	Chloride (PWS)	mg/L		88.9									
	Bromide	mg/L		0.29									
	Sulfate (PWS)	mg/L		22.6									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L	<										
	Total Arsenic	µg/L	<										
	Total Barium	µg/L											
	Total Beryllium	µg/L	<										
	Total Boron	µg/L											
	Total Cadmium	µg/L	<										
	Total Chromium (III)	µg/L	<										
	Hexavalent Chromium	µg/L	<										
	Total Cobalt	µg/L											
	Total Copper	mg/L		0.0175									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	mg/L		0.00716									
	Total Manganese	µg/L											
	Total Mercury	µg/L	<										
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L	<										
	Total Silver	µg/L	<										
	Total Thallium	µg/L	<										
	Total Zinc	mg/L											
	Total Molybdenum	µg/L	<										
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

Group 3	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L	<										
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L											
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<										
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L											
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<										
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<										
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L	<										
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										

	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<										
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L	<										
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<										
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L											
	1,2,4-Trichlorobenzene	µg/L	<										
Group 6	Aldrin	µg/L	<										
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L	<										
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L	<										
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L	<										
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg											

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Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Lake Arthur Estates MHP, NPDES Permit No. PA0093360, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Muddy Creek**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	034081	2.99	1147	53.7			Yes
End of Reach 1	034081	0	1059	58.2			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	2.99	0.0342										100	7.5		
End of Reach 1	0	0.0342													

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	2.99														
End of Reach 1	0														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Lake Arthur Estates MHP, NPDES Permit No. PA0093360, Outfall 001

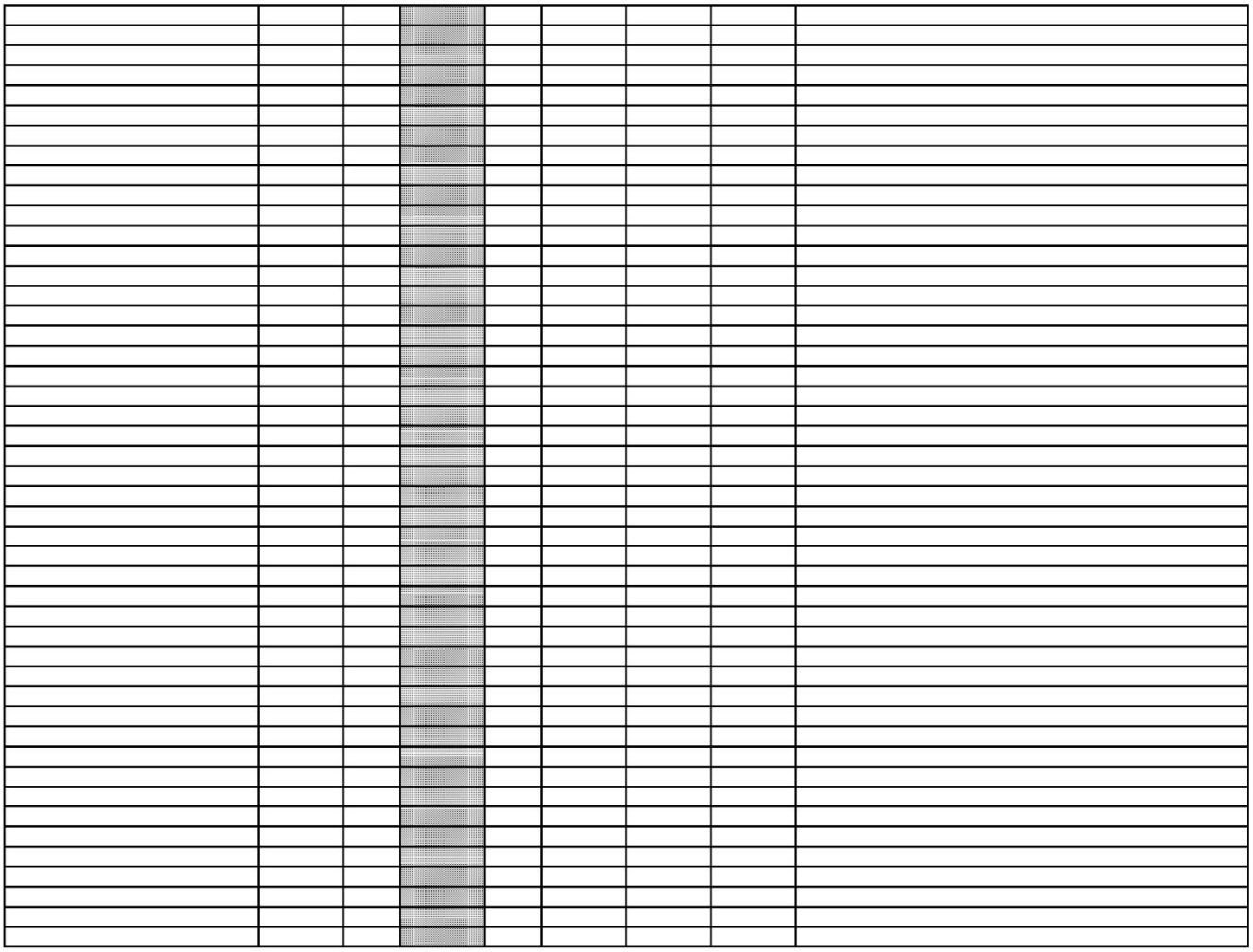
Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

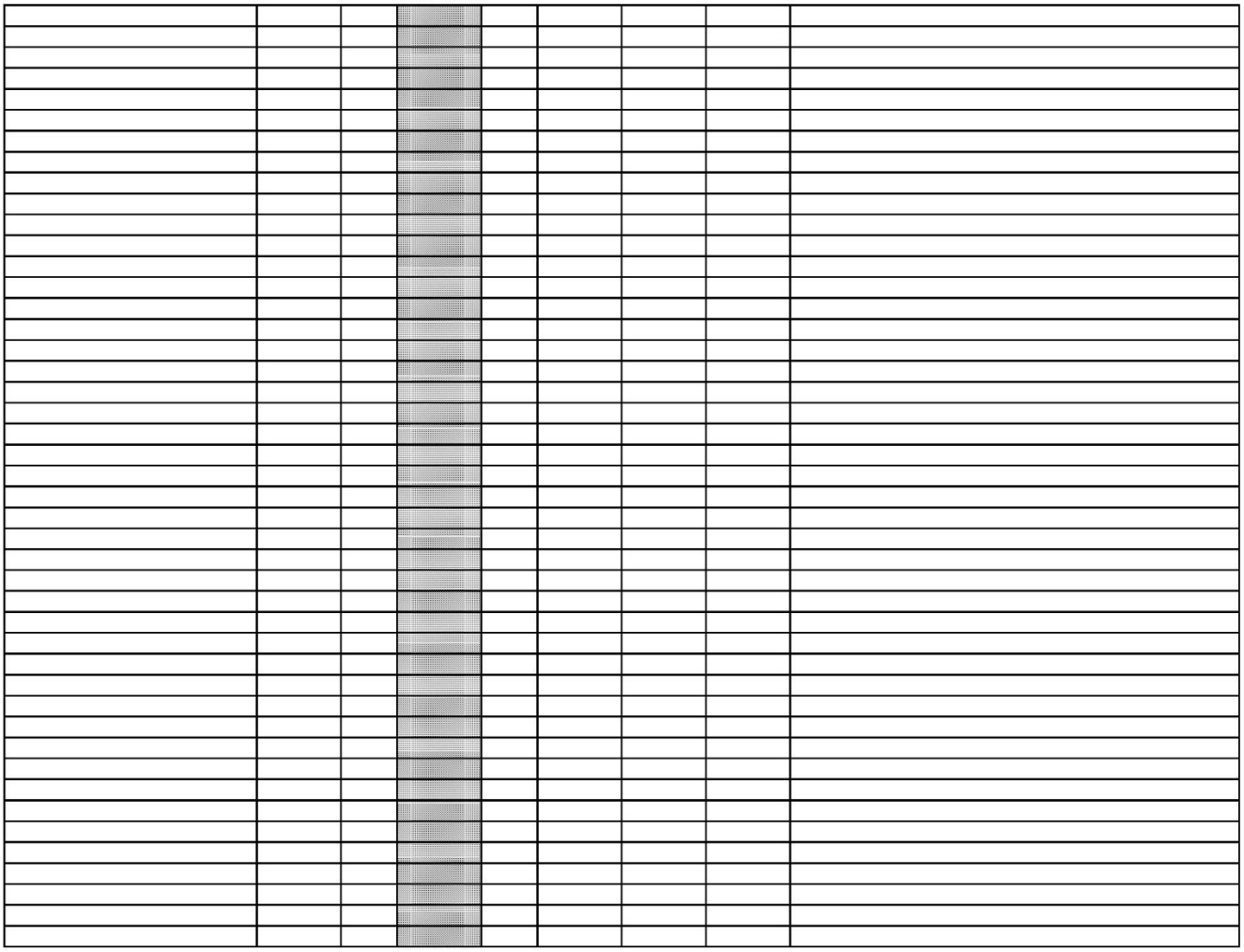
☑ ***AFC*** CCT (min): 14.345 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.40

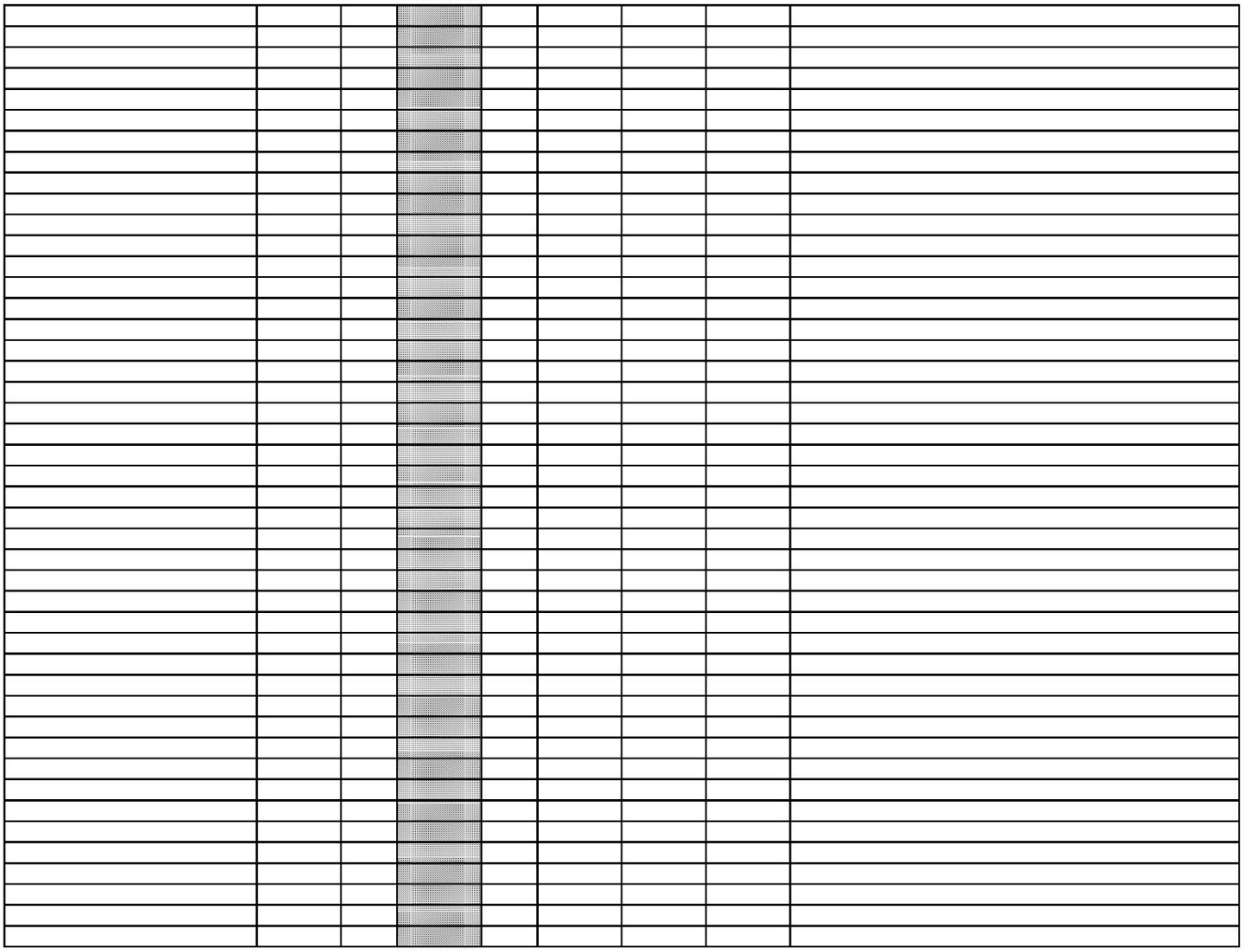
Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	13.439	14.0	53.1	Chem Translator of 0.96 applied
Total Lead	0	0		0	64.581	81.6	310	Chem Translator of 0.791 applied



☑ ***CFC*** CCT (min): 14.345 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.40

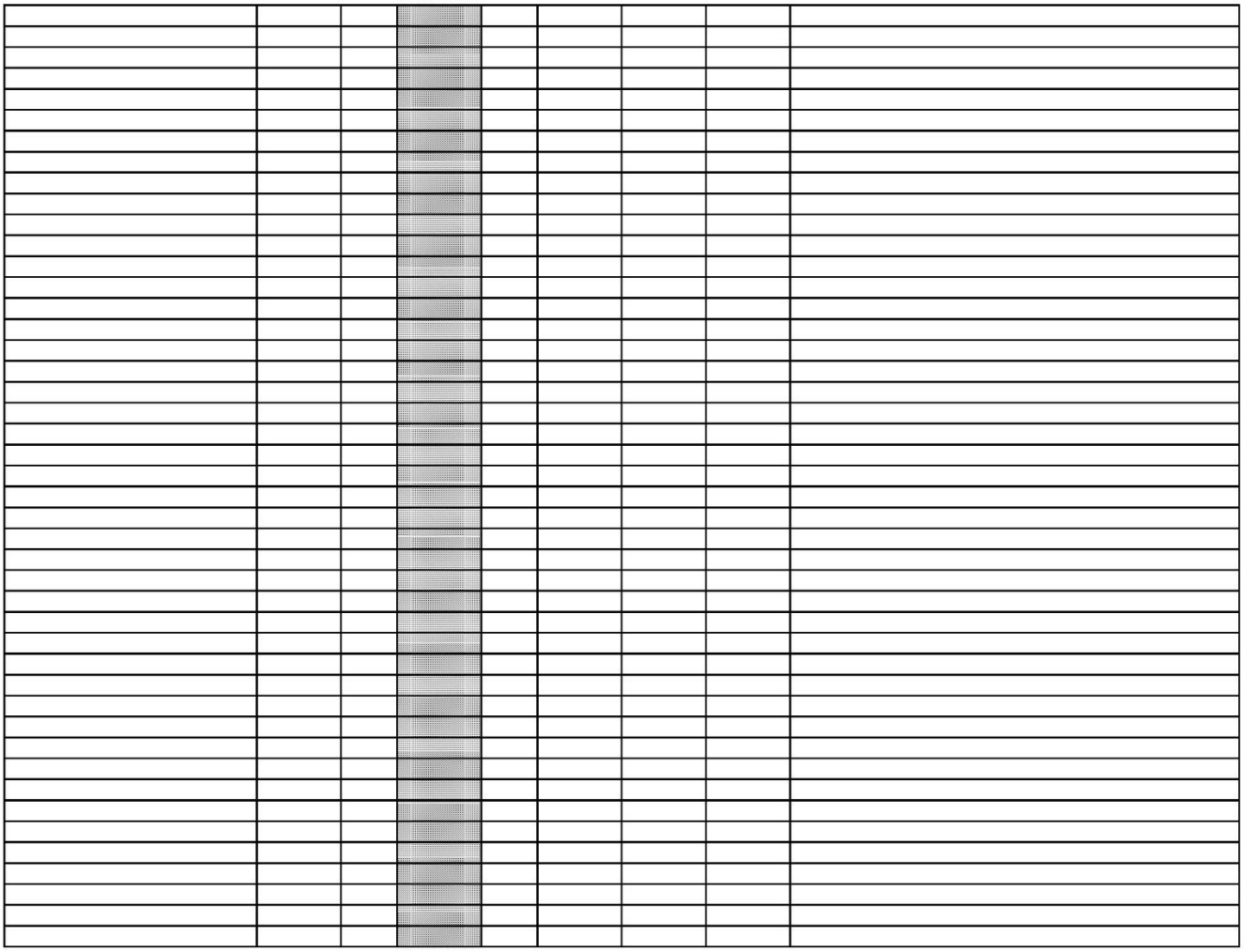
Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	8.956	9.33	35.4	Chem Translator of 0.96 applied
Total Lead	0	0		0	2.517	3.18	12.1	Chem Translator of 0.791 applied





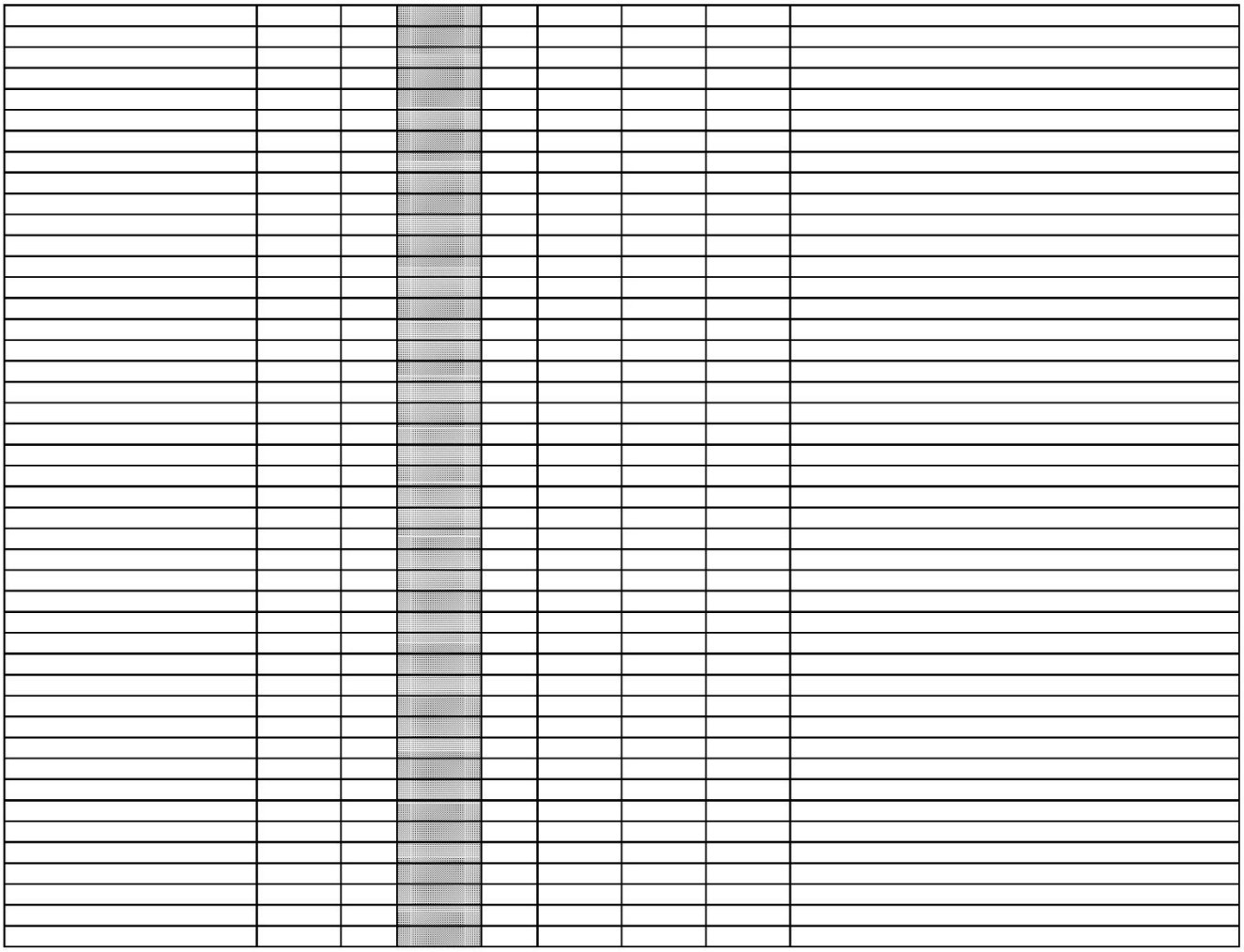
☑ ***THH*** CCT (min): 14.345 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	



☑ ***CRL*** CCT (min): 7.920 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	



☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		Concentration Limits						
Pollutants	AML	MDL	AML	MDL	IMAX	Units	Governing	WQBEL	Comments

Pollutants	(lbs/day)	(lbs/day)	AML	MDL	MAX	Units	WQBEL	Basis	Comments
Total Copper	0.12	0.19	0.034	0.053	0.085	mg/L	0.034	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Lead	0.043	0.067	0.012	0.019	0.03	mg/L	0.012	CFC	Discharge Conc ≥ 50% WQBEL (RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable