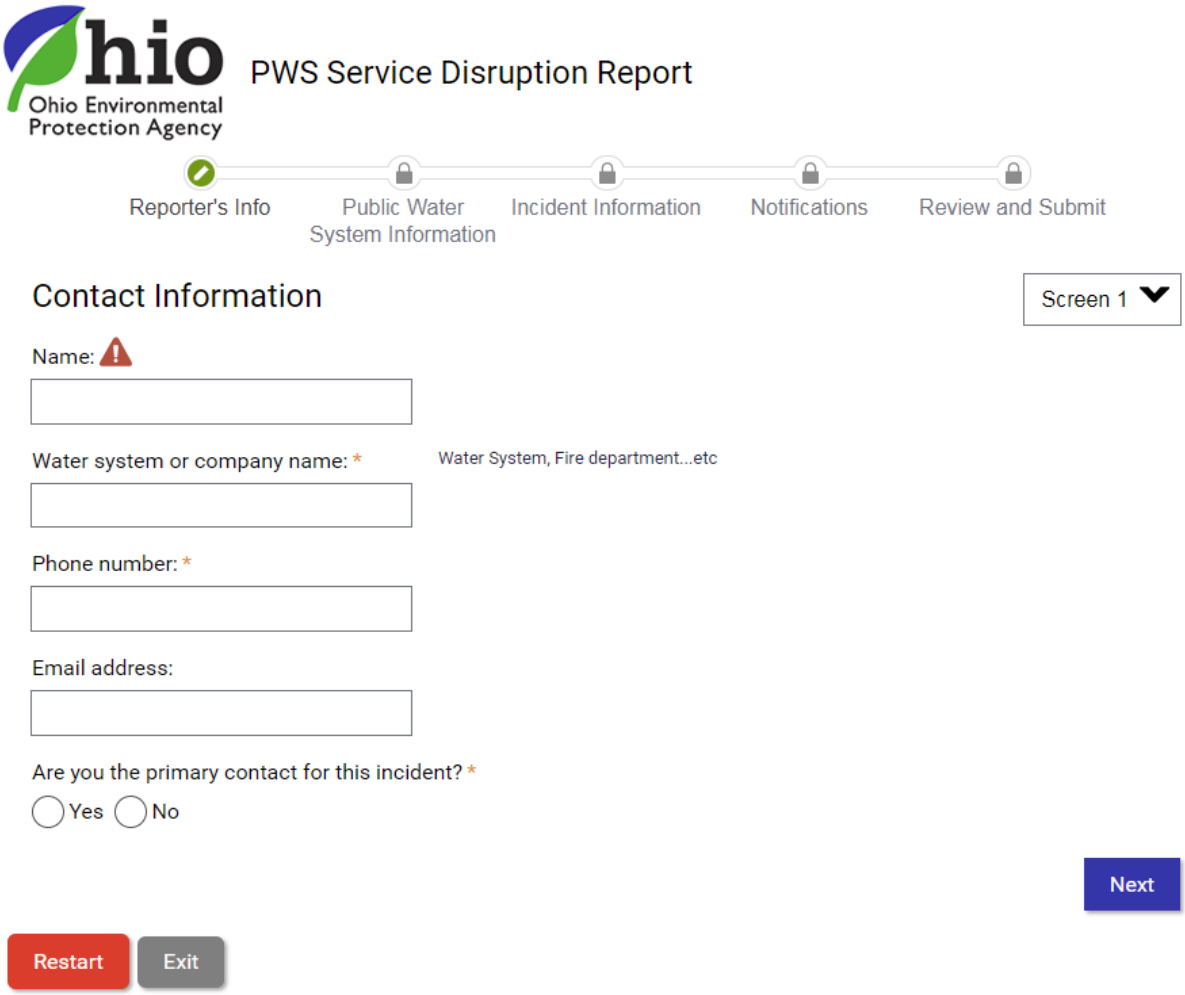
City of Pataskala Utility Department
Nathan W. Coey, Utility Director

- **Director Update**

  - Creek Road Water Main Project
    - Strand has submitted drawing review regarding the water line placement. The design work is about 40% complete at this point.
    - Geotechnical samples have been collected.
    - We are negotiating with the developer of the Hazelton Town Center to fund this improvement project in lieu of capacity fees.
  - Ohio EPA Update
    - The WRF Phosphorus Study is completed prior to the deadline. Please see the attached information concerning our study.
    - The Agency has created an on line notification system for water systems to report service issues and disruptions.
      - In the event of disruptions or following conditions we are to complete the reporting process.

The following types of incidents should be reported to Ohio EPA:

1. A disruption of service or water line repair affecting either 10 percent or 100 customers, whichever is less, where there is:
   - a loss of pressure in the lines being repaired;
   - depressurization in the area around the repair;
   - an uncontrolled shutdown of a portion of the distribution system; or
   - signs of possible contamination intrusion
2. Loss of power that impacts the provision of water;
3. Incidents impacting critical users identified in the system's contingency plan;
4. Plant upsets;
5. Pump or motor failure;
6. Treatment technique violation;
7. Exceedance of a maximum contaminant level (MCL) or an action level (ALE);
8. Incidents with media attention; or
9. A detection of contamination in the system or source water.



➢ Water Department

- Continuing to test dilution levels in relation to wastewater strontium discharge at WTP2. The diluted discharge level has provided positive results.
- A significant service line leak in Highland Hills was located and scheduled for repair on 11-16-17. Water loss was identified through elevated flows from the booster station. Social media posts were used to help locate this non surfacing leak.
- Hazelwood Section 5-1 requires a water main shut down to install a new section of pipe to deflect away from a storm conflict. This work will be completed in the late evening, early morning hours (10 pm to 2 am) on 11-16-17. Residents have been notified of this necessary work by the developer.

- **Water Reclamation Department**

    - All biosolids in inventory (366 tons) have been transported to a land application site. Once we have a forecast of several dry days we will then apply and incorporate.
    - A seal fail on a clarifier has been identified. This requires daily oil replenishment. I am working on a quote for parts to repair.
    - We have contracted with our press manufacturer to conduct replacement work on the unit. We are working to extend the life of this vital machine.

- **Billing Department Update**

    - The Billing Department will notify current builders of the residential ¾ capacity fee increases starting 2018.
    - Staff will be attending a customer service seminar in December.

Nathan W. Coey, Utility Director

Division of Surface Water: *Technical and Financial Capability Study to Reduce Phosphorus*

Ohio Environmental Protection Agency

(Read accompanying instructions carefully before completing this form)
This form may be used by publicly owned treatment works with a design flow of 1.0 million gallons per day or more or otherwise designated as a major by the director and that did not have total phosphorus limits as of July 3, 2015 to fulfill obligations set forth in ORC Section 6111.03 that require a study of the technical and financial capability of the existing treatment works to reduce the final effluent discharge of phosphorus to one milligram per liter using possible source reduction measures, operational procedures, and unit process configurations.

Completion of this form does not take the place of any previously required nutrient related reports. Submit this form to Ohio EPA Division of Surface Water by December 1, 2017.

I. Applicant Information

Facility Name:	City of Pataskala Water Reclamation Facility #1	Ohio EPA Permit Number:	4PB00009*JD
Outfall Number:	Final Outfall - 001	Type of Treatment:	Activated Sludge

II. Total Phosphorus Data from the Previous Twelve Months

Select which of the following best describes the numeric total phosphorus concentrations in the influent at your facility:	Monitored for Process Control

Include the average monthly effluent concentration for total phosphorus for the most recent twelve months below. Unless you marked "Unknown" above, also include the average monthly influent concentration for total phosphorus as well.

Month	Average Monthly Concentration of Total Phosphorus	
	Influent (mg/L)	Final Effluent Outfall (mg/L)
September 2016	3.69	3.07
October 2016	4.24	4
November 2016	4.08	3.72
December 2016	3.59	2.83
January 2017	2.53	1.96
February 2017	2.35	1.94
March 2017	2.55	1.86
April 2017	3.6	1.99
May 2017	4.18	1.57
June 2017	4.24	2.9
July 2017	3.53	2.12
August 2017	4.18	2.6

Based on the above discharge information, does the permittee believe that it is currently able to discharge total phosphorus at or below a one milligram per liter monthly average concentration without any additional changes to treatment processes?

Yes ☐ (Continue to Section III)	No ☒ (Continue to Section IV)

III. Identification of the methods currently used by the permittee to reduce the discharge of total phosphorus to a monthly average concentration of 1.0 mg/L or lower. Identify below a summary of source reduction measures, operational procedures [including biological phosphorus removal], and unit process configurations that have previously been performed and contribute to decreased total phosphorus discharges. Once this section is completed, continue to section VI.

Facility can not currently meet a 1 mg/l effluent total phosphorus level. 2017 running average indicates a 2.19 mg/l effluent total phosphorus discharge level and 2.16 mg/l orthophosphate level.

IV. Identification of the most economically feasible method(s) to reduce the discharge of total phosphorus to a monthly average effluent concentration of 1.0 mg/L. Complete the following questions to identify which phosphorus reduction methods have been evaluated or attempted and which could be used in the future to reduce the total phosphorus monthly average effluent concentration to 1.0 mg/L or lower.

IV. A.	Has **Source Reduction** been evaluated?	Yes ☐	No ☒

If yes, has **Source Reduction** been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☐	No ☒
Have **Source Reduction** concepts been implemented?		Yes ☐	No ☒
IV. B.	Have **Operational Changes** been evaluated?	Yes ☒	No ☐
If yes, have **Operational Changes** been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☐	No ☒
Have **Operational Changes** been implemented?		Yes ☒	No ☐
IV. C.	Have **Unit Process Configuration Changes** been evaluated?	Yes ☒	No ☐
If yes, have **Unit Process Configuration Changes** been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☒	No ☐
Have **Unit Process Configuration Changes** been implemented?		Yes ☐	No ☒
IV. D.	Has **Additional Treatment** (beyond your existing facility) been evaluated?	Yes ☒	No ☐
If yes, has **Additional Treatment** been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☒	No ☐
Has **Additional Treatment** been implemented?		Yes ☐	No ☒

IV. E. Include a brief summary as to how the procedures identified above could be performed and/or installed to reduce the total phosphorus monthly average effluent concentration to 1.0 mg/L or lower.

1. Additional aeration and mixing equipment in activated sludge process. 2. New conventional belt filter press. 3. Chemical percipiation of phosphorus via Rare Earth Chloride addition. Please see attached narrative regarding considerations evaluated. All options require building expansion to house new equipment. While chemical addition is the low cost alterntivie, it is appriopoate to globally address improvments to facility performance.

V. Economic Information and Total Estimated Costs of Reducing Total Phosphorus Concentrations

Were chemical treatment additives identified in Section IV as part of the most economically feasible method(s) to reduce the discharge of total phosphorus to a monthly average concentration of 1.0 mg/L or lower?

Yes ☒ (Continue to Section V.A) No ☐ (Continue to Section V.B)

V.A. Economic Information Associated with Chemical Feed

Capital Cost Associated with Chemical Feed:

Chemical Tank Cost:	$11,000	Pump Cost:	$10,000
Piping and Dosing Mechanism Cost:	$10,000	Any Other Expected Capital Costs (e.g.: new building):	$60,000
Total Associated Capital Costs (summation of the above capital costs):		$91,000	

Associated Operations and Maintenance (O&M) Cost Associated with Chemical Feed:

Monthly Chemical Cost:	$1,800	Monthly Labor Costs:	$500
Monthly Electric Cost:	$350	Other Monthly Costs:	$500
Additional Monthly Costs Associated with Increased Sludge Volumes:		$1,500	
Monthly Associated O&M Costs (summation of the above O&M costs):		$4,650	

V.B. Economic Information Associated with Non-Chemical Feed Alternatives

Complete the following information for each option identified in Section IV. Please provide an explanation for the costs (electric cost, labor, etc.) in the column titled 'Reasoning':

TP Reduction Method:	Capital Cost:	Monthly O&M Cost:	Reasoning:
Aeration Modifications	$250,000	$1,000	Monthly O&M estimate due to electrical and preventative maintenance.
Other Changes in Process Flow	$450,000	$1,000	New belt press, O&M costs due to electrical and preventative maintenance.
Other (specify in Reasoning column)	$169,000	$500	Building expansion for aeration blowers, new press, and chemical feed. O&M cost electrical and PM.
Other (specify in Reasoning column)	$100,000	0	Design estimate for above, please see written summary.

VI. Certification			
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this form and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the form, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.			
Name:	Nathan W. Coey	Official Title:	Utility Director
Signature:	Nathan W. Coey	Date Signed:	October 13, 2017

Utility Division
Nathan W. Coey
Utility Director

October 13, 2017

Ohio EPA Division of Surface Water

Regarding:
Pataskala WRF Technical and Financial Capability Study to Reduce Phosphorus

Dear Reviewer,

Please allow this narrative to serve as a phosphorus study summary of the Water Reclamation Facility owned and operated by the City of Pataskala. I want to applaud the Ohio EPA for this initiative to allow facilities the time to review all available options prior to permit modifications that may require an effluent total phosphorus discharge level of 1 mg/l. I wanted to take the time to share facility evaluations and conclusions under this study. The study provides an opportunity to improve our facility under this initiative.

Please see the attached data summary of treatment related averages relative to the study. The averages for 2017, through September are as follows.

Effluent average MGD: .7912
Influent total phosphorus average: 3.63 mg/l
Effluent total phosphorus average: 2.19 mg/l
Average phosphorus removal: 37%
Average orthophosphate: 2.16 mg/l

The Pataskala WRF is not currently capable of consistently meeting an effluent discharge level of 1 mg/l total phosphorus. No source reduction options were evaluated due to influent sewage being domestic in nature with some commercial customers and zero industrial dischargers. The tested influent phosphorus levels are indicative of the nature of our domestic users. During this study period, the highest observed influent total phosphorus sample was 5.49 mg/l with a low of 2.35 mg/l. Our running effluent average for 2017 is currently 2.19 mg/l. I provided on the data summary sheet the calculated stream loadings. It is important to note our current permit requires monthly total phosphorus upstream testing. Total phosphorus samples were collected at our downstream test location for seven months with an average of .35 mg/l.

Options Evaluated

1. **Lagoon Polishing.** Lagoon polishing was utilized from May through August 2017. The onsite lagoons have not been in service for treatment since the completion of our most recent upgrade. We have two 4 acre lagoons on the treatment property. The northern most lagoon is equipped for diversion of influent high flow. If influent flow exceeds facility design we are able to divert to the lagoon for storage until flow is back to normal. We have not utilized this option since the 2011 facility upgrade project. The south lagoon was put in service to test polishing of the effluent prior to discharge.
    a. Effluent flow was diverted through the south lagoon to gauge ability to reduce phosphorus effluent levels. We installed additional mixers in the lagoon to assist

in the test run. The lagoon provided no reduction in phosphorus as we compared the lagoon discharge and clarifier effluent.

b. This option will not meet an effluent discharge level of 1 mg/l.
c. The aerators will remain in place to improve the aesthetics of the out of service southernmost lagoon.

2. **MCRT Adjustment.** We evaluated efforts to increase and decrease our MCRT to see if it had an effect on effluent phosphorus levels. The WRF had an average MCRT of 13 in 2016, and 10 average through September 2017. Our 2017 running monthly average activated sludge waste total is 895,000 gallons.
    a. Due to limitations on our sludge processing equipment it is difficult to get below a 10 average for this test. More so this limits a daily max waste rate of 50,000 gallons daily when the plant is fully staffed Monday through Friday. Our press is also limited to about 15,000 gallons a day during a normal shift.
    b. We attempted to increase the MCRT to a 25 day average just for a comparison. The facility did not respond well. We did not have any permit violations but there was a strong increase in odor, foam, and nearly septic digester sludge. This was abandoned due to the observations.
    c. This option will not meet an effluent discharge level of 1 mg/l.
3. **Side Stream Evaluation.** Our current sludge processing is limited by the current rotary fan press. We have significant filtrate that is returned to the outer aeration channel that provides an unnecessary load due to poor press capture rate. The filtrate averages 3,000 mg/l suspended solids with an average 11 mg/l of phosphorus put back in the aeration system during the study period. It is important to note we continue to work with the manufacturer for service on the machine with no sustainable improvement.
    a. We conducted trial runs on another rotary fan press, and two conventional belt filter presses. All units tested provides a consistent filtrate less than 50 mg/l of suspended solids with an average of phosphorus less than 5 mg/l.
    b. This option alone will not help us meet an effluent discharge level of 1 mg/l. However, improvement of side streams will reduce facility peak load periods.
4. **Chemical Addition.** Our last and final test stared three weeks ago. Chemical precipitation of phosphorus in wastewater treatment facilities is a reliable option. We are currently testing a “Rare Earth Chloride” (RECl3) that is showing promising results. We have started out at very low doses and continue to increase weekly until we get to an effluent level less than 1 mg/l. We are very close to achieving that level feeding at a rate of 4 gallons per day. The RECl3 was tested because it provides the option of dosing in our influent screening building as it flows to the aeration system for the test period.
    a. Traditional ferric chloride or aluminum sulfate is preferred to be dosed at the aeration effluent prior to clarification. We do not have a splitter box or easy application location for the traditional chemicals. We are working on a plan to dose the RECl3 to the center ring of the aeration system to gauge the impact to treatment.
    b. This particular chemical will provide a means to reduce the effluent discharge level to 1 mg/l of total phosphorus. As will traditional chemical applciations. This is a new product we were made aware of this year and wanted to trial run for future budgetary considerations.

Based on our study results I am taking steps to move forward with an improvement project. I have budgeted a 1 million dollar upgrade project at the WRF over the course of 2018 and 2019. I have requested an annual budget of $500,000 in cash over the next two years to improve facility operation with a focus on phosphorus removal. At this point in the 2018 budget approval process, I have the legislative support needed to move forward with this initiative.

Target Improvements

- **Aeration System Improvements.** The aeration system is deficient in mixing and dissolved oxygen levels. The aeration system consists of three concentric rings with the outer most and middle ring working together to achieve treatment while the center ring serves as a polishing mode prior to clarification. The average dissolved oxygen mg/l to date for 2017 is 1.19 mg/l (outer), .48 mg/l (middle), and 1.89 (center) provided by surface mixers. Facility SCADA trending indicates several times daily the dissolved oxygen drops to zero. I would like to explore design and construction on additional air for the system and submersible mixers to establish a true anoxic zone. This also will include an internal recycle of the aeration biomass as currently recommended by the manufacturer of our process.
    - **Construction and procurement estimate $250,000.**

- **New Biosolids Press.** A new traditional belt filter press has been selected with a focus on minimal filtrate, reduced polymer usage, high cake production, and reduced side stream impact to the biological process. The current facility press can operate at a 50 gpm maximum feed rate with poor capture rate and high polymer use. The replacement press we have selected based on trial operation has a 350 gpm capacity with excellent finished cake product and excellent capture rate.
    - **Construction and procurement estimate $450,000.**

- **Chemical Feed System.** A chemical feed system will be designed and installed as a backup in the event our improvement efforts do not meet a future 1 mg/l total phosphorus limit.
    - **Construction and procurement estimate $31,000.**

- **Building Expansion.** A building expansion will be required for the above improvements. Individual buildings or one large building will be needed for new equipment including a belt filter press, aeration blowers, and chemical feed equipment. This cost includes building construction estimate including utilities and controls for the new equipment.
    - **Construction and procurement estimate $169,000.**

- **Design Work.** A treatment consultant will be selected to design the target improvements. This will included final design, contract administration, and permitting fees.
    - **Design estimate $100,000.**
        - **Total project cost estimate and current budget request $1,000,000.**

Budgetary Goals and Planning

- **2018.**
    - Select a consultant to design target improvements. Design work to coincide with permit to install requirements of the proposed improvement project.

    - Building construction and procurement.
    - Construction and procurement of the aeration system improvements.
- **2019.**
    - Procurement and installation of a belt filter press.
    - Procurement and installation of chemical feed system equipment.

I am confident with this project budget and process control operational changes we will consistently meet a target effluent of 1 mg/l or less total phosphorus. Improvements to the activated sludge aeration system and filtrate reduction will allow for increased biological reduction of effluent phosphorus. The design and installation of a chemical feed system will ensure compliance for future phosphorus discharge limits. My evaluation has determined our side stream is the main culprit for low phosphorus removal and the inability to compensate self-inflicted loading with additional dissolved oxygen. I feel this upgrade is obtainable financially and proactive in meeting future phosphorus limits.

In closing, our facility cannot currently meet an effluent phosphorus level of 1 mg/l without facility improvements. It is important to note the observed downstream phosphorus levels during the study period indicated minimal impact to the stream. While we can secure funding for improvement projects, the focus is facility improvement with a positive reduction in phosphorus discharge levels. In 2016, our facility participated in a study determining future ammonia criteria. I have attached that report to this submission regarding the summary of our impact to the receiving stream.

If you have any questions about our study and the submitted report, please feel free to contact me.

Sincerely,
Nathan W. Coey
Utility Director
City of Pataskala
740-927-4134
ncoey@ci.pataskala.oh.us

City of Pataskala WRF Total Phosphorus Data
Ohio EPA Technical and Financial Capability Study

2017	Average Total Phosphorus	Average Total Phosphorus	Average Flow	Stream Loading Average	
	Influent mg/l	Effluent mg/l	MGD	lbs/day	kg/day
January	2.53	1.96	0.864	14.12	6.41
February	2.35	1.94	0.7206	11.66	5.29
March	2.55	1.86	0.8774	13.61	6.18
April	3.6	1.99	0.9088	15.08	6.85
May	4.18	1.57	0.8697	11.39	5.17
June	4.24	2.9	0.6288	15.21	6.90
July	3.53	2.12	1.0367	18.33	8.32
August	4.18	2.6	0.6366	13.80	6.26
September	5.49	2.74	0.5779	13.21	5.99
October					
November					
December					
Annual Average	3.63	2.19	0.7912	14.05	6.55

2017	2017
	Average Removal %
January	22.53
February	17.45
March	27.06
April	44.72
May	62.44
June	31.60
July	39.94
August	37.80
September	50.09
October	
November	
December	
Annual Average	37.07

2017	Orthophosphate
Monthly Grab	mg/l
Dec-16	1.72
Jan-17	1.72
Feb-17	1.82
Mar-17	1.91
Apr-17	1.4
May-17	4.21
Jun-17	1.55
Jul-17	2.92
Aug-17	2.25
Sep-17	2.13
Oct-17	
Nov-17	
10 Month Average	2.16

2017	Average Total Phosphorus	Average Total Phosphorus
	Upstream mg/l	Downstream mg/l
January	0.04	
February	0.04	0.1
March	0.04	0.9
April	0.04	
May	0.11	0.3
June	0.04	0.32
July	0.08	0.34
August	0.05	0.29
September	0.11	0.2
October		
November		
December		
Annual Average	0.06	0.35

City of Pataskala WRF Total Phosphorus Data
Ohio EPA Technical and Financial Capability Study

2017	Average Total Phosphorus	Average Total Phosphorus
Side Streams	Thickener Supernant mg/l	Press Filtrate mg/l
January		
February		
March		
April		
May	5.69	20.9
June		
July	6.25	5.37
August	4.86	7.25
September		
October		
November		
December		
Annual Average	5.60	11.17

MCRT Average	2017	2016
	Days	Days
January	9.40	14.90
February	9.40	18.14
March	9.27	12.70
April	10.40	13.78
May	9.70	12.40
June	9.80	12.10
July	9.20	12.26
August	11.20	8.87
September	12.20	13.33
October		11.60
November		17.98
December		12.10
Annual Average	10.06	13.35

City of Pataskala WRF Total Phosphorus Data
Ohio EPA Technical and Financial Capability Study

2017	Outer Ring Average	Middle Ring Average	Center Ring Average
Aeration DO	DO mg/l	DO mg/l	DO mg/l
January	1.40	0.40	2.00
February	1.40	0.30	2.10
March	1.40	0.40	2.70
April	1.00	0.30	2.00
May	1.20	0.40	1.60
June	1.00	0.80	1.90
July	1.20	0.70	1.70
August	0.90	0.50	1.10
September			
October			
November			
December			
Annual Average	1.19	0.48	1.89

2016	Outer Ring Average	Middle Ring Average	Center Ring Average
Aeration DO	DO mg/l	DO mg/l	DO mg/l
January	1.30	1.30	2.60
February	0.90	1.40	2.40
March	2.20	2.10	1.10
April	1.10	1.30	2.90
May	1.10	1.20	2.40
June	1.00	1.20	2.40
July	0.90	1.40	2.40
August	0.70	1.00	2.30
September	0.90	0.80	1.80
October	1.70	0.90	1.80
November	1.00	0.80	2.30
December	1.20	0.90	2.70
Annual Average	1.17	1.19	2.26

City of Pataskala WRF Total Phosphorus Data
Ohio EPA Technical and Financial Capability Study

2016	Average Total Phosphorus	Average Total Phosphorus	Average Flow	Stream Loading Average	
	Influent mg/l	Effluent mg/l	MGD	lbs/day	kg/day
January	3.79	2	0.7754	12.93	5.87
February	4.44	2.23	0.9105	16.93	7.69
March	2.43	1.86	0.9949	15.43	7.00
April	4	2.4	0.8749	17.51	7.95
May	4.15	3.5	0.6511	19.01	8.63
June	4.98	3.35	0.5884	16.44	7.46
July	4.08	3.45	0.5882	16.92	7.68
August	4.2	3.2	0.5862	15.64	7.10
September	3.69	3.07	0.566	14.49	6.58
October	4.24	4	0.5972	19.92	9.04
November	4.08	3.72	0.5216	16.18	7.34
December	3.59	2.83	0.7472	17.64	8.00
Annual Average	3.97	2.97	0.7001	16.59	7.86

2015	Average Total Phosphorus	Average Total Phosphorus	Average Flow	Stream Loading Average	
	Influent mg/l	Effluent mg/l	MGD	lbs/day	kg/day
January	4.94	2.42	0.6999	14.13	6.41
February	3.21	1.79	0.7108	10.61	4.82
March	3.69	1.61	1.0243	13.75	6.24
April	3.36	2.24	0.9358	17.48	7.93
May	3.9	2.65	0.6624	14.64	6.64
June	4.04	3.48	0.7712	22.38	10.16
July	3.75	3.54	0.8583	25.34	11.50
August	4.19	3.61	0.5809	17.49	7.94
September	4.18	3.64	0.5523	16.77	7.61
October	4.5	3.31	0.5435	15.00	6.81
November	4.12	3.11	0.6807	17.66	8.01
December	4.05	2.32	0.9055	17.52	7.95
Annual Average	3.99	2.81	0.7438	16.90	7.91

2014	Average Total Phosphorus	Average Total Phosphorus	Average Flow	Stream Loading Average	
	Influent mg/l	Effluent mg/l	MGD	lbs/day	kg/day
January	4.2	1.71	0.7987	11.39	5.17
February	3.6	2	0.8357	13.94	6.33
March	3.8	1.9	0.7659	12.14	5.51
April	3.2	1.57	1.0608	13.89	6.30
May	3.9	1.77	0.9947	14.68	6.66
June	4.2	3.57	0.719	21.41	9.72
July	3.4	3.57	0.719	21.41	9.72
August	4.8	3.22	0.6323	16.98	7.71
September	2.9	3.77	0.5793	18.21	8.27
October	4.4	4.4	0.5392	19.79	8.98
November	4.8	3.67	0.5337	16.34	7.41
December	4.7	2.86	0.6463	15.42	7.00
Annual Average	3.99	2.83	0.7354	16.30	7.89

City of Pataskala WRF Total Phosphorus Data
Ohio EPA Technical and Financial Capability Study

	2016	2015	2014
	Average Removal %	Average Removal %	Average Removal %
January	47.23	51.01	59.29
February	49.77	44.24	44.44
March	23.46	56.37	50.00
April	40.00	33.33	50.94
May	15.66	32.05	54.62
June	32.73	13.86	15.00
July	15.44	5.60	-5.00
August	23.81	13.84	32.92
September	16.80	12.92	-30.00
October	5.66	26.44	0.00
November	8.82	24.51	23.54
December	21.17	42.72	39.15
Annual Average	25.05	29.74	27.91