

U.S. ENVIRONMENTAL PROTECTION AGENCY

NATIONAL STUDY OF NUTRIENT REMOVAL AND SECONDARY TECHNOLOGIES: POTW SCREENER QUESTIONNAIRE



Form Approved
OMB Control No. XXXX-XXXX
Approval Expires XX/XX/XXXX

The public reporting and recordkeeping burden for this collection of information is estimated to average 3.3 hours per response. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This estimate includes the time needed to review instructions, develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

To comment on the Agency's need for this collection, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques, EPA has established a public docket for this ICR under Docket ID No. EPA-HQ-OW-2016-0404, which is available for public viewing at the Water Docket in the EPA Docket Center (EPA/DC), EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20004. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Reading Room is (202) 566-1744, and the telephone number for the Water Docket is (202) 566-2426. An electronic version of the public docket is available through the Federal Docket Management System (FDMS) at <http://www.regulations.gov>. Use FDMS to submit or view public comments, access the index listing of the contents of the public docket, and access those documents in the public docket that are available electronically. Once in the system, select "search", then key in the docket ID number identified above. Please include the EPA Docket ID No. (EPA-HQ-OW-2016-0404) and OMB control number (XXXX-XXXX) in any correspondence.

DRAFT

Thank you for participating in the
National Study of Nutrient Removal and Secondary Technologies:
2016 POTW Screener Questionnaire!

INTRODUCTION

EPA requests information for calendar year 2016. The questionnaire should be completed by personnel knowledgeable about the operation of the facility. Please read each question carefully and provide the appropriate response(s).

Key terms are defined throughout the questionnaire in footnotes. Key terms and acronyms are also defined in **GLOSSARY** and **ACRONYMS** on page 3.

You may provide any clarifying notes in the **FINAL COMMENTS** section at the end of the questionnaire. For example, you may indicate if information provided for the calendar year 2016 is not representative of normal operations.

EPA is not requesting you perform non-routine tests or measurements solely for the purpose of responding to this questionnaire. In the event exact data or information are not available, provide responses using your best professional judgement.

QUESTIONNAIRE ASSISTANCE

If you have any questions about completing this questionnaire, you can request assistance using the e-mail and telephone help lines provided below.

EPA POTW Screener Questionnaire Help Lines

Eastern Research Group, Inc..... Local: 703-633-XXXX or Toll-free: 1-xxx-xxx-xxxx

E-mail..... POTWhelp@erg.com

WHEN TO RETURN THE QUESTIONNAIRE

All facilities that request a paper copy of this questionnaire are requested to submit their response no later than **February 8, 2018**.

WHERE TO RETURN THE QUESTIONNAIRE

After completing the screener questionnaire, use the enclosed mailing label to mail the completed questionnaire to:

U.S. Environmental Protection Agency
POTW Study Screener Questionnaire
c/o Eastern Research Group, Inc.
14555 Avion Parkway, Suite 200
Chantilly, VA 20151-1102

DRAFT

ACRONYMS

BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
cBOD ₅	Carbonaceous Biochemical Oxygen Demand (5-day)
CWA	Clean Water Act
MGD	Million Gallons per Day
NPDES	National Pollutant Discharge Elimination System
POTW	Publicly Owned Treatment Works
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TSS	Total Suspended Solids
WWTP	Wastewater Treatment Plant

GLOSSARY

Biological Nutrient Removal (BNR): A wastewater treatment system that is engineered to remove the nutrients nitrogen and phosphorus in amounts greater than the basic metabolic needs of the biological treatment system. BNR processes are often a variation of conventional activated sludge processes and incorporate additional biological processes into wastewater treatment systems to further reduce nutrients from the wastewater.

Biochemical Oxygen Demand (BOD): A measure of the oxygen demand to biologically degrade organic matter in wastewater.

Carbonaceous Biochemical Oxygen Demand (cBOD₅): A measure of the oxygen demand to biologically degrade organic material in wastewater (carbonaceous demand), excluding biodegradation of forms of nitrogen (nitrogenous demand).

Chemical Oxygen Demand (COD): A measure of the oxygen demand to oxidize inorganic and organic matter in wastewater.

Combined Sewer Collection System: Wastewater systems that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated.

Complex Treatment Pond System: A multi-cell pond or lagoon system, with multiple cells aligned in series, designed to receive, hold, and treat wastewater.

Continuous Discharge: Discharge occurs throughout the year.

Controlled or Intermittent Discharge: Discharge only occurs at certain times or during certain times of the year.

DRAFT

Daily Flow: The average daily flow for any calendar month in the year.

Design Capacity Flow: A wastewater flow rate, typically expressed in volume (gallons) per day, that the treatment works was designed to process. Design capacity may be identified in the treatment works' NPDES permit or in the treatment works' design documentation.

Headworks: The point at which wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, a comminutor, wet wells, or pumps.

Maximum Capacity Flow or Peak Flow: The treatment works' designed maximum capacity, including capacity for diurnal variations, wet weather, safety factors, and/or other higher than average sustained flowrates that may occur during any given 24-hour period. These are fixed values based on facility design and do not vary based on facility operation.

Municipality: A city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA.

National Pollutant Discharge Elimination System (NPDES): The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements under the CWA. The NPDES permit number is assigned by the respective state or EPA Region and generally includes the state abbreviation in the number.

Nutrient Recovery: The practice of recovering nutrients, such as nitrogen and phosphorus, from wastewater streams that would otherwise be discharged to the environment and converting them into useful products.

Package Plant: A pre-manufactured treatment works used to treat wastewater in small communities or on individual properties.

Publicly Owned Treatment Works (POTW): A treatment works that is owned by a State, municipality, or tribal organization, including facilities owned by counties, sanitary sewer districts, or other approved management agencies. A POTW is usually designed to treat domestic sewage and not industrial wastewater.

Recommended Standards for Wastewater Facilities: A document of *Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities*, written as a report of the Wastewater Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. Often referred to as “*The Ten State Standards*.”

DRAFT

Separate Sewer Collection System: Wastewater systems that are designed to collect and convey sanitary wastewater (domestic sewage from homes as well as industrial and commercial wastewater), but not stormwater or runoff. In municipalities served by separate sanitary sewers, separate storm drains may convey stormwater and runoff. Separate sewer systems are distinguished from *combined sewers*, which combine sewage and stormwater in one pipe.

Septage: Also known as septic tank sludge, septage is the liquid or solid material removed from a septic tank cesspool, portable toilet, type III marine sanitation device, or a similar system. Septage may be transported to and discharged directly into a NPDES permitted POTW.

Simple Pond: A single-cell, earthen basin designed to receive, hold, and naturally treat wastewater.

Total Nitrogen: The sum of total Kjeldahl nitrogen and nitrate and nitrite.

Total Kjeldahl Nitrogen (TKN): The sum of ammonia and organic nitrogen.

Total Suspended Solids (TSS): The portion of organic and inorganic solids retained on a filter.

Treatment Works: Devices and systems used in the storage, treatment, recycling, and/or reclamation of municipal sewage. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a treatment plant.

Typical High Flow: The average of the daily flow measurements taken during a one-month period of high flows, typically one month of significant rainfall, snowmelt, and/or significant volumes of inflow and infiltration. Flow averages should exclude days without flow readings.



OMB Control No. XXXX-XXXX

Approval Expires XX/XX/XXXX

DRAFT

2016 POTW STUDY

SCREENER QUESTIONNAIRE

Responses must be received no later than *February 8, 2018*.

EPA requests information for calendar year 2016.

Section A ELIGIBILITY CONFIRMATION

1. Is this facility a treatment works¹ used for the storage, treatment, recycling, or reclamation of municipal sewage? For purposes of this questionnaire, the term *treatment works* is used interchangeably with the terms POTW, sewage treatment plant, domestic wastewater treatment plant, wastewater treatment facility, and water resource recovery facility (WRRF).

☐ Yes

☐ No



IF YOU ANSWERED “NO” TO QUESTION 1, DO NOT COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE.

2. Which of the following describes the ownership of your treatment works? Select all that apply.

☐ Publicly owned² (owned by a State, municipality,³ or tribal organization, includes facilities owned by counties, sanitary sewer districts, or other approved management agencies)

☐ Privately owned (owned by a private individual or private organization)

☐ Federally owned (owned by the U.S. federal government)



IF YOU DID NOT ANSWER “PUBLICLY OWNED” TO QUESTION 2, DO NOT COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE.

¹ Treatment works means devices and systems used in the storage, treatment, recycling, and/or reclamation of municipal sewage. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a treatment plant.

² Publicly owned means owned by a State, municipality, or tribal organization.

³ Municipality means a city, town, borough, county, parish, district, association, or other public

DRAFT

3. Print the National Pollutant Discharge Elimination System (NPDES)⁴ permit number associated with this treatment works. Also print the state-issued wastewater discharge permit number associated with this treatment works if it is known and applicable. If you do not have a NPDES or state-issued wastewater discharge permit, then please select 'Do not have a NPDES permit (nor state equivalent).'

☐ Individual NPDES permit

NPDES Permit Number: _____

☐ General NPDES permit

NPDES Permit Number: _____

☐ State-issued wastewater discharge permit number

State Permit Number: _____

OR

☐ Do not have a NPDES permit (nor state equivalent)

4. Was your treatment works physically capable of directly discharging treatment system effluent to a surface water in 2016? This discharge may be continuous or intermittent.

☐ Yes

☐ No

- 4-1. Which of the following discharge or disposal methods does your treatment works use to manage treatment system effluent? Select all that apply.

☐ Direct discharge to a surface water (Note: Do not select this response if you responded "No" to Question 4) ➔ **Respond to Question 4-2**

☐ Discharge to another POTW ➔ **Respond to Question 4-3**

☐ Discharge to a non-publicly owned treatment works (e.g., privately or federally owned)

body created by or pursuant to State law and having jurisdiction over disposal of sewage, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 1288 of the CWA.

⁴ The NPDES program is the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements under the CWA. The NPDES permit number is assigned by the respective state or EPA Region and generally includes the state abbreviation in the number.

DRAFT

- ☐ 100% reuse
- ☐ Evaporation
- ☐ Other disposal method (e.g., underground injection, groundwater recharge, land application)

Describe 'Other disposal method': _____

4-2. If you indicated that your treatment works directly discharges to a surface water in Question 4-1, provide the name of the receiving surface water(s) and provide the latitude and longitude of the outfall location(s) if known and readily available:

Surface Water Name	Latitude	Longitude	Unknown
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

4-3. If you indicated that your treatment works discharges to another POTW in Question 4-1, print the name of that facility and any other information you have available.

Facility Name: _____(required)

Street: _____

City: _____

State: _____

Zip Code: _____

NPDES Permit Number: _____



**IF YOU ANSWERED “NO” TO QUESTION 4, DO NOT COMPLETE THE
REMAINDER OF THIS QUESTIONNAIRE.**

DRAFT

Section B POTW IDENTIFICATION

5. Print your facility name: _____

6. Print your treatment works' U.S. Postal Service (USPS) mailing address:

Street: _____

PO/Apt/Suite: _____

City: _____

State: _____

Zip Code: _____

6-1. Print the physical location of the treatment works, if different from the mailing address:

Street: _____

PO/Apt/Suite: _____

City: _____

State: _____

Zip Code: _____

7. If we have any questions about your response, whom may we contact?

Name: _____

Street: _____

PO/Apt/Suite: _____

City: _____

State: _____

Zip Code: _____

Daytime Phone: _____ Extension _____

e-Mail: _____ @ _____ . _____

DRAFT

Section C POTW OPERATIONS AND TREATMENT CHARACTERISTICS

8. Which of the following best describes the maximum population served by your treatment works at any time in 2016? Select the most applicable.

- ☐ < 750 individuals
- ☐ 750 – < 5,000 individuals
- ☐ 5,000 – < 10,000 individuals
- ☐ 10,000 – < 50,000 individuals
- ☐ 50,000 – < 100,000 individuals
- ☐ 100,000 – < 300,000 individuals
- ☐ 300,000 – < 1,000,000 individuals
- ☐ > 1,000,000 individuals

9. Did the population served vary seasonally by more than 50 percent (e.g., college town, vacation resort, snowbird destination) in 2016?

- ☐ Yes
- ☐ No

10. Is this POTW a package plant⁵?

- ☐ Yes
- ☐ No

11. Did your treatment works operate continuous⁶ or controlled⁷ discharge in 2016?

- ☐ Continuous Discharge
- ☐ Controlled or Intermittent Discharge

⁵ A package plant is a pre-manufactured treatment works used to treat wastewater in small communities or on individual properties.

⁶ Continuous discharge occurs throughout the year.

⁷ Controlled or intermittent discharge occurs only at certain times or during certain times of the year.

DRAFT

12. Do you estimate the treatment works' daily flow⁸ increased by 30 percent or more after a typical rainfall event in 2016?

Please note rigorous calculations are not required to answer this question; this question seeks to address whether typical rainfall events pose a significant source of flow to your treatment plant.

- ☐ Yes
☐ No
☐ Unknown

13. Was your treatment works' design capacity flow⁹ less than 1 MGD in 2016? Do not include additional flow capacity reserved for primary treatment units only.

- ☐ Yes ➔ **Skip to Question 14**
☐ No ➔ **Continue**

- 13-1. Print the design capacity flow of your treatment works in 2016.

Design Capacity Flow:

MGD

- 13-2. This design capacity flow is also my NPDES permitted flow.

- ☐ Yes
☐ No
☐ Unknown

- 13-3. The design flow of my treatment works is based on the *Recommended Standards for Wastewater Facilities*¹⁰ (i.e., the “Ten State Standards”)?

- ☐ Yes
☐ No
☐ Unknown

⁸ Daily Flow is the average daily flow for any calendar month in 2016.

⁹ Design Capacity Flow is a wastewater flow rate, typically expressed in volume (gallons) per day, that the treatment works was designed to process. Design capacity may be identified in the treatment works' NPDES permit or in the treatment works' design documentation.

¹⁰ Recommended Standards for Wastewater Facilities is a document of *Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities*, written as a report of the Wastewater Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. Often referred to as “*The Ten State Standards*.”

DRAFT

13-4. Print the Maximum Capacity Flow¹¹ or Peak Capacity Flow¹¹ (fixed values based on facility design).

Maximum Capacity Flow or Peak Capacity Flow:

MGD

☐

Unknown

14. What were the actual operational flows to your treatment works in the calendar year 2016?
Only use 2016 flow data for your averaging period.

Daily Flow (e.g., average daily flow or total daily flow):

MGD

☐

Unknown

Typical High Flow¹²:

MGD

☐

Unknown

➔ If you responded “< 750 individuals” to Question 8 AND responded “Yes” to Question 13:

➔ Skip to Question 18a

➔ All others:

➔ Continue

¹¹ Maximum Capacity Flow or Peak Capacity Flow are the treatment works’ designed maximum capacity, including capacity for diurnal variations, wet weather, safety factors, and/or other higher than average sustained flowrates that may occur during any given 24-hour period. These are fixed values based on facility design and do not vary based on facility operation.

¹² Typical High Flow is the average of the daily flow measurements taken during a one-month period of high flows, typically one of the months of significant rainfall, snowmelt, and/or significant volumes of inflow and infiltration. Flow averages should exclude days without flow readings.

DRAFT

- 15.** In 2016, which type of collection system(s) fed into the treatment works? Estimate percentages of contribution based on sewer population using best professional judgement. The sum of all responses must equal 100 percent. Please enter zero (0) if no contribution was received from a particular source.

Separate Sewer Collection System ¹³	<input type="text"/>	%
Combined Sewer Collection System ¹⁴	<input type="text"/>	%
Hauled from off-site:	<input type="text"/>	%
Other:	<input type="text"/>	%
Total:	<input type="text" value="100%"/>	%

- 16.** Indicate what percentage by volume of the wastewater treated at your treatment works was from each of the following sources in 2016. Estimate using best professional judgement. The sum of all responses should equal 100 percent. Please enter zero (0) if no contribution was received from a particular source.

Please note that the category of ‘septage’ is intended to cover septic tank sludge and is the liquid or solid material removed from a septic tank cesspool, portable toilet, type III marine sanitation device, or a similar system. Septage may be transported to and discharged directly into a NPDES permitted POTW. It should be accounted for separately from collected residential, commercial, and industrial wastewater. Boiler blowdown should be accounted for in the category of Commercial/Institutional. Examples of the category of ‘Other’ include onsite stormwater, onsite landfill leachate, and other POTW effluent.

Residential	<input type="text"/>	%
Commercial/Institutional	<input type="text"/>	%
Septage:	<input type="text"/>	%

¹³ Separate Sewer Collection Systems are wastewater collection systems, owned by a State or municipality, that are specifically designed to collect and convey sanitary wastewater (domestic sewage from homes as well as industrial and commercial wastewater), but not stormwater or runoff. In municipalities served by separate sanitary sewers, separate storm drains may convey stormwater and runoff. Separate sewer systems are distinguished from combined sewers, which combine sewage and stormwater in one pipe.

¹⁴ Combined sewer collection systems are wastewater systems that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated.

DRAFT

Industrial:	<input type="text"/>	%
Stormwater and other:	<input type="text"/>	%
Total:	100%	%

Describe 'Other': _____

16-1. If you indicated industrial contributions in Question 16, did flows from industrial contributions vary by more than 25 percent (excluding diurnal fluctuations) at any point in 2016?

- ☐ Yes
- ☐ No

17. Did your treatment works receive process wastewater from one or more of the following industrial sources in 2016? Select all that apply.

- ☐ Airport deicing
- ☐ Dairy products (e.g. milk or cheese), animal processing (e.g., meat processing, poultry processing, aquaculture)
- ☐ Breweries/microbreweries
- ☐ Chemical, fertilizer, or phosphate manufacturing
- ☐ Grain milling
- ☐ Metals manufacturing and processing (e.g., electroplating, smelting, iron and steel)
- ☐ Non-animal food processing
- ☐ Petroleum refining
- ☐ Pharmaceutical manufacturing
- ☐ Pulp and paper manufacturing
- ☐ Steam electric power
- ☐ Oil and gas
- ☐ None of the above
- ☐ Other significant industrial source of nutrients

Describe 'Other significant industrial source of nutrients': _____

DRAFT

➔ If you responded “<750 individuals” to Question 8 AND responded “Yes” to Question 13: ➔ Continue to Question 18a

➔ All others: ➔ Skip to Question 18b

18a. Which of the following treatment technologies were included in the treatment works in 2016? Select all that apply.

- ☐ Preliminary (e.g., grit removal, flow equalization, screening)
- ☐ Primary treatment (e.g., primary clarification)
- ☐ Biological treatment ➔ Respond to Question 18a-2

18a-2 If you indicated biological treatment, indicate which types of biological treatment technologies were operated in 2016. Select all that apply.

- ☐ Suspended growth: Tank/reactor system (e.g., sequencing batch reactor, conventional activated sludge, oxidation ditch)
- ☐ Attached growth (e.g., trickling filter, activated biofilter, rotating biological contactor, fixed-film reactor)
- ☐ Suspended growth: Natural wastewater treatment system (e.g., waste stabilization pond, wetland, facultative lagoon) ➔ Respond to Questions 18a-2.1 and 18a-2.2

18a-2.1 If you indicated Suspended growth: Natural wastewater treatment system, please indicate which types of natural wastewater treatment systems were operated in 2016. Select all that apply.

- ☐ Simple (single cell) pond¹⁵
- ☐ Complex (multi-cell) treatment pond system¹⁶
- ☐ Wetland or vegetative pond (e.g., constructed wetland, hyacinth pond, duckweed pond)
- ☐ Terrestrial treatment (e.g., soil aquifer treatment/rapid infiltration, overland flow system)

¹⁵ A simple pond is a single-cell, earthen basin designed to receive, hold, and naturally treat wastewater.

¹⁶ A complex treatment pond system is a multi-cell pond or lagoon system, with multiple cells aligned in series, designed to receive, hold, and treat wastewater.

DRAFT

18a-2.2. Was any portion of your Suspended growth: natural wastewater treatment system mechanically aerated at any time in 2016?

- ☐ Yes
- ☐ No

➔ Skip to Question 23

18b. Which of the following treatment technologies were included in the treatment works in 2016? Select all that apply.

- ☐ Preliminary (e.g., grit removal, flow equalization, screening)
- ☐ Primary treatment (e.g., primary clarification, chemically-enhanced primary treatment [CEPT]) ➔ **Respond to Question 18b-1**
- ☐ Biological treatment ➔ **Respond to Question 18b-2**
- ☐ Physical and/or chemical treatment ➔ **Respond to Question 18b-4**

18b-1. If you indicated primary treatment, is any chemical addition or chemical treatment in primary treatment specifically for the purposes of nutrient removal?

- ☐ Yes
- ☐ No

18b-2. If you indicated biological treatment, indicate which types of biological treatment technologies were operated in 2016. Select all that apply.

In the following section, BNR stands for Biological Nutrient Removal. BNR means the wastewater treatment system is engineered to remove the nutrients nitrogen and phosphorus in amounts greater than the basic metabolic needs of the biological treatment system. BNR processes are often a variation of conventional activated sludge processes and incorporate additional biological processes into wastewater treatment systems to further reduce nutrients from the wastewater.

- ☐ Suspended growth: Natural wastewater treatment system (e.g., waste stabilization pond, wetland, facultative lagoon). ➔ **Respond to Questions 18b-2.1 and 18b-2.2**
- ☐ Suspended growth: Tank/reactor system (e.g., sequencing batch reactor, conventional activated sludge, A2O, Modified Ludzack-Ettinger [MLE], Bardenpho, oxidation ditch)
- ☐ Attached growth ➔ **Respond to Question 18b-2.3**

DRAFT

- ☐ Combined suspended/attached growth systems (e.g., integrated fixed film activated sludge, moving-bed biofilm reactor)
- ☐ Biological sidestream treatment (e.g., SHARON, ANAMMOX, PhoStrip)

18b-2.1 If you indicated Suspended growth: Natural wastewater treatment system, indicate which types of natural wastewater treatment systems were operated in 2016. Select all that apply.

- ☐ Simple (single cell) pond¹⁵
- ☐ Complex (multi-cell) treatment pond system¹⁶
- ☐ Wetland or vegetative pond (e.g., constructed wetland, hyacinth pond, duckweed pond)
- ☐ Terrestrial treatment (e.g., soil aquifer treatment/rapid infiltration, overland flow system)

18b-2.2. If you indicated Suspended growth: Natural wastewater treatment system, was any portion of your natural wastewater treatment system mechanically aerated at any time in 2016?

- ☐ Yes
- ☐ No

18b-2.3. If you indicated Attached growth, which of the following describes your attached growth biological treatment technology used. Select all that apply.

- ☐ Trickling filter system (e.g., trickling filter with any media, activated biofilter)
- ☐ Other than trickling filter system (e.g., rotating biological contactor, fixed-film reactor, denitrification filtration)

DRAFT

18b-4. If you indicated physical and/or chemical treatment, indicate which types of physical and/or chemical treatment technologies were present in the treatment works in 2016. Also indicate if any of these physical and/or chemical treatment technologies were specifically operated for nutrient removal and/or recovery in 2016. Select all that apply.

Treatment Technology	Present in Treatment Works	Operated for Nutrient Removal and/or Recovery
Ammonia oxidation with chlorine (e.g., breakpoint chlorination)	<input type="checkbox"/>	<input type="checkbox"/>
Chemically-assisted clarification for reasons other than nutrient removals (e.g., chemical oxidants, coagulants, flocculants, metals precipitants, proprietary additives)	<input type="checkbox"/>	Not Applicable
Chemical phosphorus precipitation	<input type="checkbox"/>	<input type="checkbox"/>
Disinfection	<input type="checkbox"/>	<input type="checkbox"/>
Gas stripping (e.g., ammonia stripping, air stripping)	<input type="checkbox"/>	<input type="checkbox"/>
Ion separation/exchange	<input type="checkbox"/>	<input type="checkbox"/>
Media/Granular filtration (e.g., sand, mixed media, granular activated carbon [GAC], fuzzy)	<input type="checkbox"/>	<input type="checkbox"/>
Membrane filtration (e.g., ultrafiltration, reverse osmosis, microfiltration)	<input type="checkbox"/>	<input type="checkbox"/>
Solids separation (e.g., clarification, sedimentation, settling, dissolved air flotation [DAF])	<input type="checkbox"/>	<input type="checkbox"/>
Surface filtration (e.g., cloth, cartridge and bag filter)	<input type="checkbox"/>	<input type="checkbox"/>
Other physical and/or chemical technology	<input type="checkbox"/>	<input type="checkbox"/>

Describe 'Other physical and/or chemical technology': _____

DRAFT

19. What type of process control operations did your treatment works use in 2016? Select all that apply.

- ☐ Manual (Operator Controlled)
- ☐ Automatic (Computerized Control)
- ☐ None ➔ **Skip to Question 20**

19-1. Please indicate what parameters fed into the process control operations and how each parameter was measured in 2016. Select all that apply.

Parameter	Type of Measurement	
	Manual Sampling	Automatic Sensor/Probe/Meter
Dissolved Oxygen (DO)	<input type="checkbox"/>	<input type="checkbox"/>
Influent Flow	<input type="checkbox"/>	<input type="checkbox"/>
Internal Recycle Flow	<input type="checkbox"/>	<input type="checkbox"/>
Mixed Liquor Suspended Solids (MLSS)	<input type="checkbox"/>	<input type="checkbox"/>
Nitrate and/or Nitrite	<input type="checkbox"/>	<input type="checkbox"/>
Organics (including BOD, COD, TOC)	<input type="checkbox"/>	<input type="checkbox"/>
Oxidation-Reduction Potential (ORP)	<input type="checkbox"/>	<input type="checkbox"/>
pH	<input type="checkbox"/>	<input type="checkbox"/>
Phosphate-orthophosphate	<input type="checkbox"/>	<input type="checkbox"/>
Solids Retention Time (SRT)	<input type="checkbox"/>	<input type="checkbox"/>
Sludge Blanket Depth	<input type="checkbox"/>	<input type="checkbox"/>
Temperature	<input type="checkbox"/>	<input type="checkbox"/>
Ammonia	<input type="checkbox"/>	<input type="checkbox"/>
Total Suspended Solids (TSS)	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

Describe 'Other': _____

DRAFT

➔ If you indicated that your treatment works included “Biological treatment” in Q18b: ➔ Continue to Question 20

➔ All others: ➔ Skip to Question 21

20. Indicate the seasonal wastewater temperatures (winter and summer) of the biological treatment system for your treatment works in 2016. Please note this question is not asking for the temperature at the outfall.

Season	Temperature Units
Coldest <input type="text"/>	<input type="checkbox"/> °C <input type="checkbox"/> °F
Warmest <input type="text"/>	<input type="checkbox"/> °C <input type="checkbox"/> °F

21. Please indicate if your treatment works has implemented any capital upgrades or operational changes that resulted in nutrient removal or improved energy efficiency (e.g., energy audit, energy optimization) in the past 10 years. Select all that apply.

Action	Objective
Capital Upgrades (e.g., baffles, added tank capacity, new treatment unit, pumps and piping for additional return and recycle lines)	<input type="checkbox"/> Nutrient removal <input type="checkbox"/> Energy efficiency <input type="checkbox"/> Not applicable
Operational Changes (e.g., adjusting residence time or mechanical aeration, additional monitoring probes in biological treatment, upgraded process control)	<input type="checkbox"/> Nutrient removal <input type="checkbox"/> Energy efficiency <input type="checkbox"/> Not applicable

DRAFT

- 21-1.** Please indicate if your treatment works is planning to implement any capital upgrades or operational changes specifically for nutrient removal or to improve energy efficiency (e.g., energy audit, energy optimization) in the next 3 years. Select all that apply.

Action	Objective
Capital Upgrades (e.g., baffles, added tank capacity, new treatment unit, pumps and piping for additional return and recycle lines)	<input type="checkbox"/> Nutrient removal <input type="checkbox"/> Energy efficiency <input type="checkbox"/> Not applicable
Operational Changes (e.g., adjusting residence time or mechanical aeration, additional monitoring probes in biological treatment, upgraded process control)	<input type="checkbox"/> Nutrient removal <input type="checkbox"/> Energy efficiency <input type="checkbox"/> Not applicable

- 22.** In the following section, respond to the following three questions (Questions 22-1 through 22-3) to indicate if your treatment works may have been designed to achieve objectives for BNR or achieves these objectives for BNR through process optimization and/or other operational changes.

22-1. Which nutrients, if any, were removed by your treatment works in 2016? This does not include incidental nutrient removals due to the basic metabolic requirements of your biological treatment system. Select all that apply.

- ☐ Ammonia
☐ Nitrogen
☐ Phosphorus
☐ Unknown

22-2. Were the average annual treatment system effluent concentrations for your treatment works below the following values in 2016? Select all that apply.

	<u>Yes</u>	<u>No</u>	<u>Unknown</u>
Total Nitrogen \leq 8 mg N/L	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Phosphorus \leq 1 mg P/L	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DRAFT

22-3. Did your treatment works utilize resource recovery practices in 2016? Select all that apply.

- ☐ Nutrient recovery¹⁷ (e.g., struvite, nitrogen, phosphorus)
- ☐ Beneficial use of biosolids (e.g., land application)
- ☐ Energy recovery (e.g., digestion, biogas, primary effluent filtration [PEF] for carbon diversion)
- ☐ Other resource recovery practice
- ☐ No

23. Indicate where your treatment works monitored for ammonia in 2016. Select all that apply. If your treatment works did not monitor for ammonia in any of the following locations in 2016, check the box under Did Not Monitor. Please note, if you have more than one outfall, use your primary outfall to answer this question.

Nutrient monitored	Headworks or System Influent	Treatment System Effluent ¹⁸	Wet Weather System Effluent ¹⁹	Final Outfall(s)	Biosolids	Other locations within the treatment works	Did Not Monitor
Ammonia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

➔If you responded “<750 individuals” to Question 8 AND responded “Yes” to Question 13:

➔ Skip to Question 25a

➔All others:

➔Continue to Question 24

¹⁷ Nutrient Recovery is the practice of recovering nutrients, such as nitrogen and phosphorus, from wastewater streams that would otherwise be discharged to the environment and converting them into useful products.

¹⁸ Treatment System is the portion of the treatment works which is designed to provide physical, chemical, and/or biological treatment (including recycling and reclamation) of municipal sewage and industrial waste.

¹⁹ Wet Weather system is the system through which flow is diverted past portions of the treatment works during wet weather events.

DRAFT

- 24.** For each monitoring location you indicated in Question 23, what were the average annual concentrations of ammonia in the treatment works in 2016? Circle the range that best approximates the concentration of ammonia and check the appropriate unit. Please note, if you have more than one outfall, use your primary outfall to answer this question.

➔Once you have completed Question 24, skip to Question 25b

Nutrient Parameter	Average Concentration (mg/L)				Units Select the most applicable
	Headworks or System Influent (untreated)	Treatment System Effluent (treated)	Wet Weather System Effluent	Outfall	
Ammonia	< 10 mg/L	< 1 mg/L		< 1 mg/L	<input type="checkbox"/> NH ₃ -N <input type="checkbox"/> Other
	10 – < 25 mg/L	1 – < 3 mg/L	< 5 mg/L	1 – < 3 mg/L	
	25 – < 50 mg/L	3 – < 10 mg/L	5 – < 15 mg/L	3 – < 10 mg/L	
	≥ 50 mg/L	≥ 10 mg/L	≥ 15 mg/L	≥ 10 mg/L	

- 25a.** Indicate where your treatment works monitored for nutrients other than ammonia in 2016. Select all that apply. If your treatment works did not monitor for nitrogen species other than ammonia or phosphorus in any of the following locations in 2016, check the box under Did Not Monitor. Please note, if you have more than one outfall, use your primary outfall to answer this question.

➔Once you have completed Question 25a, skip to Question 28

Nutrient monitored	Headworks or System Influent	Treatment System Effluent	Wet Weather System Effluent	Final Outfall(s)	Biosolids	Other locations within the treatment works	Did Not Monitor
Nitrogen (other than Ammonia)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phosphorus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DRAFT

25b. Indicate where your treatment works monitored for nutrients other than ammonia in 2016. Select all that apply. If your treatment works did not monitor for a nutrient parameter in any of the following locations in 2016, check the box under Did Not Monitor. Please note, if you have more than one outfall, use your primary outfall to answer this question.

➔Once you have completed Question 25b, continue to Question 26

Nutrient monitored	Headworks or System Influent	Treatment System Effluent	Wet Weather System Effluent	Final Outfall(s)	Biosolids	Other locations within the treatment works	Did Not Monitor
Total Nitrogen ²⁰	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Kjeldahl Nitrogen (TKN) ²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nitrate or Nitrate-Nitrite (if measured together)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organic Nitrogen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Phosphorus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Orthophosphate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DRAFT

26. Of the nutrients that you monitor, what were the average annual concentrations in the treatment works measured at any of the following locations in 2016? Circle the range that best approximates the concentration of each of the following parameters and check the appropriate unit. Please note, if you have more than one outfall, use your primary outfall to answer this question.

➔Once you have completed Question 26, continue to Question 26b.

Nutrient Parameter	Average Concentration (mg/L)				Units Select the most applicable
	Headworks or System Influent (untreated)	Treatment System Effluent (treated)	Wet Weather System Effluent	Outfall	
Total Nitrogen	< 10 mg/L 10 – < 35 mg/L 35 – < 70 mg/L ≥ 70 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 25 mg/L 25 – < 35 mg/L ≥ 35 mg/L	< 5 mg/L 5 – < 15 mg/L 15 – < 35 mg/L ≥ 35 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 25 mg/L 25 – < 35 mg/L ≥ 35 mg/L	<input type="checkbox"/> N <input type="checkbox"/> Other
Total Kjeldahl Nitrogen (TKN)	< 10 mg/L 10 – < 35 mg/L 35 – < 70 mg/L ≥ 70 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 25 mg/L 25 – < 35 mg/L ≥ 35 mg/L	< 5 mg/L 5 – < 15 mg/L 15 – < 35 mg/L ≥ 35 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 25 mg/L 25 – < 35 mg/L ≥ 35 mg/L	<input type="checkbox"/> TKN-N <input type="checkbox"/> Other
Nitrate or Nitrate-Nitrite (if measured together)	Non-detect > 0 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 25 mg/L 25 – < 35 mg/L ≥ 35 mg/L	< 5 mg/L 5 – < 15 mg/L 15 – < 35 mg/L ≥ 35 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 25 mg/L 25 – < 35 mg/L ≥ 35 mg/L	<input type="checkbox"/> NO ₃ ⁻ /NO ₂ ⁻ -N <input type="checkbox"/> Other
Organic Nitrogen ²²	< 10 mg/L 10 – < 15 mg/L 15 – < 25 mg/L ≥ 25 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 20 mg/L ≥ 20 mg/L	< 10 mg/L 10 – < 25 mg/L ≥ 25 mg/L	< 5 mg/L 5 – < 10 mg/L 10 – < 20 mg/L ≥ 20 mg/L	<input type="checkbox"/> N <input type="checkbox"/> Other
Total Phosphorus	< 4 mg/L 4 – < 7 mg/L 7 – < 12 mg/L ≥ 12 mg/L	< 0.3 mg/L 0.3 – < 1 mg/L 1 – < 4 mg/L ≥ 4 mg/L	< 4 mg/L 4 – < 7 mg/L ≥ 7 mg/L	< 0.3 mg/L 0.3 – < 1 mg/L 1 – < 4 mg/L ≥ 4 mg/L	<input type="checkbox"/> P <input type="checkbox"/> Other
Orthophosphate	< 3 mg/L 3 – < 6 mg/L 6 – < 10 mg/L ≥ 10 mg/L	< 0.3 mg/L 0.3 – < 1 mg/L 1 – < 4 mg/L ≥ 4 mg/L	< 3 mg/L 3 – < 6 mg/L ≥ 6 mg/L	< 0.3 mg/L 0.3 – < 1 mg/L 1 – < 4 mg/L ≥ 4 mg/L	<input type="checkbox"/> PO ₄ -P <input type="checkbox"/> Other

26b. Do you have more than one outfall? Yes No
☐ ☐ ☐

²² Organic Nitrogen is typically a calculated, not measured, value. You do not need to calculate this value for purposes of this questionnaire.

DRAFT

27. What were the average concentrations of, BOD₅, cBOD₅, COD, and TSS at the headworks or system influent for this treatment work in 2016?

BOD₅²³ mg/L ☐ Unknown

cBOD₅²⁴ mg/L ☐ Unknown

COD²⁵ mg/L ☐ Unknown

TSS²⁶ mg/L ☐ Unknown

28. FINAL COMMENTS: This concludes the questionnaire. Provide any relevant notes or comments in this section. Operations are expected to fluctuate, but you may explain in this section if any information from calendar year 2016 is not representative of normal operations. If you need to provide additional comments, please record on separate pages and include your submission by mail.

²³ Biochemical Oxygen Demand (BOD) is a measure of the oxygen demand to biologically degrade organic matter in wastewater.

²⁴ Carbonaceous Biochemical Oxygen Demand (cBOD₅) is a measure of the oxygen demand to biologically degrade organic material in wastewater (carbonaceous demand), excluding biodegradation of forms of nitrogen (nitrogenous demand).

²⁵ Chemical Oxygen Demand (COD) is a measure of the oxygen demand to oxidize inorganic and organic matter in wastewater.

²⁶ Total Suspended Solids (TSS) is the portion of organic and inorganic solids retained on a filter.