



Village of Romeoville Phosphorus Removal Feasibility Study

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Village of Romeoville

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Village of Romeoville

1.0 Background Information

1.1 Purpose

The purpose of this study is to fulfill the evaluation requirements set forth in Special Condition 17 in the current National Pollutant Discharge Elimination System (NPDES) Permit for the Village of Romeoville's wastewater treatment facility (WWTF).

The effective date of the current NPDES Permit is September 1, 2019.

Special Condition 17 states that, "The Permittee shall, within 18 months of the effective date of this permit (March 2021), prepare and submit to the Agency a Phosphorus Removal Feasibility Study (PRFS) that identifies the method, timeframe, and costs of reducing phosphorus levels in its discharge to a level consistently meeting a potential future effluent limit of 0.5 mg/L and 0.1 mg/L. The study shall evaluate the construction and O&M costs of the application of this limit on a monthly, seasonal, and annual average basis. The feasibility report shall also be shared with the Lower Des Plaines Watershed Group. Previously submitted feasibility studies that did not include an alternative effluent limit of 0.5 mg/L and 0.1 mg/L may be amended to identify supplemental treatment technologies necessary to achieve 0.5 mg/L and 0.1 mg/L."

For reference, a copy of the current NPDES Permit for the WWTF has been included in APPENDIX A.

1.2 Location

The Village of Romeoville is located in Will County, Illinois. It is approximately 26 miles southwest of downtown Chicago. The Village is generally situated with Bolingbrook to the north, Plainfield to the west, Crest Hill to the south, and Lockport to the east. The Village corporate boundaries encompass an area of approximately 20.14 square miles.

1.3 Population and Utility Accounts

The population of Romeoville, as measured by the 2010 Census, is 39,680 people. The corresponding population density is approximately 1,970 people per square mile. The Chicago Metropolitan Agency for Planning (CMAP) forecasts Romeoville's population to be approximately 51,505 by 2050.

Currently, there are approximately 16,968 active accounts (i.e. residences, businesses) that utilize the Village's sanitary sewer collection system and WWTF.

2.0 Wastewater Treatment Facility

2.1 System Overview

The Village's WWTF provides primary and secondary wastewater treatment. This section provides a brief synopsis of the major elements of the treatment system.

Wastewater enters the treatment facility by passing through a mechanically cleaned fine screen. The screen removes larger inorganic solids from the wastewater stream that would negatively impact downstream equipment. The screened wastewater flows to a wet well where raw sewage pumps convey the screened wastewater to the grit tank. The grit tank removes the smaller inorganic grit from the screened wastewater. The screened and de-gritted wastewater flows to the aeration tanks. The activated sludge process utilized in the aeration tanks allow microorganisms to remove various pollutants from the wastewater. Once pollutant processing is complete, the mixed liquor (i.e. activated sludge + effluent) flows to the secondary clarifiers. The secondary clarifiers allow the activated sludge to separate from the effluent (i.e. treated wastewater). The effluent flows to the UV disinfection structure where it is exposed to ultraviolet light. The ultraviolet light destroys/inactivates the microorganisms, thus disinfecting the effluent. The final effluent is then conveyed and discharged into the Des Plaines River.

A byproduct of any activated sludge type process is waste (i.e. excess) activated sludge (WAS). A solids treatment system is utilized to reduce and stabilize the WAS prior to disposal. The WAS is pumped to the gravity belt thickener where the volume of the WAS is reduced. The thickened WAS is pumped to the aerobic digesters where the material is broken down and stabilized into digested sludge. The digested sludge is then sent through the centrifuges to significantly reduce the water content of the material. The final product is dried Class B biosolids, which is temporarily stored and periodically disposed of by land application to agricultural fields.

2.2 NPDES Permit Parameters

The WWTF is permitted for a Design Average Flow (DAF) of 7.5 MGD and a Design Maximum Flow (DMF) of 15.0 MGD. The permitted load and concentration discharge limits for 5-day carbonaceous biochemical oxygen demand (cBOD₅), suspended solids, ammonia-nitrogen, and phosphorus are shown in TABLE 1 and TABLE 2.

TABLE 1: cBOD₅ & SUSPENDED SOLIDS DISCHARGE LIMITS AT DAF = 7.5 MGD

Parameter	Permit Load Limits at DAF (lbs/day)		Permit Conc. Limits at DAF (mg/L)	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
cBOD ₅	1,001	2,002	20	40
Suspended Solids	1,251	2,252	25	45

TABLE 2: NITROGEN & PHOSPHORUS DISCHARGE LIMITS AT DAF = 7.5 MGD

Parameter	Permit Load Limits At DAF (lbs/day)			Permit Conc. Limits At DAF (mg/L)		
	Monthly Average	Weekly Average	Daily Maximum	Monthly Average	Weekly Average	Daily Maximum
Ammonia-Nitrogen	-	-	-	-	-	-
Mar-May/ Sept-Oct	75	-	140	1.5	-	2.8
Jun-Aug	75	-	115	1.5	-	2.3
Nov-Feb	200	-	300	4.0	-	6.0
Phosphorus	63	-	-	1.0	-	-

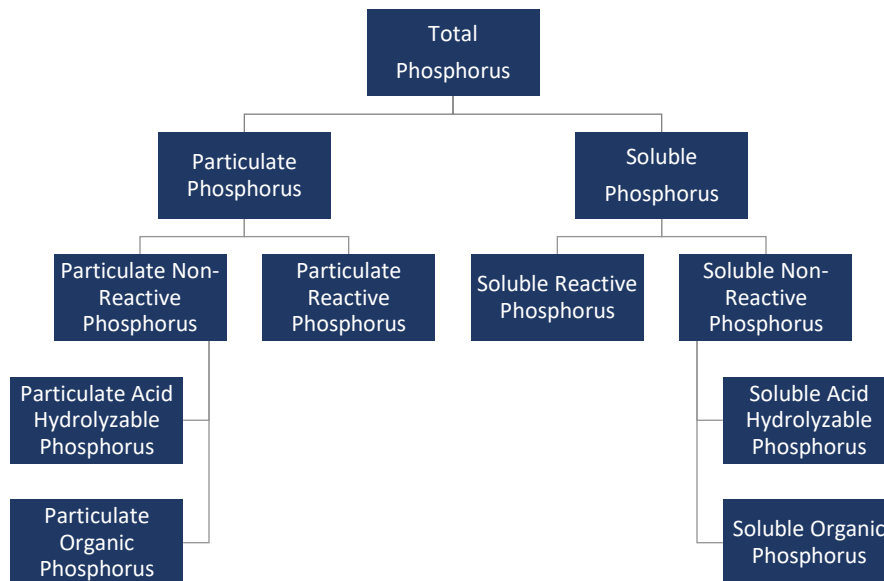
Other permit parameters include: pH shall be in the range of 6 to 9 standard units, the chlorine residual daily maximum is 0.05 mg/L, and the fecal coliform daily maximum shall not exceed 400 per 100 mL from May through October. Refer to APPENDIX A for additional details on the current NPDES Permit.

3.0 Phosphorus

3.1 Total Phosphorus

Total phosphorus (TP) in the wastewater entering the WWTF generally comes from human waste, food disposal, some cleaning products, and corrosion control chemicals in water supplies. As depicted in FIGURE 1, TP is comprised of particulate and soluble (i.e. dissolved) phosphorus. The particulate and soluble phosphorus fractions include subsets that are reactive and non-reactive. Non-reactive phosphorus includes acid hydrolyzable and organic fractions.

FIGURE 1: TOTAL PHOSPHORUS COMPOSITION



The amount of each phosphorus fraction present in the wastewater has a direct impact on the level of removal that can be achieved, and the efficacy of the various treatment options utilized to remove phosphorus.

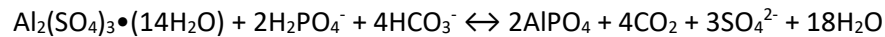
- Particulate phosphorous can be settled or filtered out of the wastewater.
- Soluble reactive phosphorus can be precipitated through chemical addition and then settled or filtered out of the wastewater. This fraction can also be utilized by microorganisms for cell growth, then the microorganisms can be settled or filtered out of the wastewater.
- Soluble non-reactive phosphorus is not effectively removed by conventional chemical or biological phosphorus removal processes. If a significant percentage of the TP is soluble non-reactive phosphorus, it becomes very challenging to meet low TP discharge concentrations.

Before making a final decision on any phosphorus removal approach, the Village should conduct testing to determine the amount of each phosphorus fraction to have sufficient information to be able to select the most appropriate removal strategy.

3.2 Chemical Phosphorus Removal (CPR) Overview

A metal salt is added to the wastewater to react with the soluble phosphorus to form a solid precipitate. This precipitate can then be removed by a conventional solids separation process such as clarification or filtration.

The Village currently has a chemical phosphorus removal system that utilizes alum (e.g. aluminum sulfate). For the purposes of this study, it is assumed that the Village will continue to utilize alum at the WWTF. The reaction between the alum and the soluble phosphorus can be generally written as:



The aluminum phosphate precipitate can then be removed by the liquid treatment system in the clarifiers. The aluminum phosphate precipitate is intermixed with the WAS that is sent to the solids treatment system for further processing and is ultimately disposed of by agricultural land application.

3.3 Biological Phosphorus Removal (BPR) Overview

Conventional activated sludge treatment processes remove a percentage of phosphorus from wastewater due to phosphorus being utilized as a component of activated sludge cell growth. Conventional activated sludge contains approximately 1% to 2% phosphorus by weight. The WAS, which contains intracellular phosphorus, is removed from the WWTF along with the phosphorus contained therein.

There is a group of aerobic microorganisms that has been characterized as phosphorus accumulating organisms (PAOs). Given the right environmental conditions, the PAOs store additional intracellular phosphorus. Enhanced biological phosphorus removal (EBPR) processes provide the appropriate anaerobic and aerobic conditions for the PAOs to flourish and bioaccumulate phosphorus. EBPR activated sludge contains approximately 5% to 7% phosphorus by weight. The EBPR WAS, which contains a greater amount of intracellular phosphorus, is removed from the WWTF along with the phosphorus contained therein.

Along with the right environmental conditions, the PAOs also need to be exposed to an adequate amount of volatile fatty acids (VFAs) as a food/energy source during anaerobic conditions. The PAOs store this energy under anaerobic conditions but will then utilize it under aerobic conditions to replicate and uptake additional phosphorus. Carbonaceous biochemical oxygen demand (cBOD₅), chemical oxygen demand (COD), and readily biodegradable chemical oxygen demand (rbCOD) concentrations can be used as indicators of the VFA concentration to determine if there is sufficient food/energy to support EBPR. The minimum recommended ratios to support EBPR based on cBOD₅, COD, rbCOD, and VFA to TP are provided in TABLE 3.

TABLE 3: RECOMMENDED EBPR RATIOS

Ratio	Recommended Value
cBOD ₅ :TP	> 20-25
COD:TP	> 40-45
rbCOD:TP	> 10-16
VFA:TP	> 4-16

If there are not enough VFAs to support EBPR, then either VFAs must be supplemented by chemical addition or created by breaking more complex compounds down using a fermenter.

3.4 Influent Characterization

Thirty-six months (January 2017 to December 2019) of NPDES Permit compliance influent and effluent analytical testing data were analyzed. TABLE 4 summarizes the parameters that are useful when evaluating chemical or biological phosphorus removal.

TABLE 4: ACTUAL MONTHLY AND DESIGN POLLUTANT PARAMETERS

Parameter	Actual Monthly Average	Current Basis of Design
Influent Flow (MGD)	6.85	7.5
Influent cBOD ₅ (mg/L)	189	309
Influent Total Phosphorus (mg/L)	4.7	7.0
Influent cBOD ₅ :TP Ratio	40	44

With respect to biological phosphorus removal, the aforementioned parameters do not provide sufficient information to conclude if EBPR is viable without VFA supplementation. Therefore, the Village completed five months of supplementary influent and effluent analytical testing to provide information on the COD and rbCOD concentrations. The parameter, rbCOD, is more indicative of the availability of food/energy sources in a form that can be readily utilized by the PAOs.

TABLE 5: ACTUAL DAILY AVERAGE POLLUTANT PARAMETERS

Parameter	March 2017	April 2017	May 2017	June 2017	July 2017	Average
Influent Total Phosphorus (mg/L)	3.5	3.1	3.2	5.0	5.0	4.0
Influent cBOD ₅ (mg/L)	185	141	129	197	192	169
Influent COD (mg/L)	380	319	293	456	436	377
Influent rbCOD (mg/L)	77	73	70	117	106	89

The averaged data in TABLE 5 was utilized to develop the average influent phosphorus ratios shown in TABLE 6. The recommended ratios have been included for comparison purposes.

TABLE 6: INFLUENT PHOSPHORUS RATIOS

Ratio	Average	Recommended
Influent	-	-
cBOD ₅ :TP	42	> 20-25
COD:TP	94	> 40-45
rbCOD:TP	22	> 10-16

The influent ratios look promising for EBPR, but keep in mind that this is a limited data set. EBPR will only be successful with the appropriate types and sufficient quantities of VFAs, so additional testing should be completed to truly confirm or refute the viability of EBPR throughout the entire year.

4.0 Chemical Phosphorus Removal

4.1 System Considerations

The WWTF was consolidated and upgraded over the course of a multiphase project that was completed in 2011. The following chemical phosphorus removal facilities were installed at the WWTF as part of this multiphase project.

- Two 10,300-gallon alum storage tanks.
- Two alum feed pumps, each with an approximate capacity of 100 gallons per hour.

As previously stated, this study assumes that the Village will continue to utilize alum for chemical phosphorus removal at the WWTF. As the phosphorus discharge limit is decreased, then the amount of alum that needs to be supplied will increase. The amount supplied also needs to account for competing reactions and interferences in the waste stream, which become more prevalent when trying to achieve lower phosphorus discharge concentrations.

4.2 CPR for Total Phosphorus Discharge Limit, 0.5 mg/L

The Illinois Recommended Standards for Sewage Works recommends that effluent filtration be considered where effluent phosphorus concentrations of less than 1 mg/L must be achieved.

Village staff has conducted some limited phosphorus removal trials at the WWTF. With various process parameter modifications, staff has been able to achieve 0.5 mg/L TP in the effluent with the capabilities of the existing facilities. Therefore, the significant capital costs associated with effluent filtration facilities do not appear to be warranted.

As an increasing amount of chemical is utilized to achieve the required TP discharge limit, it becomes more imperative to utilize this resource as effectively as possible to minimize negative cost impacts. The USEPA's Nutrient Control Design Manual, EPA/600/R-09/012, indicates that multi-point additions of metal salts have been very effective and can typically remove more phosphorus than single-point applications.

The Village is currently in the design phase of a WWTF capacity expansion. The proposed improvements include modifications to further support the viability of biological nutrient removal. The actual phosphorus removal efficiency of these proposed improvements will not be proven until these facilities are on-line. Therefore, for the purposes of this study, we will make some conservative assumptions on what still may be needed to consistently achieve 0.5 mg/L TP. We will assume that multi-point chemical addition is needed. We will also assume that polymer addition is needed to enhance solids settling in the secondary clarifiers. Once the proposed improvements are complete, these assumptions will either be refuted or confirmed.

Alum Requirement Analysis

On average, the influent wastewater at the WWTF has a TP concentration of approximately 4.7 mg/L. An analysis was conducted to determine how much alum is theoretically required to remove phosphorus from the existing influent concentration of 4.7 mg/L to the proposed effluent concentration limit of 0.5 mg/L.

On a molar basis, 1 mole of AL will react with 1 mole of PO_4 . However, competing reactions will occur due to the complex nature of wastewater. Based upon WEF Manual of Practice No. 8, Sixth Edition, to achieve phosphorus reduction up to 85% an Al:P mole ratio of 1.72:1 should be anticipated. Therefore, anticipated alum usage is calculated to be 1,612 gallons per day (gpd).

Alum Storage and Feed

The Illinois Recommended Standards for Sewage Works requires storage for a minimum of a 10-day supply of chemical for CPR. Therefore, a minimum storage volume of 16,120 gallons is required. The existing storage volume available is 20,600 gallons, which exceeds the minimum storage volume required. The existing volume of the alum storage tanks is sufficient for CPR to attain 0.5 mg/L TP.

The daily alum usage converted to an hourly feed rate equates to 67 gph. Each pump has an approximate capacity of 100 gph, so the existing pumps have adequate capacity to meet the daily alum demand.

Solids

The dosing of alum to achieve an effluent TP of 0.5 mg/L creates additional chemical precipitate that will need to be separated from the forward flow in the secondary clarifiers. These additional solids will result in increased solids handling pump run times, increased pumping rates, etc.

The dosing of alum to achieve an effluent TP of 0.5 mg/L produces additional solids that need to be processed and disposed of as compared to an effluent TP of 1.0 mg/L. Approximately 378 pounds of additional chemical solids will be generated each day. This equates to approximately 6,043 gallons per day (gpd) of 0.75% solids that need to be processed by the gravity belt thickener (GBT). The existing GBT has a solids loading rate of 1,000 lbs TS/hr at 0.75% solids, so the GBT will need to be operated for an additional 2.6 hours per week in order to process the additional chemical solids generated. The additional chemical solids also equate to approximately 1,511 gpd of 3% solids that need to be processed and dewatered by the centrifuges. The existing centrifuges have a hydraulic loading rate of 80 gpm, so a centrifuge will need to be operated for an additional 132 minutes (2.2 hours) per week in order to process the additional chemical solids generated. This results in approximately 1.12 cubic yards per day of dried biosolids that need to be stored and disposed of.

Recommended Improvements for CPR to 0.5 mg/L TP

- Multi-point chemical addition
- Polymer addition

In this scenario, a multi-point chemical additional strategy may need to be employed to maximize the efficacy of CPR and provide the necessary flexibility to consistently achieve CPR to 0.5 mg/L TP.

The only chemical addition point is between the aeration tanks and the secondary clarifiers. A second chemical addition point will be added upstream of the aeration tanks. One (1) additional chemical feed pump and all the necessary appurtenances will be installed in the chemical feed building. Also, a chemical feed line will need to be installed from the chemical feed building to this second application point.

To enhance solids settling in the secondary clarifiers, polymer addition may be needed periodically, especially during process upsets. The interior of the chemical feed building will need to be modified to house a polymer feed system. The polymer feed system and all the necessary appurtenances will be installed in the chemical feed building. A polymer feed line will need to be installed from the chemical feed building to an application point between the aeration tanks and the secondary clarifiers.

4.3 Cost Evaluation, CPR to 0.5 mg/L

TABLE 7 lists the capital costs associated with the improvements required to meet a 0.5 mg/L TP limit with CPR.

TABLE 7: CPR TO 0.5 mg/L TP – CAPITAL IMPROVEMENTS PROBABLE COST

Item	Estimated Amount ¹
Chemical Feed	\$ 30,000
Polymer Feed	\$ 60,000
Site Piping	\$ 64,000
Electrical and SCADA	\$ 21,000
Demolition	\$ 5,000
Restoration	\$ 15,000
Subtotal	\$ 195,000
Contingencies (20%)	\$ 39,000
Subtotal	\$ 234,000
Design & Construction Engineering (15%)	\$ 36,000
PROJECT TOTAL	\$ 270,000

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

In order to make cost comparisons across all scenarios, we will assume the Village will pursue a low interest loan through the State Revolving Fund (SRF) program. Assuming a 20-year term at the current interest rate of 1.35% results in a loan repayment amount of \$15,400 per year.

Besides the initial capital cost of the improvements there will be ongoing annual costs to operate and maintain the equipment and facilities. TABLE 8 quantifies the probable annual operation and maintenance (O&M) costs associated with achieving a 0.5 mg/L TP discharge concentration via CPR.

TABLE 8: CPR TO 0.5 mg/L TP – ANNUAL O&M PROBABLE COSTS

Item	Estimated Amount ^{1,2}
Energy (electricity & natural gas)	\$ 6,000
Chemicals & Biosolids Disposal	\$ 276,000
Maintenance & Labor	\$ 35,000
Subtotal	\$ 317,000
Contingencies (20%)	\$ 63,000
O&M Total	\$ 380,000

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

2. Based on monthly average discharge limit; will be nominally less on a seasonal or annual basis.

Additional revenue from the utility account holders will be needed for loan debt service and to fund the additional costs associated with operating and maintaining the proposed equipment and facilities. TABLE 9 summarizes these costs and shows the annual financial impact to the account holders.

TABLE 9: CPR TO 0.5 mg/L TP – ANNUAL PROBABLE COSTS

Item	Estimated Amount ¹
Annual Loan Payment	\$ 15,400
Annual O&M Cost	\$ 380,000
Annual Total	\$ 395,400
Active Accounts	16,968
Annual Expense Per Account	\$ 23
Monthly Expense Per Account	\$ 2 ±

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

An additional \$2 ± per month per active account would need to be collected, assuming the additional costs are equally distributed across all the active utility accounts.

4.4 CPR for Total Phosphorus Discharge Limit, 0.1 mg/L

Consistent with Section 4.2, a multi-point chemical addition strategy will need to be employed. However, as TP discharge limits decrease, filtration is needed, and it becomes increasingly imperative to maximize the contact time between the metal salt and the phosphorus laden wastewater. Adequate time and conditions will be needed to allow the chemical reaction to come to equilibrium and maximize the amount of chemical precipitate that is formed.

Alum Requirement Analysis

On average, the influent wastewater at the WWTF has a TP concentration of approximately 4.7 mg/L. An analysis was conducted to determine how much alum is theoretically required to remove phosphorus from the existing influent concentration of 4.7 mg/L to the proposed effluent concentration limit of 0.1 mg/L.

On a molar basis, 1 mole of AL will react with 1 mole of PO_4 . However, competing reactions will occur due to the complex nature of wastewater. Based upon WEF Manual of Practice No. 8, Sixth Edition, to achieve phosphorus reduction up to 95% an Al:P mole ratio of 2.3:1 should be anticipated. Therefore, anticipated alum usage is calculated to be 2,361 gpd.

Alum Storage and Feed

The Illinois Recommended Standards for Sewage Works requires storage for a minimum of a 10-day supply of chemical for CPR. Therefore, a minimum storage volume of 23,610 gallons is required. The existing storage volume available is 20,600 gallons, which does not provide the minimum storage volume required. Additional alum storage for CPR to attain 0.1 mg/L TP will be needed.

The daily alum usage converted to an hourly feed rate equates to 98 gph. Each pump has an approximate capacity of 100 gph. This leaves very little room for upward adjustment and does not provide an adequate safety factor. Larger capacity pumps for CPR to attain 0.1 mg/L TP will be needed.

Solids

The dosing of alum to achieve an effluent TP of 0.1 mg/L creates additional chemical precipitate that will need to be separated from the forward flow in the secondary clarifiers. These additional solids will result in increased solids handling pump run times, increased pumping rates, etc.

The dosing of alum to achieve an effluent TP of 0.1 mg/L produces an additional amount of solids that need to be processed and disposed of as compared to an effluent TP of 1.0 mg/L. Approximately 942 pounds of additional chemical solids will be generated each day. This equates to approximately 15,063 gpd of 0.75% solids that need to be processed by the GBT. The existing GBT has a solids loading rate of 1,000 lbs TS/hr at 0.75% solids, so the GBT will need to be operated for an additional 6.6 hours per week in order to process the additional chemical solids generated. The additional chemical solids also equate to approximately 3,766 gpd of 3% solids that need to be processed and dewatered by the centrifuges. The existing centrifuges have a hydraulic loading rate of 80 gpm, so a centrifuge

will need to be operated for an additional 330 minutes (5.5 hours) per week in order to process the additional chemical solids generated. This results in approximately 2.80 cubic yards per day of dried biosolids that need to be stored and disposed of.

Recommended Improvements for CPR to 0.1 mg/L TP

- Multi-point chemical addition
- Coagulation and flocculation
- Filtration
- Hydraulic modifications

In this scenario, a multi-point chemical addition strategy will be employed. This will need to be supplemented by a coagulation/flocculation tank and disk filters to maximize the efficacy of CPR and provide the necessary flexibility to consistently achieve CPR to 0.1 mg/L TP.

Due to increased chemical usage, the existing 10,300-gallon alum tanks will need to be replaced with new 12,150-gallon tanks in order to comply with minimum storage requirements. The existing chemical feed pumps will need to be replaced with larger capacity pumps.

A coagulation/flocculation tank followed by disk filters will be installed downstream of the secondary clarifiers. The second chemical addition point will now be installed at the beginning of the coagulation/flocculation tank. Alum will be added, rapidly mixed with the effluent from the secondary clarifiers, and allowed to coagulate. This mixed liquid will then flow into the flocculation tank and be mixed slowly. This will allow the aluminum phosphate particles that form to agglomerate so they can be more readily filtered out. From the flocculation tank the mixed liquid will flow to the disk filters where the aluminum phosphate particles will be removed. Ultimately, the aluminum phosphate precipitate will become a component of the WAS, which will be removed from the WWTF via the solids treatment and disposal process.

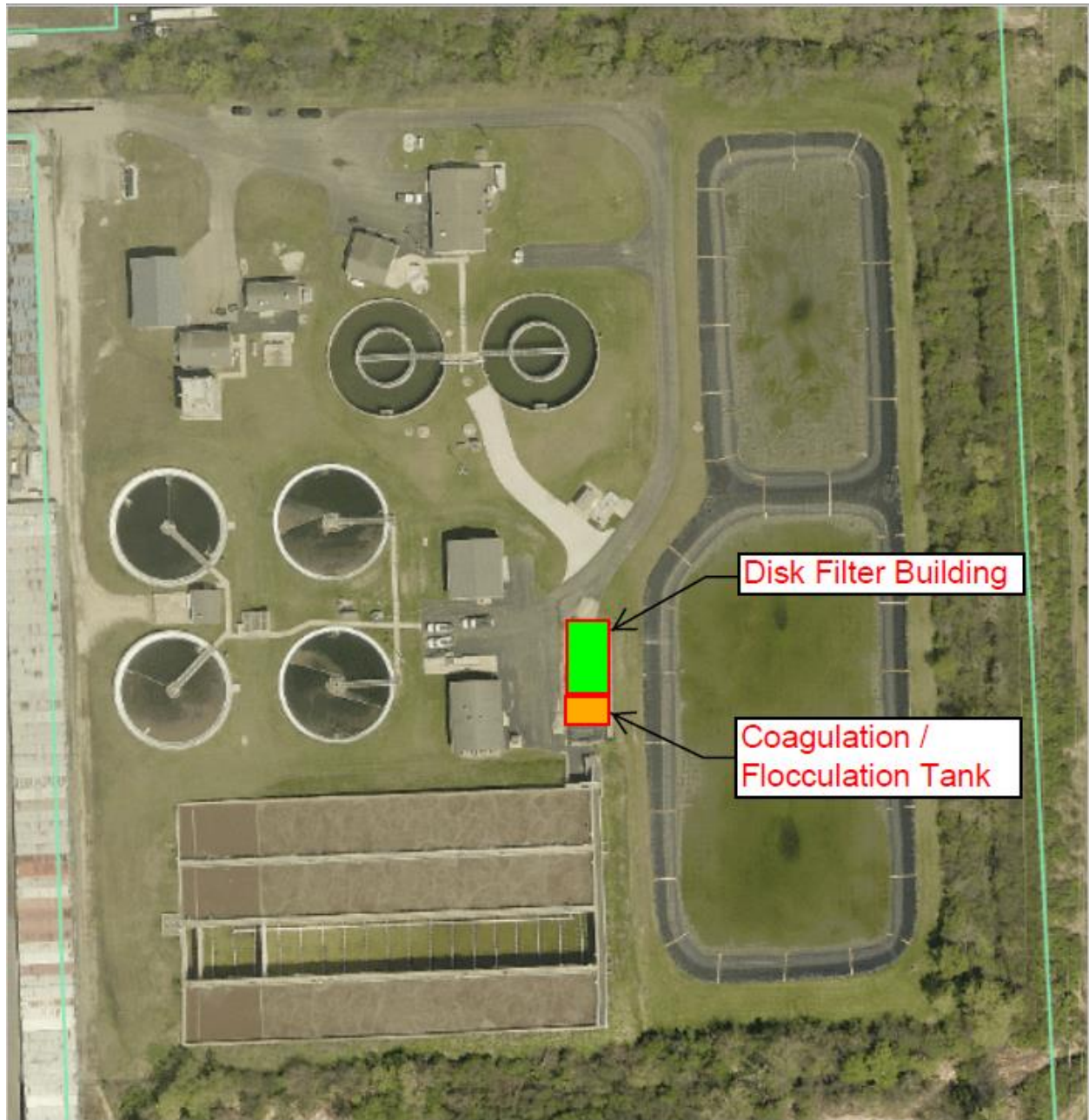
The additional head loss associated with the coagulation/flocculation tank, the disk filters, and all the associated piping will need to be addressed in order to make the WWTF function properly. It is likely that the additional head needed can be achieved by raising the elevation of the two lower secondary clarifiers to match the elevation of the two higher secondary clarifiers, along with various pipe modifications.

EXHIBIT 1 depicts the location of the coagulation/flocculation tank and the disk filter building.

Village of Romeoville

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EXHIBIT 1 – CPR to 0.1 mg/L TP



4.5 Cost Evaluation, CPR to 0.1 mg/L

TABLE 10 lists the capital costs associated with the improvements required to meet a 0.1 mg/L TP limit with CPR.

TABLE 10: CPR TO 0.1 mg/L TP – CAPITAL IMPROVEMENTS PROBABLE COST

Item	Estimated Amount ¹
Chemical Feed	\$ 130,000
Coagulation/Flocculation	\$ 352,000
Filtration	\$ 2,810,000
Hydraulic Improvements	\$ 350,000
Site Piping	\$ 315,000
Electrical and SCADA	\$ 712,000
Demolition	\$ 50,000
Restoration	\$ 80,000
Subtotal	\$ 4,799,000
Contingencies (20%)	\$ 960,000
Subtotal	\$ 5,759,000
Design & Construction Engineering (15%)	\$ 864,000
PROJECT TOTAL	\$ 6,623,000

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

Due to the significant cost of these improvements, the Village may pursue a low interest loan through the SRF program. Assuming a 20-year term at the current interest rate of 1.35% results in a loan repayment amount of \$378,000 per year.

Besides the initial capital cost of the improvements, there will be ongoing annual costs to operate and maintain the equipment and facilities. TABLE 11 quantifies the probable annual operation and maintenance costs associated with the improvements.

TABLE 11: CPR TO 0.1 mg/L TP – ANNUAL O&M PROBABLE COSTS

Item	Estimated Amount ^{1,2}
Energy (electricity & natural gas)	\$ 45,000
Chemicals & Sludge Disposal	\$ 713,000
Maintenance & Labor	\$ 70,000
Subtotal	\$ 828,000
Contingencies (20%)	\$ 166,000
O&M Total	\$ 994,000

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

2. Based on monthly average discharge limit; will be nominally less on a seasonal or annual basis.

Additional revenue from the utility account holders will be needed for loan debt service and to fund the additional costs associated with operating and maintaining the proposed equipment and facilities. TABLE 12 summarizes these costs and shows the annual financial impact to the account holders.

TABLE 12: CPR TO 0.1 mg/L TP – ANNUAL PROBABLE COSTS

Item	Estimated Amount ¹
Annual Loan Payment	\$ 378,000
Annual O&M Cost	\$ 994,000
Annual Total	\$ 1,372,000
Active Accounts	16,968
Annual Expense Per Account	\$ 81
Monthly Expense Per Account	\$ 7 ±

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

An additional \$7 ± per month per active account will need to be collected, assuming the additional costs are equally distributed across all the active utility accounts.

5.0 Biological Phosphorus Removal

5.1 System Considerations

The WWTF was consolidated and upgraded over the course of a multiphase project that was completed in 2011. The following biological nutrient removal facilities were installed at the WWTF as part of this multiphase project.

- Anaerobic zone with submersible mixers within the aeration tanks.
- Anoxic zone with submersible mixers and fine bubble diffusers within the aeration tanks.
- Internal recycle from the aerobic zones to the anoxic zones.

The Village is currently in the design phase of a WWTF capacity expansion. The aeration tanks are generally being setup for the UCT process. The proposed improvements include the following modifications to further support the viability of biological nutrient removal.

- RAS discharge rerouted to anoxic zones.
- Internal recycle from anoxic zones to anaerobic zones.

5.2 BPR for Total Phosphorus Discharge Limit, 0.5 mg/L

In the event of a BPR process upset, all of the CPR improvements identified in Section 4.2 would still be needed as a full chemical phosphorus removal backup system would be required.

The average influent phosphorus ratios summarized in TABLE 6 are all equal to or greater than the recommended ratios for BPR to likely be viable, but keep in mind that this is a limited data set. Therefore, the goal of this treatment strategy is to utilize BPR to remove phosphorus to the maximum extent practicable without supplemental VFA addition. If further TP reductions are needed, alum and/or polymer would be added, as needed, to meet the permitted discharge limit.

Recommended Improvements for BPR to 0.5 mg/L TP

- Recommended improvements identified in Section 4.2

No additional improvements beyond those identified in Section 4.2 are contemplated to reliably meet a total phosphorus discharge limit of 0.5 mg/L by utilizing a biological removal strategy with chemical polishing and polymer addition as needed.

5.3 Cost Evaluation, BPR to 0.5 mg/L

TABLE 13 lists the capital costs associated with the improvements required to meet a 0.5 mg/L TP limit with BPR.

TABLE 13: BPR TO 0.5 mg/L TP – ENGINEER’S OPINION OF PROBABLE COST

Item	Estimated Amount ¹
Chemical Feed	\$ 30,000
Polymer Feed	\$ 60,000
Site Piping	\$ 64,000
Electrical and SCADA	\$ 21,000
Demolition	\$ 5,000
Restoration	\$ 15,000
Subtotal	\$ 195,000
Contingencies (20%)	\$ 39,000
Subtotal	\$ 234,000
Design & Construction Engineering (15%)	\$ 36,000
PROJECT TOTAL	\$ 270,000

1. Engineer’s opinion of probable cost calculated based on 2020 dollars.

In order to make cost comparisons across all scenarios, we will assume the Village will pursue a low interest loan through the SRF program. Assuming a 20-year term at the current interest rate of 1.35% results in an annual loan repayment amount of \$15,400.

Besides the initial capital cost of the improvements, there will be ongoing annual costs to operate and maintain the equipment and facilities. TABLE 14 quantifies the probable annual O&M costs associated with achieving a 0.5 mg/L TP discharge concentration via BPR.

TABLE 14: BPR TO 0.5 mg/L TP – ANNUAL O&M PROBABLE COSTS

Item	Estimated Amount ^{1,2}
Energy (electricity & natural gas)	\$ 6,000
Chemicals & Sludge Disposal	\$ 276,000
Maintenance & Labor	\$ 35,000
Subtotal	\$ 317,000
Contingencies (20%)	\$ 63,000
O&M Total	\$ 380,000

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

2. Based on monthly average discharge limit; will be nominally less on a seasonal or annual basis.

Additional revenue from the utility account holders will be needed for loan debt service and to fund the additional costs associated with operating and maintaining the proposed equipment and facilities. TABLE 15 summarizes these costs and shows the annual financial impact to the account holders.

TABLE 15: BPR TO 0.5 mg/L TP – ANNUAL PROBABLE COSTS

Item	Estimated Amount ¹
Annual Loan Payment	\$ 15,400
Annual O&M Cost	\$ 380,000
Annual Total	\$ 395,400
Active Accounts	16,968
Annual Expense Per Account	\$ 23
Monthly Expense Per Account	\$ 2 ±

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

An additional \$2 ± per month per active account will need to be collected, assuming the additional costs are equally distributed across all the active utility accounts.

5.4 BPR for Total Phosphorus Discharge Limit, 0.1 mg/L

In the event of a BPR process upset, all of the CPR improvements identified in Section 4.4 would still be needed as a full chemical phosphorus removal backup system would be required.

As shown in TABLE 6, the influent phosphorus ratios look promising with respect to providing sufficient food/energy for PAOs to flourish and bioaccumulate phosphorus. However, from a permit compliance perspective reliable phosphorus removal needs to be achieved down to low levels under varying conditions. Therefore, this treatment strategy is to utilize BPR to remove phosphorus to the maximum extent practicable with supplemental VFA addition and minimal chemical polishing.

VFA Supply

An adequate and reliable food/energy source (e.g. VFAs) needs to be consistently fed into the aeration tanks in order to maximize the phosphorus and nitrogen removal by the UCT process. A fermenter can be utilized to cost-effectively produce VFAs. The fermented liquid would then be fed to the anaerobic zone of the aeration tanks to help the PAOs thrive and then maximize phosphorus uptake in the aerobic zone of the aeration tanks.

Recommended Improvements for BPR to 0.1 mg/L TP

- Recommended improvements identified in Section 4.4
- Fermenter

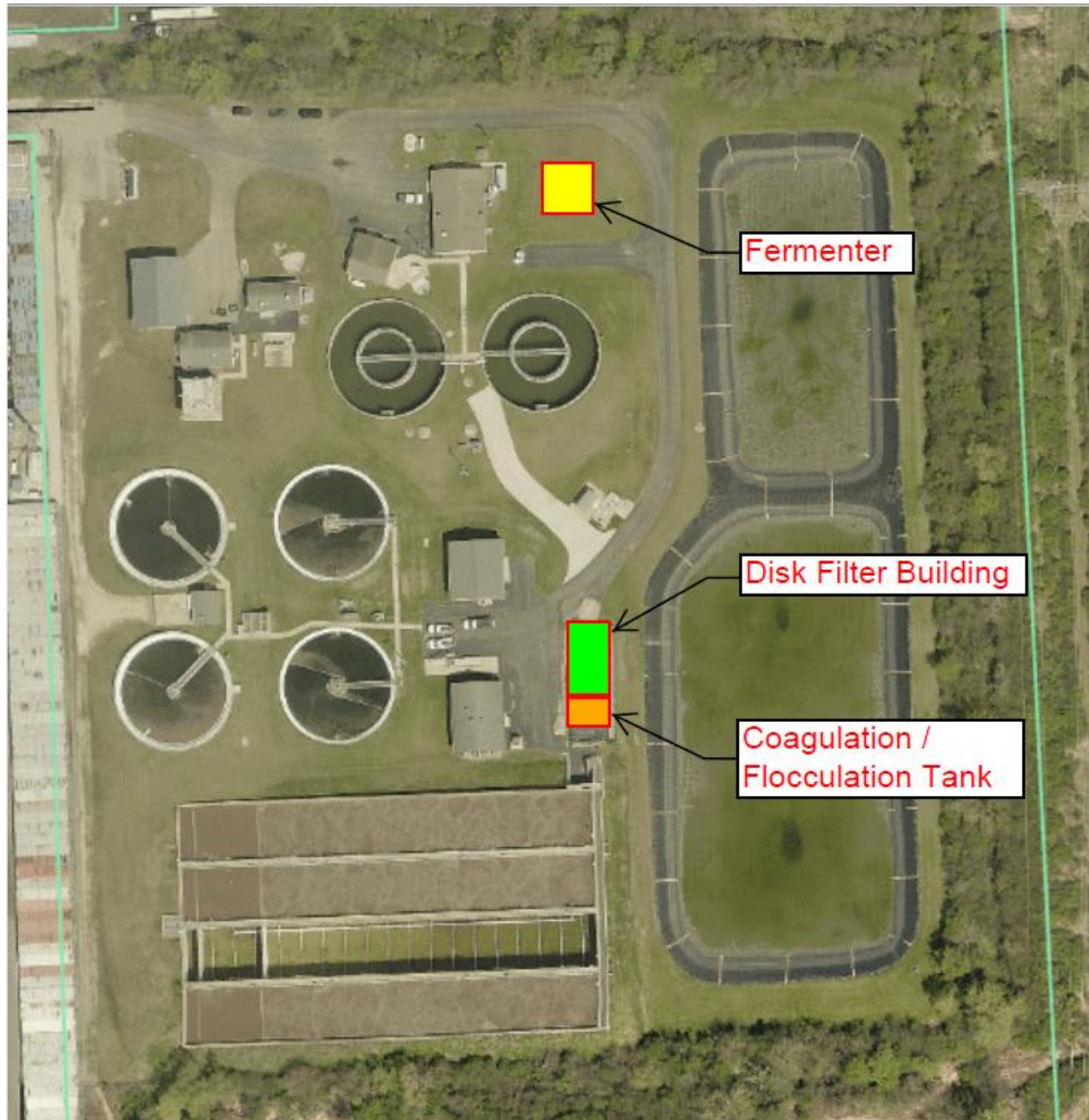
In this scenario, a fermenter would be utilized to cost effectively produce VFAs to support PAO replication and help optimize phosphorus removed by the UCT process. The fermenter would generally consist of a concrete tank and a mixer.

EXHIBIT 2 depicts the proposed location of the fermenter, coagulation/flocculation tank, and disk filter building.

Village of Romeoville

Phosphorus Removal Feasibility Study

EXHIBIT 2 – BPR to 0.1 mg/L TP



5.5 Cost Evaluation, BPR to 0.1 mg/L

TABLE 16 lists the capital costs associated with the improvements required to meet a 0.1 mg/L TP limit with BPR.

TABLE 16: BPR TO 0.1 mg/L TP – ENGINEER’S OPINION OF PROBABLE COST

Item	Estimated Amount ¹
Chemical Feed	\$ 130,000
Coagulation/Flocculation	\$ 352,000
Filtration	\$ 2,810,000
Hydraulic Improvements	\$ 350,000
Fermenter	\$ 646,000
Site Piping	\$ 465,000
Electrical and SCADA	\$ 859,000
Demolition	\$ 85,000
Restoration	\$ 120,000
Subtotal	\$ 5,817,000
Contingencies (20%)	\$ 1,164,000
Subtotal	\$ 6,981,000
Design & Construction Engineering (15%)	\$ 1,048,000
PROJECT TOTAL	\$ 8,029,000

1. Engineer’s opinion of probable cost calculated based on 2020 dollars.

Due to the significant cost of these improvements, the Village may choose to pursue a low interest loan through the SRF program. Assuming a 20-year term at the current interest rate of 1.35% results in an annual loan repayment amount of \$458,000.

Besides the initial capital cost of the improvements, there will be ongoing annual costs to operate and maintain the equipment and facilities. TABLE 17 quantifies the probable annual operation and maintenance costs associated with the improvements.

TABLE 17: BPR TO 0.1 mg/L TP – ANNUAL O&M PROBABLE COSTS

Item	Estimated Amount ^{1,2}
Energy (electricity & natural gas)	\$ 42,000
Chemicals & Sludge Disposal	\$ 367,000
Maintenance & Labor	\$ 70,000
Subtotal	\$ 479,000
Contingencies (20%)	\$ 96,000
O&M Total	\$ 575,000

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

2. Based on monthly average discharge limit; will be nominally less on a seasonal or annual basis.

Additional revenue from the utility account holders will be needed for loan debt service and to fund the additional costs associated with operating and maintaining the proposed equipment and facilities. TABLE 18 summarizes these costs and shows the annual financial impact to the account holders.

TABLE 18: BPR TO 0.1 mg/L TP – ANNUAL PROBABLE COSTS

Item	Estimated Amount ¹
Annual Loan Payment	\$ 458,000
Annual O&M Cost	\$ 575,000
Annual Total	\$ 1,033,000
Active Accounts	16,968
Annual Expense Per Account	\$ 61
Monthly Expense Per Account	\$ 5 ±

1. Engineer's opinion of probable cost calculated based on 2020 dollars.

An additional \$5 ± per month per active account will need to be collected, assuming the capital improvement costs and the operation and maintenance costs are equally distributed across all the active utility accounts.

6.0 Timeframe

6.1 NPDES Permit Status

The current NPDES Permit for the WWTF has an expiration date of August 31, 2024. We would not anticipate a change in the permitted TP discharge limits until such time that the NPDES Permit is up for renewal. This would be the year 2024 or later.

6.2 Planning, Design, and Construction

Due to the significant cost of any of the improvements considered, the Village may choose to pursue an SRF loan to be able to fund the improvements. Therefore, a Project Plan (i.e. Facilities Planning Report) would need to be developed, submitted, and approved by the IEPA as required by the SRF loan process. An element of the Project Plan would include additional analytical testing to more accurately quantify influent wastewater characteristics, including, but not limited to, phosphorus speciation, VFA fractions, and rbCOD concentrations. One year should be allocated for the project planning process.

Once the Project Plan has been approved, work can begin on the detailed design of the phosphorus removal improvements. After the design is complete it needs to be reviewed and approved by the IEPA before it can be publicly bid. Upon design approval, bids are obtained, and then the SRF loan is executed. A year and a half should be allocated for the design process.

After the SRF loan funds are secured, then construction can move forward. The construction duration needs to account for the complexity of the improvements, weather limitations, sequencing around on-going WWTF operations, etc. Two years should be allocated for the construction process.

Once the improvements are on-line, it will take some time for staff to become accustomed to the nuances of the system and any biological processes will need time to develop the required microbial population. This will allow staff time to try and evaluate different operational approaches to optimize system performance without fear of a permit exceedance. A one-year process stabilization period should be allowed before a lower TP discharge limit is enforced.

TABLE 19: PROJECT SCHEDULE

Project Phase	Duration
Planning	1 year
Design	1.5 years
Construction	2 years
Process Stabilization	1 year
Total	5.5 years

APPENDIX A
CURRENT NPDES PERMIT



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

JB PRITZKER, GOVERNOR

JOHN J. KIM, DIRECTOR

217/782-0610

August 22, 2019

Village of Romeoville
615 Anderson Drive
Romeoville, Illinois 60446

Re: Village of Romeoville Wastewater Treatment Facility
NPDES Permit No. IL0048526
Bureau ID W1970900003
Final Permit

Gentlemen:

Attached is the final NPDES Permit for your discharge. The Permit as issued covers discharge limitations, monitoring, and reporting requirements. Failure to meet any portion of the Permit could result in civil and/or criminal penalties. The Illinois Environmental Protection Agency is ready and willing to assist you in interpreting any of the conditions of the Permit as they relate specifically to your discharge.

Pursuant to the Final NPDES Electronic Reporting Rule, all permittees must report DMRs electronically unless a waiver has been granted by the Agency. The Agency utilizes NetDMR, a web based application, which allows the submittal of electronic Discharge Monitoring Reports instead of paper Discharge Monitoring Reports (DMRs). More information regarding NetDMR can be found on the Agency website, <https://www2.illinois.gov/epa/topics/water-quality/surface-water/netdmr/pages/quick-answer-guide.aspx>. If your facility has received a waiver from the NetDMR program, a supply of preprinted paper DMR Forms will be sent to your facility. Additional information and instructions will accompany the preprinted DMRs. Please see the attachment regarding the electronic reporting rule.

The attached Permit is effective as of the date indicated on the first page of the Permit. Until the effective date of any re-issued Permit, the limitations and conditions of the previously-issued Permit remain in full effect. You have the right to appeal any condition of the Permit to the Illinois Pollution Control Board within a 35 day period following the issuance date.

Should you have questions concerning the Permit, please contact Jaime Rabins at 217/782-0610.

Sincerely,

Amy L. Dragovich, P.E.
Manager, Permit Section
Division of Water Pollution Control

ALD:JAR:16021601

Attachments: Final Permit

cc: Records Unit
Des Plaines FOS
Compliance Assurance Section
Billing
Robinson Engineering
CMAP
DRSCW/The Conservation Foundation

4302 N. Main St., Rockford, IL 61103 (815) 987-7760
9511 Harrison St., Des Plaines, IL 60016 (847) 294-4000
595 S. State, Elgin, IL 60123 (847) 608-3131
2125 S. First St., Champaign, IL 61820 (217) 278-5800

2009 Mall St., Collinsville, IL 62234 (618) 346-5120
412 SW Washington St., Suite D, Peoria, IL 61602 (309) 671-3022
2309 W. Main St., Suite 116, Marion, IL 62959 (618) 993-7200
100 W. Randolph, Suite 4-500, Chicago, IL 60601

NPDES Permit No. IL0048526

Illinois Environmental Protection Agency

Division of Water Pollution Control

1021 North Grand Avenue East

Post Office Box 19276

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Reissued (NPDES) Permit

Expiration Date: August 31, 2024

Issue Date: August 22, 2019

Effective Date: September 1, 2019

Name and Address of Permittee:

Village of Romeoville
615 Anderson Drive
Romeoville, Illinois 60446

Facility Name and Address:

Romeoville Wastewater Treatment Facility
615 Anderson Drive
Romeoville, Illinois 60446
(Will County)

Receiving Waters: Des Plaines River

In compliance with the provisions of the Illinois Environmental Protection Act, Title 35 of the Ill. Adm. Code, Subtitle C, Chapter I, and the Clean Water Act (CWA), the above-named Permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the Effluent Limitations, Monitoring, and Reporting requirements; Special Conditions and Attachment H Standard Conditions attached herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization to discharge beyond the expiration date, the Permittee shall submit the proper application as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.



Amy L. Dragovich, P.E.
Manager, Permit Section
Division of Water Pollution Control

ALD:JAR:16021601

Effluent Limitations, Monitoring, and Reporting

FINAL

Discharge Number(s) and Name(s): 001 STP Outfall

Load limits computed based on a design average flow (DAF) of 7.5 MGD (design maximum flow (DMF) of 15.0 MGD).

From the effective date of this Permit until the expiration date, the effluent of the above discharge(s) shall be monitored and limited at all times as follows:

Parameter	LOAD LIMITS lbs/day DAF (DMF)*			CONCENTRATION LIMITS MG/L			Sample Frequency	Sample Type
	Monthly Average	Weekly Average	Daily Maximum	Monthly Average	Weekly Average	Daily Maximum		
Flow (MGD)							Continuous	
CBOD ₅ *** ****	1001 (2502)	2002 (5004)		20	40		3 Days/Week	Composite
Suspended Solids****	1251 (3128)	2252 (5630)		25	45		3 Days/Week	Composite
pH	Shall be in the range of 6 to 9 Standard Units						3 Days/Week	Grab
Fecal Coliform***	Daily Maximum shall not exceed 400 per 100 mL (May through October)						3 Days/Week	Grab
Chlorine Residual						0.05	***	Grab
Ammonia Nitrogen: (as N)								
March-May/Sept.- Oct.	75 (188)		140 (350)	1.5		2.8	3 Days/Week	Composite
June - August	75 (188)		115 (288)	1.5		2.3	3 Days/Week	Composite
November-February	200 (500)		300 (751)	4.0		6.0	3 Days/Week	Composite
Total Phosphorus (as P)	63 (125)			1.0			3 Days/Week	Composite
Total Nitrogen (as N)	Monitor Only						1 Day/Month	Composite
Dissolved Phosphorus	Monitor Only						1 Day/Month	Composite
Nitrate/Nitrite	Monitor Only						1 Day/Month	Composite
Total Kjeldahl Nitrogen (TKN)	Monitor Only						1 Day/Month	Composite
Alkalinity	Monitor Only						1 Day/Month	Grab
Temperature	Monitor Only						1 Day/Month	Grab
Specific Conductivity	Monitor Only						1 Day/Month	Grab
Chloride	Monitor Only						1 Day/Month	Grab
				Monthly Average not less than	Weekly Average not less than	Daily Minimum		
Dissolved Oxygen								
March - July				N.A.	6.0	5.0	3 Days/Week	Grab
August - February				5.5	4.0	3.5	3 Days/Week	Grab

* Load limits based on design maximum flow shall apply only when flow exceeds design average flow. The load limits for CBOD₅, SS, and Ammonia Nitrogen are based on the DAF=6.0 MGD.**Carbonaceous BOD₅ (CBOD₅) testing shall be in accordance with 40 CFR 136.

***See Special Condition 8.

****BOD₅ and Suspended Solids (85% removal required): In accordance with 40 CFR 133, the 30-day average percent removal shall not be less than 85 percent. The percent removal need not be reported to the IEPA on DMRs but influent and effluent data must be used for this calculation and available, as required elsewhere in this Permit, for IEPA inspection and review. For measuring compliance

Effluent Limitations, Monitoring, and Reporting

FINAL

Discharge Number(s) and Name(s): 001 STP Outfall (continued)

with this requirement, 5 mg/L shall be added to the effluent CBOD₅ concentration to determine the effluent BOD₅ concentration. Percent removal is a percentage expression of the removal efficiency across a treatment plant for a given pollutant parameter, as determined from the 30-day average values of the raw wastewater influent concentrations to the facility and the 30-day average values of the effluent pollutant concentrations for a given time period.

Flow shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

Fecal Coliform shall be reported on the DMR as a daily maximum value.

pH shall be reported on the DMR as minimum and maximum value.

Chlorine Residual shall be reported on the DMR as a daily maximum value.

Dissolved oxygen shall be reported on the DMR as a minimum value.

Total Phosphorus shall be reported on the DMR as a daily maximum and monthly average value.

Total Nitrogen shall be reported on the DMR as a daily maximum value. Total Nitrogen is the sum total of Total Kjeldahl Nitrogen, Nitrate, and Nitrite.

NPDES Permit No. IL0048526

Influent Monitoring, and Reporting

The influent to the plant shall be monitored as follows:

Parameter	Sample Frequency	Sample Type
Flow (MGD)	Continuous	
BOD ₅	3 Days/Week	Composite
Suspended Solids	3 Days/Week	Composite
Total Phosphorus (as P)	3 Days/Week	Composite

Influent samples shall be taken at a point representative of the influent.

Flow (MGD) shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

BOD₅ and Suspended Solids shall be reported on the DMR as a monthly average concentration.

Total Phosphorus shall be reported on the DMR as a daily maximum and monthly average value.

Special Conditions

SPECIAL CONDITION 1. This Permit may be modified to include different final effluent limitations or requirements which are consistent with applicable laws and regulations. The IEPA will public notice the permit modification.

SPECIAL CONDITION 2. The use or operation of this facility shall be by or under the supervision of a Certified Class 1 operator.

SPECIAL CONDITION 3. The IEPA may request in writing submittal of operational information in a specified form and at a required frequency at any time during the effective period of this Permit.

SPECIAL CONDITION 4. The IEPA may request more frequent monitoring by permit modification pursuant to 40 CFR § 122.63 and Without Public Notice.

SPECIAL CONDITION 5. The effluent, alone or in combination with other sources, shall not cause a violation of any applicable water quality standard outlined in 35 Ill. Adm. Code 302 and 303.

SPECIAL CONDITION 6. Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream.

SPECIAL CONDITION 7. Consistent with permit modification procedures in 40 CFR 122.62 and 63, this Permit may be modified to include requirements for the Permittee on a continuing basis to evaluate and detail its efforts to effectively control sources of infiltration and inflow into the sewer system and to submit reports to the IEPA if necessary.

SPECIAL CONDITION 8. Fecal Coliform limits for Discharge Number 001 are effective May thru October. Sampling of Fecal Coliform is only required during this time period.

Any use of chlorine to control slime growths, odors or as an operational control, etc. shall not exceed the limit of 0.05 mg/L (daily maximum) total residual chlorine in the effluent. Sampling is required on a daily grab basis during the chlorination process. Reporting shall be submitted on the DMR's on a monthly basis.

SPECIAL CONDITION 9. The Permittee shall conduct semi-annual monitoring of the effluent and report concentrations (in mg/L) of the following listed parameters. Monitoring shall begin three (3) months from the effective date of this permit. The sample shall be a 24-hour effluent composite except as otherwise specifically provided below and the results shall be submitted on Discharge Monitoring Report Forms to IEPA unless otherwise specified by the IEPA. The parameters to be sampled and the minimum reporting limits to be attained are as follows:

STORET CODE	PARAMETER	Minimum reporting limit
01002	Arsenic	0.05 mg/L
01007	Barium	0.5 mg/L
01027	Cadmium	0.001 mg/L
01032	Chromium (hexavalent) (grab)	0.01 mg/L
01034	Chromium (total)	0.05 mg/L
01042	Copper	0.005 mg/L
00720	Cyanide (total) (grab)***	5.0 µg/L
00722	Cyanide (grab) (available**** or amenable to chlorination)***	5.0 µg/L
00951	Fluoride	0.1 mg/L
01045	Iron (total)	0.5 mg/L
01046	Iron (Dissolved)	0.5 mg/L
01051	Lead	0.05 mg/L
01055	Manganese	0.5 mg/L
71900	Mercury (grab)**	1.0 ng/L*
01067	Nickel	0.005 mg/L
00556	Oil (hexane soluble or equivalent) (Grab Sample only)	5.0 mg/L
32730	Phenols (grab)	0.005 mg/L
01147	Selenium	0.005 mg/L
01077	Silver (total)	0.003 mg/L
01092	Zinc	0.025 mg/L

Minimum Reporting Limits are defined as – (1) The minimum value below which data are documented as non-detects. (2) Three to ten times the method detection limit. (3) The minimum value of the calibration range.

All sample containers, preservative, holding times, analyses, method detection limit determinations and quality assurance/quality control requirements shall be in accordance with 40 CFR 136.

Unless otherwise indicated, concentrations refer to the total amount of the constituent present in all phases, whether solid, suspended or dissolved, elemental or combined, including all oxidation states.

Special Conditions

*1.0 ng/L = 1 part per trillion.

**Utilize USEPA Method 1631E and the digestion procedure described in Section 11.1.1.2 of 1631E.

***Analysis for cyanide (available or amenable to chlorination) is only required if cyanide (total) is detected at or above the minimum reporting limit.

****USEPA Method OIA-1677.

The Permittee shall provide a report briefly describing the permittee's pretreatment activities and an updated listing of the Permittee's significant industrial users. The list should specify which categorical pretreatment standards, if any, are applicable to each Industrial User. Permittees who operate multiple plants may provide a single report. Such report shall be submitted within six (6) months of the effective date of this Permit to the following addresses:

U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604
Attention: Water Assurance Branch Enforcement and Compliance

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attention: Compliance assurance Section, Mail Code #19
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 10. During January of each year the Permittee shall submit annual fiscal data regarding sewerage system operations to the Illinois Environmental Protection Agency/Division of Water Pollution Control/Compliance Assurance Section. The Permittee may use any fiscal year period provided the period ends within twelve (12) months of the submission date.

Submission shall be on forms provided by IEPA titled "Fiscal Report Form For NPDES Permittees".

SPECIAL CONDITION 11. The Permittee shall conduct biomonitoring of the effluent from Discharge Number(s) 001.

Biomonitoring

- A. Acute Toxicity - Standard definitive acute toxicity tests shall be run on at least two trophic levels of aquatic species (fish, invertebrate) representative of the aquatic community of the receiving stream. Testing must be consistent with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fifth Ed.) EPA/821-R-02-012. Unless substitute tests are pre-approved; the following tests are required:
1. Fish 96-hour static LC₅₀ Bioassay using fathead minnows (*Pimephales promelas*).
 2. Invertebrate 48-hour static LC₅₀ Bioassay using *Ceriodaphnia*.
- B. Testing Frequency - The above tests shall be conducted using 24-hour composite samples unless otherwise authorized by the IEPA. Sample collection and testing must be conducted in the 18th, 15th, 12th, and 9th month prior to the expiration date of this Permit. When possible, bioassay sample collection should coincide with sample collection for metals analysis or other parameters that may contribute to effluent toxicity.
- C. Reporting - Results shall be reported according to EPA/821-R-02-012, Section 12, Report Preparation, and shall be mailed to IEPA, Bureau of Water, Compliance Assurance Section or emailed to EPA.PrmtSpecCondtns@Illinois.gov within one week of receipt from the laboratory. Reports are due to the IEPA no later than the 16th, 13th, 10th, and 7th month prior to the expiration date of this Permit.
- D. Toxicity - Should a bioassay result in toxicity to >20% of organisms tested in the 100% effluent treatment, the IEPA may require, upon notification, six (6) additional rounds of monthly testing on the affected organism(s) to be initiated within 30 days of the toxic bioassay. Results shall be submitted to IEPA within one (1) week of becoming available to the Permittee. Should any of the additional bioassays result in toxicity to ≥50% of organisms tested in the 100% effluent treatments, the Permittee must contact the IEPA within one (1) day of the results becoming available to the Permittee and begin the toxicity identification and reduction evaluation process as outlined below.
- E. Toxicity Identification and Reduction Evaluation - Should any of the additional bioassays result in toxicity to ≥50% of organisms tested in the 100% effluent treatment, the Permittee must contact the IEPA within one (1) day of the results becoming available to the Permittee and begin the toxicity identification evaluation process in accordance with Methods for Aquatic Toxicity Identification Evaluations, EPA/600/6-91/003. The IEPA may also require, upon notification, that the Permittee prepare a plan for toxicity reduction evaluation to be developed in accordance with Toxicity Reduction Evaluation Guidance for Municipal Wastewater

Special Conditions

Treatment Plants, EPA/833B-99/002, which shall include an evaluation to determine which chemicals have a potential for being discharged in the plant wastewater, a monitoring program to determine their presence or absence and to identify other compounds which are not being removed by treatment, and other measures as appropriate. The Permittee shall submit to the IEPA its plan for toxicity reduction evaluation within ninety (90) days following notification by the IEPA. The Permittee shall implement the plan within ninety (90) days or other such date as contained in a notification letter received from the IEPA.

The IEPA may modify this Permit during its term to incorporate additional requirements or limitations based on the results of the biomonitoring. In addition, after review of the monitoring results, the IEPA may modify this Permit to include numerical limitations for specific toxic pollutants. Modifications under this condition shall follow public notice and opportunity for hearing.

SPECIAL CONDITION 12. For the duration of this Permit, the Permittee shall determine the quantity of sludge produced by the treatment facility in dry tons or gallons with average percent total solids analysis. The Permittee shall maintain adequate records of the quantities of sludge produced and have said records available for U.S. EPA and IEPA inspection. The Permittee shall submit to the IEPA, at a minimum, a semi-annual summary report of the quantities of sludge generated and disposed of, in units of dry tons or gallons (average total percent solids) by different disposal methods including but not limited to application on farmland, application on reclamation land, landfilling, public distribution, dedicated land disposal, sod farms, storage lagoons or any other specified disposal method. Said reports shall be submitted to the IEPA by January 31 and July 31 of each year reporting the preceding January thru June and July thru December interval of sludge disposal operations.

Duty to Mitigate. The Permittee shall take all reasonable steps to minimize any sludge use or disposal in violation of this Permit.

Sludge monitoring must be conducted according to test procedures approved under 40 CFR 136 unless otherwise specified in 40 CFR 503, unless other test procedures have been specified in this Permit.

Planned Changes. The Permittee shall give notice to the IEPA on the semi-annual report of any changes in sludge use and disposal.

The Permittee shall retain records of all sludge monitoring, and reports required by the Sludge Permit as referenced in Standard Condition 25 for a period of at least five (5) years from the date of this Permit.

If the Permittee monitors any pollutant more frequently than required by this permit or the Sludge Permit, the results of this monitoring shall be included in the reporting of data submitted to the IEPA.

The Permittee shall comply with existing federal regulations governing sewage sludge use or disposal and shall comply with all existing applicable regulations in any jurisdiction in which the sewage sludge is actually used or disposed.

The Permittee shall comply with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish the standards for sewage sludge use or disposal even if the permit has not been modified to incorporate the requirement.

The Permittee shall ensure that the applicable requirements in 40 CFR Part 503 are met when the sewage sludge is applied to the land, placed on a surface disposal site, or fired in a sewage sludge incinerator.

Monitoring reports for sludge shall be reported on the form titled "Sludge Management Reports" to the following address:

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section
Mail Code #19
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 13. The Permittee shall record monitoring results on Discharge Monitoring Report (DMR) electronic forms using one such form for each outfall each month.

In the event that an outfall does not discharge during a monthly reporting period, the DMR Form shall be submitted with no discharge indicated.

The Permittee is required to submit electronic DMRs (NetDMRs) instead of mailing paper DMRs to the IEPA unless a waiver has been granted by the Agency. More information, including registration information for the NetDMR program, can be obtained on the IEPA website, <https://www2.illinois.gov/epa/topics/water-quality/surface-water/netdmr/pages/quick-answer-guide.aspx>.

The completed Discharge Monitoring Report forms shall be submitted to IEPA no later than the 25th day of the following month, unless otherwise specified by the permitting authority.

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Permittees that have been granted a waiver shall mail Discharge Monitoring Reports with an original signature to the IEPA at the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attention: Compliance Assurance Section, Mail Code # 19
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 14. The Permittee shall work towards the goals of achieving no discharges from sanitary sewer overflows or basement back-ups and ensuring that overflows or back-ups, when they do occur do not cause or contribute to violations of applicable standards or cause impairment in any adjacent receiving water. Overflows from sanitary sewers are expressly prohibited by this permit and by Ill. Adm. Code 306.304. As part of the process to ultimately achieve compliance through the elimination of and mitigating the adverse impacts of any such overflows if they do occur, the Permittee shall (A) identify and report to IEPA all SSOs that do occur, and (B) develop, implement and submit to the IEPA a Capacity, Management, Operations, and Maintenance (CMOM) plan which includes an Asset Management strategy within twenty-four (24) months of the effective date of this Permit or review and revise any existing plan accordingly. The Permittee shall modify the Plan to incorporate any comments that it receives from IEPA and shall implement the modified plan as soon as possible. The Permittee should work as appropriate, in consultation with affected authorities at the local, county, and/or state level to develop the plan components involving third party notification of overflow events. The Permittee may be required to construct additional sewage transport and/or treatment facilities in future permits or other enforceable documents should the implemented CMOM plan indicate that the Permittee's facilities are not capable of conveying and treating the flow for which they are designed.

The CMOM plan shall include the following elements:

A. Measures and Activities:

1. A complete map and system inventory for the collection system owned and operated by the Permittee;
2. Organizational structure; budgeting; training of personnel; legal authorities; schedules for maintenance, sewer system cleaning, and preventative rehabilitation; checklists, and mechanisms to ensure that preventative maintenance is performed on equipment owned and operated by the Permittee;
3. Documentation of unplanned maintenance;
4. An assessment of the capacity of the collection and treatment system owned and operated by the Permittee at critical junctions and immediately upstream of locations where overflows and backups occur or are likely to occur; use flow monitoring and/or sewer hydraulic modeling, as necessary;
5. Identification and prioritization of structural deficiencies in the system owned and operated by the Permittee. Include preventative maintenance programs to prevent and/or eliminate collection system blockages from roots or grease, and prevent corrosion or negative effects of hydrogen sulfide which may be generated within collection system;
6. Operational control, including documented system control procedures, scheduled inspections and testing, list of scheduled frequency of cleaning (and televising as necessary) of sewers;
7. The Permittee shall develop and implement an Asset Management strategy to ensure the long-term sustainability of the collection system. Asset Management shall be used to assist the Permittee in making decisions on when it is most appropriate to repair, replace or rehabilitate particular assets and develop long-term funding strategies; and
8. Asset Management shall include but is not limited to the following elements:
 - a. Asset Inventory and State of the Asset;
 - b. Level of Service;
 - c. Critical Asset Identification;
 - d. Life Cycle Cost; and
 - e. Long-Term Funding Strategy.

B. Design and Performance Provisions:

1. Monitor the effectiveness of CMOM;
2. Upgrade the elements of the CMOM plan as necessary; and
3. Maintain a summary of CMOM activities.

C. Overflow Response Plan:

1. Know where overflows and back-ups within the facilities owned and operated by the Permittee occur;
2. Respond to each overflow or back-up to determine additional actions such as clean up; and
3. Locations where basement back-ups and/or sanitary sewer overflows occur shall be evaluated as soon as practicable for excessive inflow/infiltration, obstructions or other causes of overflows or back-ups as set forth in the System Evaluation Plan.
4. Identify the root cause of the overflow or basement backup, and document to files;
5. Identify actions or remediation efforts to reduce risk of reoccurrence of these overflows or basement backups in the future, and

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document to files.

D. System Evaluation Plan:

1. Summary of existing SSO and Excessive I/I areas in the system and sources of contribution;
2. Evaluate plans to reduce I/I and eliminate SSOs;
3. Evaluate the effectiveness and performance in efforts to reduce excessive I/I in the collection system;
4. Special provisions for Pump Stations and force mains and other unique system components; and
5. Construction plans and schedules for correction.

E. Reporting and Monitoring Requirements:

1. Program for SSO detection and reporting; and
2. Program for tracking and reporting basement back-ups, including general public complaints.

F. Third Party Notice Plan:

1. Describes how, under various overflow scenarios, the public, as well as other entities, would be notified of overflows within the Permittee's system that may endanger public health, safety or welfare;
2. Identifies overflows within the Permittee's system that would be reported, giving consideration to various types of events including events with potential widespread impacts;
3. Identifies who shall receive the notification;
4. Identifies the specific information that would be reported including actions that will be taken to respond to the overflow;
5. Includes a description of the lines of communication; and
6. Includes the identities and contact information of responsible POTW officials and local, county, and/or state level officials.

For additional information concerning USEPA CMOM guidance and Asset Management please refer to the following web site addresses.

http://www.epa.gov/npdes/pubs/cmom_guide_for_collection_systems.pdf and

http://water.epa.gov/type/watersheds/wastewater/upload/guide_smallsystems_assetmanagement_bestpractices.pdf

SPECIAL CONDITION 15. This Permit may be modified to include alternative or additional final effluent limitations pursuant to an approved Total Maximum Daily Load (TMDL) Study, an approved Nutrient Assessment Reduction Plan, or an approved trading program.

SPECIAL CONDITION 16. The Permittee shall develop and submit to the Agency a Phosphorus Discharge Optimization Plan within 18 months of the effective date of this permit. The plan shall include a schedule for the implementation of these optimization measures. Annual progress reports on the optimization of the existing treatment facilities shall be submitted to the Agency by March 31 of each year beginning 12 months from the effective date of the permit. In developing the plan, the Permittee shall evaluate a range of measures for reducing phosphorus discharges from the treatment plant, including possible source reduction measures, operational improvements, and minor facility modifications that will optimize reductions in phosphorus discharges from the wastewater treatment facility. The Permittee's evaluation shall include, but not be limited to, an evaluation of the following optimization measures:

A. WWTF influent reduction measures.

1. Evaluate the phosphorus reduction potential of users.
2. Determine which sources have the greatest opportunity for reducing phosphorus (i.e., industrial, commercial, institutional, municipal and others).
 - a. Determine whether known sources (i.e., restaurant and food preparation) can adopt phosphorus minimization and water conservation plans.
 - b. Evaluate implementation of local limits on influent sources of excessive phosphorus.

B. WWTF effluent reduction measures.

1. Reduce phosphorus discharges by optimizing existing treatment processes.
 - a. Adjust the solids retention time for either nitrification, denitrification, or biological phosphorus removal.
 - b. Adjust aeration rates to reduce dissolved oxygen and promote simultaneous nitrification-denitrification.
 - c. Add baffles to existing units to improve microorganism conditions by creating divided anaerobic, anoxic, and aerobic zones.
 - d. Change aeration settings in plug flow basins by turning off air or mixers at the inlet side of the basin system.
 - e. Minimize impact on recycle streams by improving aeration within holding tanks.
 - f. Reconfigure flow through existing basins to enhance biological nutrient removal.
 - g. Increase volatile fatty acids for biological phosphorus removal.

SPECIAL CONDITION 17. The Permittee shall, within 18 months of the effective date of this permit, prepare and submit to the Agency a Phosphorus Removal Feasibility Study (PRFS) that identifies the method, timeframe, and costs of reducing phosphorus levels in its discharge to a level consistently meeting a potential future effluent limit of 0.5 mg/L and 0.1 mg/L. The study shall evaluate the construction and O & M costs of the application of this limit on a monthly, seasonal and annual average basis. The feasibility report shall also be shared with the Lower Des Plaines Watershed Group. Previously submitted feasibility studies that did not include an alternative effluent limit of 0.5 mg/L and 0.1 mg/L may be amended to identify supplemental treatment technologies necessary to achieve 0.5 mg/L and 0.1 mg/L.

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SPECIAL CONDITION 18. The Permittee shall monitor the wastewater effluent for Total Phosphorus, Dissolved Phosphorus, Nitrate/Nitrite, Total Kjeldahl Nitrogen (TKN), Ammonia, Total Nitrogen (calculated), Alkalinity, Specific Conductivity, Chloride and Temperature at least once a month beginning on the effective date of this permit. The Permittee shall monitor the wastewater influent for Total Phosphorus at least once a month. The results shall be submitted on electronic Discharge Monitoring Report Forms (NetDMRs) to IEPA unless otherwise specified by the IEPA.

SPECIAL CONDITION 19. The Permittee shall participate in the Lower Des Plaines Watershed Group (LDWG). The Permittee shall work with other watershed members of the LDWG to determine the most cost effective means to remove dissolved oxygen (DO) and offensive condition impairments in the Lower Des Plaines Watershed to the extent feasible. The Permittee shall participate in the LDWG for the completion of the Bioassessment Monitoring Program Plan of the Lower Des Plaines Watershed Bioassessment Quality Assurance Project Plan dated July 27, 2018 (hereinafter the Plan) which will include biological, chemical and physical monitoring of the Lower Des Plaines River Watershed.

- A. The LDWG will conduct the following activities in accordance with the Plan during the term of this permit:
1. Conduct stream monitoring in Lower Mainstem Des Plaines River in 2018;
 2. Conduct stream monitoring in Upper Mainstem and tributaries of the Des Plaines River in 2019;
 3. Conduct stream monitoring in Hickory Creek Watershed in 2020;
 4. Conduct stream monitoring in remaining tributaries of the Des Plaines River in 2021; and
 5. Assess stream monitoring and develop recommendations for future stream monitoring in 2022.
- B. The Permittee shall submit an annual progress report on the activities identified in (A) above to the Agency by March 31 of each year. The Permittee may work cooperatively with the LDWG to prepare a single annual progress report that is common among LDWG members.
- C. In its application for renewal of this permit, the Permittee shall consider and incorporate recommended LDWG activities listed in any annual progress report or Nutrient Assessment Reduction Plan that the Permittee will implement during the next permit term.

SPECIAL CONDITION 20.

- A. Subject to paragraph (B) below, an effluent limit of 0.5 mg/L Total Phosphorus 12 month rolling geometric mean (calculated monthly) basis (hereinafter "the Limit"), shall be met by the Permittee by January 1, 2030, unless the Permittee demonstrates that meeting such Limit is not technologically or economically feasible in one of the following manners:
1. the Limit is not technologically feasible through the use of biological phosphorus removal (BPR) process(es) at the treatment facility; or
 2. the Limit would result in substantial and widespread economic or social impact. Substantial and widespread economic impacts must be demonstrated using applicable USEPA guidance, including but not limited to any of the following documents:
 - a. Interim Economic Guidance for Water Quality Standards, March 1995, EPA-823-95-002;
 - b. Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development, February 1997, EPA-832-97-004;
 - c. Financial Capability Assessment Framework for Municipal Clean Water Act Requirements, November 24, 2014; and
 - d. any additional USEPA guidance on affordability issues that revises, supplements or replaces those USEPA guidance documents; or
 3. the Limit can only be met by chemical addition for phosphorus removal at the treatment facility in addition to those processes currently contemplated; or
 4. the Limit is demonstrated not to be feasible by January 1, 2030, but is feasible within a longer timeline, then the Limit shall be met as soon feasible and approved by the Agency; or
 5. the Limit is demonstrated not to be achievable, then an effluent limit that is achievable by the Permittee (along with associated timeline) will apply instead, except that the effluent limit shall not exceed 0.6 mg/L Total Phosphorus 12 month rolling geometric mean (calculated monthly).
- B. The Limit shall be met by the Permittee by January 1, 2030, except in the following circumstances:
1. If the Permittee develops a written plan, preliminary engineering report, facility plan or project plan no later than January 1, 2025, to rebuild or replace the secondary treatment process(es) of the treatment facility, the Limit shall be met by December 31, 2035; or
 2. If the Permittee decides to construct/operate biological nutrient removal (BNR) process(es), incorporating nitrogen reduction, the Limit shall be met by December 31, 2035; or
 3. If the Permittee decides to use chemical addition for phosphorus removal instead of BPR, the Limit and the effluent limit of 1.0 mg/L Total Phosphorus monthly average shall be met by December 31, 2025; or
 4. If the Permittee has already installed chemical addition for phosphorus removal instead of BPR, and has a 1.0 mg/L Total Phosphorus monthly average effluent limit in its permit, or the Permittee is planning to install chemical addition with an IEPA construction permit that is issued on or before July 31, 2018, the 1.0 mg/L Total Phosphorus monthly average effluent limit (and associated compliance schedule) shall apply, and the Limit shall not be applicable; or
 5. The NARP determines that a limit lower than the Limit is necessary and attainable. The lower limit and timeline identified in the NARP shall apply to the Permittee; or
 6. If the Permittee participates in a watershed group that is developing a NARP for an impairment related to phosphorus or a risk eutrophication, and IEPA determines that the group has the financial and structural capability to develop the NARP by the

Special Conditions

deadline specified in the NARP provisions below.

- C. The Permittee shall identify and provide adequate justification of any exception identified in paragraph (A) or circumstance identified in paragraph (B), regarding meeting the Limit. The justification shall be submitted to the Agency at the time of renewal of this permit or by December 31, 2023, whichever date is first. Any justification or demonstration performed by the Permittee pursuant to paragraph (A) or circumstance pursuant to paragraph (B) must be reviewed and approved by the Agency. The Agency will renew or modify the NPDES permit as necessary. No date deadline modification or effluent limitation modification for any of the exceptions or circumstances specified in paragraphs (A) or (B) will be effective until it is included in a modified or reissued NPDES permit.
- D. For purposes of this permit, the following definitions are used:
1. BPR (Biological Phosphorus Removal) is defined herein as treatment processes which do not require use of supplemental treatment processes at the treatment facilities before or after the biological system, such as but not limited to, chemical addition, carbon supplementation, fermentation, or filtration. The use of filtration or additional equipment to meet other effluent limits is not prohibited, but those processes will not be considered part of the BPR process for purposes of this permit, and
 2. BNR (Biological Nutrient Removal) is defined herein as treatment processes used for nitrogen and phosphorus removal from wastewater before it is discharged. BNR treatment processes, as defined herein, do not require use of supplemental treatment processes at the treatment facilities before or after the biological system, such as but not limited to, chemical addition, carbon supplementation, fermentation or filtration. The use of filtration or additional equipment to meet other effluent limits is not prohibited, but those processes will not be considered part of the BNR process for purposes of this permit.
- E. The 0.5 mg/L Total Phosphorus 12 month rolling geometric mean (calculated monthly) effluent limit applies to the effluent from the treatment plant.

SPECIAL CONDITION 21. The Agency has determined that the Permittee's treatment plant effluent is located upstream of a waterbody or stream segment that has been determined to have a phosphorus related impairment. This determination was made upon reviewing available information concerning the characteristics of the relevant waterbody/segment and the relevant facility (such as quantity of discharge flow and nutrient load relative to the stream flow).

A phosphorus related impairment means that the downstream waterbody or segment is listed by the Agency as impaired due to dissolved oxygen and/or offensive condition (algae and/or aquatic plant growth) impairments that is related to excessive phosphorus levels.

The Permittee shall develop, or be a part of a watershed group that develops, a Nutrient Assessment Reduction Plan (NARP) that will meet the following requirements:

- A. The NARP shall be developed and submitted to the Agency by December 31, 2023. This requirement can be accomplished by the Permittee, by participation in an existing watershed group or by creating a new group. The NARP shall be supported by data and sound scientific rationale.
- B. The Permittee shall cooperate with and work with other stakeholders in the watershed to determine the most cost-effective means to address the phosphorus related impairment. If other stakeholders in the watershed will not cooperate in developing the NARP, the Permittee shall develop its own NARP for submittal to the Agency to comply with this condition.
- C. In determining the target levels of various parameters necessary to address the phosphorus related impairment, the NARP shall either utilize the recommendations by the Nutrient Science Advisory Committee or develop its own watershed-specific target levels.
- D. The NARP shall identify phosphorus input reductions by point source discharges and non-point source discharges in addition to other measures necessary to remove phosphorus related impairments in the watershed. The NARP may determine, based on an assessment of relevant data, that the watershed does not have an impairment related to phosphorus, in which case phosphorus input reductions or other measures would not be necessary. Alternatively, the NARP could determine that phosphorus input reductions from point sources are not necessary, or that phosphorus input reductions from both point and nonpoint sources are necessary, or that phosphorus input reductions are not necessary and that other measures, besides phosphorus input reductions, are necessary.
- E. The NARP shall include a schedule for the implementation of the phosphorus input reductions by point sources, non-point sources and other measures necessary to remove phosphorus related impairments. The NARP schedule shall be implemented as soon as possible, and shall identify specific timelines applicable to the Permittee.
- F. The NARP can include provisions for water quality trading to address the phosphorus related impairments in the watershed. Phosphorus/Nutrient trading cannot result in violations of water quality standards or applicable antidegradation requirements.
- G. The Permittee shall request modification of the permit within 90 days after the NARP has been completed to include necessary phosphorus input reductions identified within the NARP. The Agency will modify the NPDES permit, if necessary.
- H. If the Permittee does not develop or assist in developing the NARP, and such a NARP is developed for the watershed, the Permittee will become subject to effluent limitations necessary to address the phosphorus related impairments. The Agency shall calculate these effluent limits by using the NARP and any applicable data. If no NARP has been developed, the effluent limits shall be determined for the Permittee on a case-by-case basis, so as to ensure that the Permittee's discharge will not cause or contribute to violations of the dissolved oxygen or narrative water quality standards.

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SPECIAL CONDITION 22. The Permittee has undergone a Monitoring Reduction review and the influent and effluent sample frequency has been reduced for parameters due to sustained compliance. The IEPA may require that the influent and effluent sampling frequency for these parameters be increased without Public Notice. This provision does not limit EPA's authority to require additional monitoring, information or studies pursuant to Section 308 of CWA.

Attachment H

Standard Conditions

Definitions

Act means the Illinois Environmental Protection Act, 415 ILCS 5 as Amended.

Agency means the Illinois Environmental Protection Agency.

Board means the Illinois Pollution Control Board.

Clean Water Act (formerly referred to as the Federal Water Pollution Control Act) means Pub. L. 92-500, as amended. 33 U.S.C. 1251 et seq.

NPDES (National Pollutant Discharge Elimination System) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318 and 405 of the Clean Water Act.

USEPA means the United States Environmental Protection Agency.

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Maximum Daily Discharge Limitation (daily maximum) means the highest allowable daily discharge.

Average Monthly Discharge Limitation (30 day average) means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Discharge Limitation (7 day average) means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Aliquot means a sample of specified volume used to make up a total composite sample.

Grab Sample means an individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

24-Hour Composite Sample means a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period.

8-Hour Composite Sample means a combination of at least 3 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over an 8-hour period.

Flow Proportional Composite Sample means a combination of sample aliquots of at least 100 milliliters collected at periodic intervals such that either the time interval between each aliquot or the volume of each aliquot is proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot.

- (1) **Duty to comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.
- (2) **Duty to reapply.** If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. If the permittee submits a proper application as required by the Agency no later than 180 days prior to the expiration date, this permit shall continue in full force and effect until the final Agency decision on the application has been made.
- (3) **Need to halt or reduce activity not a defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- (4) **Duty to mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.
- (5) **Proper operation and maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up, or auxiliary facilities, or similar systems only when necessary to achieve compliance with the conditions of the permit.
- (6) **Permit actions.** This permit may be modified, revoked and reissued, or terminated for cause by the Agency pursuant to 40 CFR 122.62 and 40 CFR 122.63. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- (7) **Property rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.
- (8) **Duty to provide information.** The permittee shall furnish to the Agency within a reasonable time, any information which the Agency may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also furnish to the Agency upon request, copies of records required to be kept by this permit.
- (9) **Inspection and entry.** The permittee shall allow an authorized representative of the Agency or USEPA (including an authorized contractor acting as a representative of the Agency or USEPA), upon the presentation of credentials and other documents as may be required by law, to:
 - (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records

- must be kept under the conditions of this permit;
 - (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
 - (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
 - (d) Sample or monitor at reasonable times, for the purpose of assuring permit compliance, or as otherwise authorized by the Act, any substances or parameters at any location.
- (10) **Monitoring and records.**
- (a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
 - (b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of this permit, measurement, report or application. Records related to the permittee's sewage sludge use and disposal activities shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503). This period may be extended by request of the Agency or USEPA at any time.
 - (c) Records of monitoring information shall include:
 - (1) The date, exact place, and time of sampling or measurements;
 - (2) The individual(s) who performed the sampling or measurements;
 - (3) The date(s) analyses were performed;
 - (4) The individual(s) who performed the analyses;
 - (5) The analytical techniques or methods used; and
 - (6) The results of such analyses.
 - (d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Where no test procedure under 40 CFR Part 136 has been approved, the permittee must submit to the Agency a test method for approval. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.
- (11) **Signatory requirement.** All applications, reports or information submitted to the Agency shall be signed and certified.
- (a) **Application.** All permit applications shall be signed as follows:
 - (1) For a corporation: by a principal executive officer of at least the level of vice president or a person or position having overall responsibility for environmental matters for the corporation;
 - (2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
 - (3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.
 - (b) **Reports.** All reports required by permits, or other information requested by the Agency shall be signed by a person described in paragraph (a) or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - (1) The authorization is made in writing by a person described in paragraph (a); and

- (2) The authorization specifies either an individual or a position responsible for the overall operation of the facility, from which the discharge originates, such as a plant manager, superintendent or person of equivalent responsibility; and
 - (3) The written authorization is submitted to the Agency.
- (c) **Changes of Authorization.** If an authorization under (b) is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of (b) must be submitted to the Agency prior to or together with any reports, information, or applications to be signed by an authorized representative.
- (d) **Certification.** Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

(12) **Reporting requirements.**

- (a) **Planned changes.** The permittee shall give notice to the Agency as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when:
 - (1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source pursuant to 40 CFR 122.29 (b); or
 - (2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements pursuant to 40 CFR 122.42 (a)(1).
 - (3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.
- (b) **Anticipated noncompliance.** The permittee shall give advance notice to the Agency of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- (c) **Transfers.** This permit is not transferable to any person except after notice to the Agency.
- (d) **Compliance schedules.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.
- (e) **Monitoring reports.** Monitoring results shall be reported at the intervals specified elsewhere in this permit.
 - (1) Monitoring results must be reported on a Discharge Monitoring Report (DMR).

- (2) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
 - (3) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Agency in the permit.
 - (f) **Twenty-four hour reporting.** The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24-hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time; and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The following shall be included as information which must be reported within 24-hours:
 - (1) Any unanticipated bypass which exceeds any effluent limitation in the permit.
 - (2) Any upset which exceeds any effluent limitation in the permit.
 - (3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Agency in the permit or any pollutant which may endanger health or the environment.
The Agency may waive the written report on a case-by-case basis if the oral report has been received within 24-hours.
 - (g) **Other noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs (12) (d), (e), or (f), at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (12) (f).
 - (h) **Other information.** Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the Agency, it shall promptly submit such facts or information.
- (13) **Bypass.**
- (a) Definitions.
 - (1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.
 - (2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
 - (b) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (13)(c) and (13)(d).
 - (c) Notice.
 - (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
 - (2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph (12)(f) (24-hour notice).
 - (d) Prohibition of bypass.
 - (1) Bypass is prohibited, and the Agency may take enforcement action against a permittee for bypass, unless:
 - (i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - (iii) The permittee submitted notices as required under paragraph (13)(c).
 - (2) The Agency may approve an anticipated bypass, after considering its adverse effects, if the Agency determines that it will meet the three conditions listed above in paragraph (13)(d)(1).
- (14) **Upset.**
- (a) Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
 - (b) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph (14)(c) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
 - (c) Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - (1) An upset occurred and that the permittee can identify the cause(s) of the upset;
 - (2) The permitted facility was at the time being properly operated; and
 - (3) The permittee submitted notice of the upset as required in paragraph (12)(f)(2) (24-hour notice).
 - (d) The permittee complied with any remedial measures required under paragraph (4).
 - (d) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

- (15) **Transfer of permits.** Permits may be transferred by modification or automatic transfer as described below:
 - (a) Transfers by modification. Except as provided in paragraph (b), a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued pursuant to 40 CFR 122.62 (b) (2), or a minor modification made pursuant to 40 CFR 122.63 (d), to identify the new permittee and incorporate such other requirements as may be necessary under the Clean Water Act.
 - (b) Automatic transfers. As an alternative to transfers under paragraph (a), any NPDES permit may be automatically transferred to a new permittee if:
 - (1) The current permittee notifies the Agency at least 30 days in advance of the proposed transfer date;
 - (2) The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage and liability between the existing and new permittees; and
 - (3) The Agency does not notify the existing permittee and the proposed new permittee of its intent to modify or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement.
- (16) All manufacturing, commercial, mining, and silvicultural dischargers must notify the Agency as soon as they know or have reason to believe:
 - (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant identified under Section 307 of the Clean Water Act which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:
 - (1) One hundred micrograms per liter (100 ug/l);
 - (2) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6 dinitrophenol; and one milligram per liter (1 mg/l) for antimony.
 - (3) Five (5) times the maximum concentration value reported for that pollutant in the NPDES permit application; or
 - (4) The level established by the Agency in this permit.
 - (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the NPDES permit application.
- (17) All Publicly Owned Treatment Works (POTWs) must provide adequate notice to the Agency of the following:
 - (a) Any new introduction of pollutants into that POTW from an indirect discharge which would be subject to Sections 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and
 - (b) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
 - (c) For purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.
- (18) If the permit is issued to a publicly owned or publicly regulated treatment works, the permittee shall require any industrial user of such treatment works to comply with federal requirements concerning:
 - (a) User charges pursuant to Section 204 (b) of the Clean Water Act, and applicable regulations appearing in 40 CFR 35;
 - (b) Toxic pollutant effluent standards and pretreatment standards pursuant to Section 307 of the Clean Water Act; and
 - (c) Inspection, monitoring and entry pursuant to Section 308 of the Clean Water Act.
- (19) If an applicable standard or limitation is promulgated under Section 301(b)(2)(C) and (D), 304(b)(2), or 307(a)(2) and that effluent standard or limitation is more stringent than any effluent limitation in the permit, or controls a pollutant not limited in the permit, the permit shall be promptly modified or revoked, and reissued to conform to that effluent standard or limitation.
- (20) Any authorization to construct issued to the permittee pursuant to 35 Ill. Adm. Code 309.154 is hereby incorporated by reference as a condition of this permit.
- (21) The permittee shall not make any false statement, representation or certification in any application, record, report, plan or other document submitted to the Agency or the USEPA, or required to be maintained under this permit.
- (22) The Clean Water Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed \$25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318 or 405 of the Clean Water Act is subject to a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than one year, or both.

Additional penalties for violating these sections of the Clean Water Act are identified in 40 CFR 122.41 (a)(2) and (3).
- (23) The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both.
- (24) The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.
- (25) Collected screening, slurries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into waters of the State. The proper authorization for such disposal shall be obtained from the Agency and is incorporated as part hereof by reference.
- (26) In case of conflict between these standard conditions and any other condition(s) included in this permit, the other condition(s) shall govern.
- (27) The permittee shall comply with, in addition to the requirements of the permit, all applicable provisions of 35 Ill. Adm. Code, Subtitle C, Subtitle D, Subtitle E, and all applicable orders of the Board or any court with jurisdiction.
- (28) The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit is held invalid, the remaining provisions of this permit shall continue in full force and effect.