

Permit Rationale

Date: October 9, 2026

Permit Writer: Nick Kirkendall

Facility Name: La Porte City, City of STP

Location: County: Black Hawk
Coordinates: 42°N 19' 2.46", -92°W 11'19.72"

Region/FO: EPA Region VII / Field Office 1, Manchester

Design: Discharge from an activated sludge plant to Wolf Creek (A1, B(WW-1), HH)
Date constructed: 2025
Flow: AWW: 0.950 MGD; ADW: 0.131; MWW: 1.512
BOD₅: 265 lbs/day; TSS: 335 lbs/day; TKN: 70 lbs/day
P.E. 1,587
Source: Construction Permit # 2023-0203S issued January 10, 2023

Treatment Plant Description: The wastewater treatment plant consists of an Aero-Mod activated sludge plant with UV disinfection. The facility receives domestic wastewater from the City of La Porte City. Discharge from the treatment facility is to Wolf Creek (A1, B(WW-1), HH) via outfall 001.

Wasteload Allocation (WLA): WLA(s) dated December 1, 2021.

Antidegradation: According to the Iowa Antidegradation Implementation Procedure, effective February 17, 2010 (IAC 567-61.2(2).e), all new or expanded regulated activities (with limited exceptions, such as unsewered communities) are subject to antidegradation review requirements.

An Antidegradation Analysis was completed by La Porte City for the upgrade of the wastewater treatment facility to an activated sludge plant. The analysis was approved by the Department in a letter from Suresh Kumar, dated May 11, 2022.

Impaired Waterbody: The following waterbodies in the discharge route are on the 2024 impaired waters list:

- Wolf Creek for bacteria (indicator bacteria – E. coli)
- Cedar River for nutrients (nitrogen), bacteria (indicator bacteria – E. coli), and biological (loss of native mussel species)
- Iowa River for bacteria (indicator bacteria – E. coli)

There are three approved TMDLs in the discharge route: two on the Cedar River (nitrate and indicator bacteria) and one on the Iowa River (indicator bacteria). This facility was given total nitrogen and E. coli allocations in the two TMDLs for the Cedar River. This facility has not been given any other TMDL allocations at this time.

Additional and/or more stringent effluent limits may be applicable to this discharge based on approved TMDLs for impaired waterbodies, which may provide watershed based wasteload allocations.

Information on impaired streams in Iowa and approved TMDLs can be found at the following website:

<http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Impaired-Waters>.

Limits

Effective from permit issuance to permit expiration

Parameter	Season	7-day ave mg/L	30-day ave mg/L	daily max mg/L	min	max	7-day ave lbs/day	30-day ave lbs/day	daily max lbs/day
CBOD ₅	yearly	40	25	---	---	---	317	198	---
TSS	yearly	45	30	---	---	---	357	238	---
pH	yearly	---	---	---	6.3 s.u.	9.0 s.u.	---	---	---
Chloride	yearly	---	922	922	---	---	---	5,230	5,303
Dissolved Oxygen	yearly	---	---	---	2.0 mg/L	---	---	---	---
Total Nitrogen	yearly	---	---	---	---	---	---	116.7	191.0
<i>E. coli</i> (geomean)	summer	---	126 (#/100 ml)	---	---	---	---	---	---
NH ₃ -N	monthly	As specified in WLA dated December 1, 2021							

Basis for limits:

Technology-based limits: CBOD₅, TSS, and pH maximum limits are consistent with Standard Secondary Treatment requirements with CBOD₅ and TSS mass limits based on design flows.

Water Quality-based limits: Minimum pH, dissolved oxygen, chloride, ammonia nitrogen, and *Escherichia coli* (*E. coli*) limits are based on the attached WLA dated December 1, 2021. Total nitrogen limits are based on the Cedar River TMDL for nitrate nitrogen. Pollutant-specific analyses are described below.

E.coli: The Department reviewed DMR data for E. coli available for the wastewater treatment facility. After a review of the E. coli data submitted by the facility, it appears that the facility can consistently comply with the E. coli effluent limits from the December 1, 2021 WLA. E. coli monitoring and limits are included in the permit.

Ammonia-Nitrogen: After reviewing the available DMR data for ammonia nitrogen, it is believed that the facility can comply with the proposed limits from the December 1, 2021 WLA. This permit contains ammonia monitoring and limits that are effective at permit issuance.

Dissolved Oxygen: Modeling conducted in the December 1, 2021 WLA determined that the effluent from the plant must maintain a minimum DO of 2.0 mg/L to ensure a minimum DO of 5.0 mg/L in stream for an allowed maximum effluent CBOD5 of 40 mg/L. It is believed that the facility will be able to comply with the proposed limit. Monitoring and limits are included in the permit to ensure DO limits are met.

Sulfate and Chloride: As part of its NPDES permit renewal application, the facility submitted a sample result for chloride and sulfate. The chloride result of 493 mg/L was greater than 50% of the 30-day average limit (922 mg/L) calculated in the December 1, 2021 WLA. The current permit includes monitoring for chloride. After a review of the chloride data submitted by the facility, it was determined that there is reasonable potential to violate the chloride limits from the December 1, 2021 WLA. However, it is believed that the facility can comply with the 922 mg/L limit in the December 1, 2021 WLA, therefore, a compliance schedule is not necessary. This permit contains chloride monitoring and limits that are effective at permit issuance.

The sulfate result of 129 mg/L is well below 50% of the 30-day average limit of 2,230 mg/L calculated in the December 1, 2021 WLA. After a review of the sulfate data submitted by the facility, there is no reasonable potential for the discharge to violate the sulfate limits calculated in the WLA, and no sulfate limits or monitoring have been proposed.

Total Residual Chlorine (TRC): The permit does not include limits for total residual chlorine (TRC) since the wastewater treatment facility does not currently use chlorine or employ chlorine disinfection. If the facility chooses to install a chlorination/dechlorination disinfection system in the future, the permit will be reopened and TRC monitoring and limits will be added.

Oil & Grease: The maximum oil and grease result included in the permit renewal application was <5.0 mg/L. Iowa's water quality standards (WQS) only include a narrative standard for oil and grease at 567 IAC 61.3(2). In most cases if oil and grease is below 10 mg/L, there should not be a visible sheen.

TKN, Nitrate + Nitrite Nitrogen and Total Phosphorous: The total phosphorus sample result was 5.28 mg/L. There are no Water Quality Standards (WQS) for phosphorus. The nitrate + nitrite nitrogen sample result was 28.3 mg/L. The standard for nitrate applies only to Class "C" waters that are used for drinking water which Wolf Creek is not. The TKN sample result was 3.18 mg/L. There are no WQS for TKN. Based on information currently available the Department cannot make a reasonable potential determination for the narrative WQS in IAC 567-61.2(3) specific to nitrogen and/or phosphorus. However, NPDES permits are protective of Iowa's narrative standards that apply at all times to all surface waters regardless of whether or not the standards are specifically included in the permit. The Department is addressing nitrogen and phosphorus discharges from point sources through the Iowa Nutrient Reduction Strategy.

TMDL: A nitrate nitrogen TMDL for the Cedar River was completed by the DNR in 2007. The average and daily maximum load limits of 116.7 lbs/day and 191.0 lbs/day, respectively for the facility are based on the TMDL, and adapted using the DNR memo: "Deriving total nitrogen limits from the Cedar River TMDL". Limits and monitoring requirements are included in the proposed permit.

Backsliding: The permit has been reviewed for anti-backsliding according to sections 303(d)(4) and 402(o) of the Clean Water Act and 40 CFR 122.44. The City of La Porte City has replaced the old SBR wastewater facility with a new activated sludge plant facility; therefore, anti-backsliding requirements do not pertain due to the anti-backsliding exception of "Material and substantial alterations or additions to the permitted facility" located in the above referenced documents. The limits established in this permit will be reviewed for backsliding in future permits.

Effluent toxicity: Annual testing is not required because this is a minor facility.

Monitoring Basis: Compliance and operational monitoring are based on 567 IAC 63, Table II, Frequency by P.E. Category 1,001-3,000, and best professional judgement.

Special Monitoring: *E.coli*, CBOD5, and total nitrogen sampling requirements are specified on the Special Monitoring Requirements page of the permit.

Sludge: Sludge must be land applied according to Chapter 67 IAC land application rules or otherwise disposed of in accordance with the Federal regulations in 40 CFR 503. No adverse environmental or public health impacts have been identified.

Compliance Schedule: none.

City of La Porte City
(Proposed change in facility flows and loads)

(Please do not microfiche this document.)

This Package Contains

WASTELOAD ALLOCATION CALCULATIONS & NOTES

Please Do Not Separate

**ENVIRONMENTAL SERVICES DIVISION
WATER QUALITY-BASED PERMIT LIMITS**

SECTION VI: WATER QUALITY-BASED PERMIT LIMITS

Facility Name: La Porte City, City of STP

Sewage File Number: 6-07-43-0-01

Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 001	ADW = 0.131 MGD & AWW = 0.950 MGD			
CBOD5	Secondary Treatment Levels Will Not Violate WQS			
Total D.O.	Minimum Concentration (mg/l)			
January - December	2.0			
Ammonia - Nitrogen				
January	19.1	19.1	76.4	129.1
February	18.5	18.5	87.9	122.1
March	15.3	18.5	45.5	124.9
April	11.5	18.8	33.9	131.6
May	13.2	18.6	38.7	128.1
June	9.9	17.8	29.2	122.0
July	7.6	21.4	22.4	148.1
August	7.2	19.8	21.2	136.7
September	8.0	19.7	23.5	138.2
October	11.8	18.8	34.8	131.7
November	17.7	17.7	52.0	123.2
December	18.8	19.1	55.3	133.8
Bacteria*	Geometric Mean (#org./100 ml)		March 15 th – November 15 th	
E. coli	126			
Chloride	922	922	5,230	5,303
Sulfate	2,230	2,230	12,775	12,775
TRC**	0.028	0.028	0.129	0.161
Total Nitrogen*	--	--	116.7	191.0
pH	6.3-14.0 Standard Units			

Stream Network/Classification of Receiving Stream: Wolf Creek (A1, B(WW-1), HH)

Annual critical low flows in Wolf Creek at the outfall:
1Q10 flow 4.00 cfs, 7Q10 flow 4.50 cfs, 30Q10 flow 5.42 cfs

Excel spreadsheet calculations ☒ [X]

Qual II E model ☐ []

Qual II E modeling date ☐ []

Performed by: Alex Martin

*TMDL based limits

**Only required if chlorine is used for disinfection.

Antidegradation Review Requirement

A tier II antidegradation review is required. See Section 2 for details.

Please note that the antidegradation review conducted in this wasteload allocation is based on the current information available. Antidegradation could also be triggered during the NPDES permitting process based on new information.

WLAs/Permit Limits for the City of La Porte City's Mechanical Plant

These wasteload allocations and water quality-based permit limitations are for the City of La Porte City's wastewater discharge. The wasteload allocations/permit limits are based on the Water Quality Standards (IAC 567.61) and the "Iowa Wasteload Allocation (WLA) Procedure," effective November 11, 2020. The chloride allocation/permit limits are based on the criteria that became effective on November 11, 2009.

The water quality-based limits in this WLA are calculated to meet the surface water quality criteria to protect downstream uses. There could be technology-based limits applicable to this facility that are more stringent than the water quality-based limits shown in this WLA. The technology-based limits could be derived from either federal guidelines based on different industrial categories or permit writer's judgment.

1. BACKGROUND:

The City of La Porte City discharges treated domestic wastewater from a mechanical wastewater treatment facility (sequencing batch reactor) into Wolf Creek (at 42° 19' 09" N, 92° 11' 22" W). This WLA is for a proposed change in facility flows and loads.

Route of flow and use designations:

Wolf Creek is an A1, B(WW-1), HH designated use waterbody. The designations have been adopted in Iowa's state rule described in the rule-referenced document of "Surface Water Classification," effective July 24, 2019. Based on the pollutants of concern, the use designations of waterbodies further downstream will not impact the resulting limits for this facility.

Critical low flow determination:

The annual critical low flows in Wolf Creek at the outfall are estimated based on the Regional Regression Equations (RRE) from "Methods for estimating selected low-flow frequency statistics and harmonic mean flows for streams in Iowa" (2012, revised 2017).

Table 1: Annual critical low flows

Location	D.A. (mi ²)	1Q10 (cfs)	7Q10 (cfs)	30Q10 (cfs)
Wolf Creek at the outfall	326	4.00	4.50	5.42

2. ANTIDegradation REVIEW:

According to the “Iowa Antidegradation Implementation Procedure,” effective February 17, 2010 (IAC 567-61.2(2).e), all new or expanded regulated activities (with limited exceptions, such as unsewered communities) are subject to antidegradation review requirements.

Table 2: Antidegradation review analysis

Item #	Factor or scenario	Antidegradation determination	Analysis/comments
1	Design capacity increase	Yes ☒ , No ☐ , or Not Applicable ☐	1: Proposed design capacity shown on the request form.
2	Significant Industrial Users (SIU) contributing new pollutant of concern (POC)	Yes ☐ , No ☐ , or Not Applicable ☒	
3	New process contributing new pollutant of concern (POC)	Yes ☐ , No ☐ , or Not Applicable ☒	1: Note that if chlorine is utilized for disinfection in the future an antidegradation review will be required.
4	Less stringent water quality-based limits?	Yes ☒ , No ☐ , or Not Applicable ☐	1: Less stringent WQ-based pH limits will not trigger an antidegradation review. 2: Less stringent ammonia nitrogen limits will trigger an antidegradation review.
5	Outfall location change	Yes ☐ , No ☒ , or Not Applicable ☐	
Conclusion and discussion:			
Due to Items 1 and 4, a tier II antidegradation review is required.			
Please note that the antidegradation review conducted in this WLA is based on the current information available. Antidegradation could also be triggered during the NPDES permitting process based on new information.			

3. TOTAL MAXIMUM DAILY LOAD (TMDL) LIMITATIONS:

The following waterbodies in the discharge route are on the 2020 impaired waters list:

- Wolf Creek for bacteria (indicator bacteria – *E. coli*)
- Cedar River for nutrients (nitrogen), bacteria (indicator bacteria – *E. coli*), and biological (loss of native mussel species)
- Iowa River for bacteria (indicator bacteria – *E. coli*)
- Mississippi River for metals (aluminum)

There are three approved TMDLs in the discharge route: two on the Cedar River (nitrate and indicator bacteria) and one on the Iowa River (indicator bacteria). This facility was given total nitrogen and *E. coli* allocations in the two TMDLs for the Cedar River. See Section 4 for details. This facility has not been given any other TMDL allocations at this time.

Please note that the results presented in this report are wasteload allocations based on meeting the State’s current water quality standards in the receiving waterbody. Additional and/or more stringent effluent limits may be applicable to this discharge based on approved TMDLs for impaired waterbodies, which may provide watershed based wasteload allocations. Information on impaired streams in Iowa and approved TMDLs can be found at the following website: <http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Impaired-Waters>.

4. CALCULATIONS:

The WLAs/permit limits for this outfall are calculated based on the facility’s Average Dry Weather (ADW) design flow of 0.131 MGD and its Average Wet Weather (AWW) design flow of 0.950 MGD.

Please note that only wasteload allocations/permit limits (water quality-based effluent limits) calculated using DNR approved design flows can be applied in NPDES permits. Water quality-based effluent limits

calculated using proposed flows that have not been approved by the DNR for permitting and compliance may be used for informational purposes only.

The water quality-based permit concentration limits are derived using the allowed stream flow and the ADW design flow, while the loading limits are derived using the allowed stream flow and the AWW design flow.

Toxics and TRC:

The toxics and TRC wasteload allocations will consider the procedures included in the 2000 revised WQS and the 2007 chemical criteria. Important to toxics and TRC is the use of the 1Q10 stream flow in association with the acute wasteload allocation calculation. The chronic WLA will continue to use the 7Q10 stream flow in its calculations. In this case, 25% of the 7Q10 flow and 2.5% of the 1Q10 flow in Wolf Creek at the outfall are used as the Mixing Zone (MZ) and the Zone of Initial Dilution (ZID), respectively.

Please note that the TRC limits are based on a sampling frequency of 2/week, based on a design population equivalent (PE) of 1,587.

Ammonia Nitrogen:

Standard stream background pH, temperatures, and concentrations of NH₃-N are mixed with the discharge from the facility's effluent pH and temperature values to calculate the applicable instream criteria for the protection of Wolf Creek.

Based on the ratio of the stream flow to the discharge flow, 2.5% of the 1Q10 flow and 25% of the 30Q10 flow in Wolf Creek at the outfall are used as the ZID and the MZ, respectively, for ADW flow. Based on the ratio of the stream flow to the discharge flow, 5.0% of the 1Q10 flow and 50% of the 30Q10 flow in Wolf Creek at the outfall are used as the ZID and the MZ, respectively, for AWW flow. Wolf Creek is a B(WW-1) stream; therefore, early life protection will begin in March and run through September.

The monthly background pH, temperatures, and NH₃-N concentrations shown in Table 3 are used for the wasteload allocation/permit limits calculations based on the Year 2000 ammonia nitrogen criteria. Table 4 shows the statewide monthly effluent pH and temperature values for mechanical facilities. Table 5 shows the calculated ammonia nitrogen wasteload allocations for this facility.

Table 3: Background pH, temperatures, and NH₃-N concentrations
for use with Year 2000 ammonia nitrogen criteria

Months	pH	Temperature (°C)	NH ₃ -N (mg/l)
January	8.1	0.3	0.02
February	8.0	0.1	0.08
March	8.1	1.5	0.12
April	8.3	9.3	0.03
May	8.2	15.0	0.03
June	8.2	19.4	0.02
July	8.2	23.5	0.02
August	8.2	24.3	0.02
September	8.3	20.2	0.02
October	8.3	14.2	0.02
November	8.3	8.0	0.02
December	8.3	0.8	0.03

Table 4: Standard effluent pH and temperature values for mechanical facilities

Months	pH	Temperature (°C)
January	7.67	12.4
February	7.71	11.3
March	7.69	13.1
April	7.65	16.2
May	7.67	19.3
June	7.70	22.1
July	7.58	24.1
August	7.63	24.4
September	7.62	22.8
October	7.65	20.2
November	7.69	17.1
December	7.64	14.1

Table 5: Wasteload allocations for ammonia nitrogen for the protection of aquatic life

Months	ADW-based*		AWW-based**	
	Acute (mg/l)	Chronic (mg/l)	Acute (mg/l)	Chronic (mg/l)
January	19.1	26.0	16.3	9.6
February	18.5	29.8	15.4	11.1
March	18.5	15.3	15.8	5.7
April	18.8	11.5	16.6	4.3
May	18.6	13.2	16.2	4.9
June	17.8	9.9	15.4	3.7
July	21.4	7.6	18.7	2.8
August	19.8	7.2	17.3	2.7
September	19.7	8.0	17.4	3.0
October	18.8	11.8	16.6	4.4
November	17.7	17.7	15.6	6.6
December	19.1	18.8	16.9	7.0

*: bases for concentration limits;

**: bases for mass loading limits

CBOD5/Total Dissolved Oxygen:

Streeter-Phelps DO Sag Model is used to simulate the decay of CBOD and dispersion of total Dissolved Oxygen (DO) in the receiving water downstream from the outfall. The criterion is that the discharge cannot cause the DO level in the receiving stream (warm water) to be below 5.0 mg/l.

The parameter values used in the modeling are listed below:

Background:

The temperature and ammonia nitrogen levels are shown in Table 3. The ultimate CBOD and DO levels are assumed to be 6.0 mg/l and 6.0 mg/l, respectively.

Effluent:

The temperatures are shown in Table 4. The CBOD5 level used in the modeling is 40 mg/l, which is the technology-based maximum limit for standard secondary treatment. The ammonia nitrogen values used in the modeling are the calculated acute wasteload allocations shown in Table 5. Both ADW and AWW flows and the ammonia nitrogen limits associated with them are used in the modeling.

Receiving stream parameters:

There is an average water channel slope of 0.00053 (the water channel elevation changes from 806 ft to 798 ft over a distance of approximately 15,070 ft, estimated based on the GIS LiDAR 2-ft contour coverage).

Field Use Attainability Assessment (UAA) had two sites along Wolf Creek near the outfall. Two observations of stream width, average depth, and velocity were made at each site. Based on these UAA data, stream width, depth, and velocity at 7Q10 + ADW and 7Q10 + AWW conditions are estimated and are shown in Table 6.

Table 6: Stream width, depth, and velocity

Flow Condition	Flow (cfs)	Width (ft)	Depth (ft)	Velocity (fps)
7Q10 + ADW	4.70	56.2	0.35	0.24
7Q10 + AWW	5.97	57.9	0.39	0.27

Reaeration:

The USGS pool-riffle model (Melching and Flores, 1999) was used as Wolf Creek has meanders and low flows.

Discussion and conclusion:

The modeling results show that the effluent, which could have an allowed maximum effluent CBOD5 level of 40 mg/l (technology-based limits for secondary treatment), ammonia nitrogen levels as shown in Table 5, and a minimum DO level of 2.0 mg/l, will not cause the DO level in the receiving stream to be below 5.0 mg/l at any time.

E. coli:

This facility discharges into a Class A1 waterbody. The water quality standard for *E. coli* in a Class A1 waterbody is a geometric mean of 126 org./100 ml and a sample maximum of 235 org./100 ml from March 15th through November 15th. The criteria apply at “end-of-pipe.”

This facility was assigned a limit of a geometric mean of 126 org./100 ml and a sample maximum of 235 org./100 ml from March 15th through November 15th in the 2010 Cedar River TMDL for bacteria.

However, 567 IAC 62.8(2) states that “the daily sample maximum criteria for *E. coli* set forth in 567 – Chapter 61 shall not be used as an end-of-pipe permit limitation.” Therefore, only the geometric mean limit of 126 org./100 ml applies.

Chloride and Sulfate:

The chloride and sulfate criteria became effective on November 11, 2009 and apply to all Class B waters. The default hardness for background and effluent is 200 mg/l.

Chloride criteria are functions of hardness and sulfate concentration, shown as follows:

$$\begin{aligned}\text{Acute criteria} &= 287.8 * (\text{Hardness})^{0.205797} * (\text{Sulfate})^{-0.07452} \\ \text{Chronic criteria} &= 177.87 * (\text{Hardness})^{0.205797} * (\text{Sulfate})^{-0.07452}\end{aligned}$$

Sulfate criteria, shown in Table 7, are functions of hardness and chloride concentration and serve as both the acute and chronic criteria.

Table 7: Sulfate criteria

Hardness (mg/l as CaCO ₃)	Sulfate criteria (mg/l)		
	Chloride < 5 mg/l	5 mg/l ≤ Chloride < 25 mg/l	25 mg/l ≤ Chloride < 500 mg/l
< 100	500	500	500
100 ≤ H ≤ 500	500	$(-57.478 + 5.79 * H + 54.163 * Cl) * 0.65$	$(1276.7 + 5.508 * H - 1.457 * Cl) * 0.65$
H > 500	500	2,000	2,000

The acute criteria apply at the end of the ZID, and the chronic criteria apply at the end of the MZ. In this case, 25% of the 7Q10 flow and 2.5% of the 1Q10 flow in Wolf Creek at the outfall are used as the MZ and the ZID, respectively.

The default chloride concentration for both background water and effluent is 34 mg/l, while the default sulfate concentration for both background water and effluent is 63 mg/l. The limits are calculated based on an assumed sampling frequency of 1/week.

pH:

Iowa Water Quality Standards (IAC 567.61.3.(3).a.(2) and IAC 567.61.3.(3).b.(2)) require that pH in Class A or Class B waters “shall not be less than 6.5 nor greater than 9.0.” The criteria apply at the end of the MZ, which is 25% of the 7Q10 flow in Wolf Creek at the outfall.

TDS:

Effective November 11, 2009, the site-specific TDS approach is no longer applicable; instead, the new chloride and sulfate criteria became applicable. However, the TDS level should be controlled to a level such that the narrative criteria stated in IAC 567.61.3 are fulfilled.

Total Nitrogen:

The Jan. 24, 2007 TMDL for the nitrate impaired Cedar River in Linn County has given this facility a total nitrogen allocation of 61.4 lbs/day. The value is adjusted to 30-day average and daily maximum total nitrogen limits of 116.7 and 191.0 lbs/day based on the November 20, 2008 memo “Deriving total nitrogen limits from the WLA in the Cedar River TMDL”.

5. PERMIT LIMITATIONS:

- Based on the Year 2006 Water Quality Standards and 2002 Permit Derivation Procedure.

The acute and chronic WLAs are used as the values for input into the current permit derivation procedure. Under the 2002 permit derivation procedure, only for toxic parameters is the monitoring frequency considered in the calculation of final limits. The water quality-based limits are shown on Page 1 of this report.

**STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES
HENRY A. WALLACE BUILDING
DES MOINES, IOWA 50319**

CONSTRUCTION PERMIT

Honorable Mayor
City of La Porte City
202 Main Street
La Porte City, Iowa 50651

PERMIT NO.: 2023-0203S
FILE: City of La Porte City Sewage
RE: WWTP Improvements Project
Project No.: 2022-0008A

In accordance with the provisions of Section 455B.173.3 and 455B.174.4, Code of Iowa, and Rule 567-64.2 (455B) or Rule 567-65.6 (455B), or Rule 567-43.3 (455B) of the Iowa Administrative Code, the Director of the Department of Natural Resources does hereby issue a permit for the construction of:

This permit covers the construction of the following major components:

The construction includes a new activated sludge treatment system, the installation of a vertical fine screen, replacement of the grit removal equipment, blowers, and electrical switch gear and controls, construction of a new UV building with a non-contact UV system, and construction of reed beds for sludge storage. The treated effluent will be discharged to the Wolf Creek.

Pretreatment System Improvements:

Replacement of the existing grit pump with new 7.5 hp pump that is capable of delivering 250 gpm at 28 ft TDH, installation of 4-inch diameter grit suction pipe and one 4-inch diameter discharge, installation of one hydro cyclone de-gritting device capable of 250 gpm capacity at 7 psi pressure drop, one fully automated screenings and dewatering press, installation of a mechanical vertical fine screen with integrated washing system and ¼ inch opening size and 2.74 mgd maximum capacity.

New Lift Station:

Construction of a new influent lift station with 3 variable frequency drive 10 HP pumps each capable of delivering 555 gpm at 32 feet of TDH.

New Activated sludge Treatment System-Aero-Mod:

Consists of two anoxic selector tanks, four clarifiers, two first stage aeration basins, two second stage aeration basins, four third stage aeration basins, and one aerobic digester.

Anoxic Selector Tanks:

Two new Anoxic tanks each with 24 feet length and 4 feet width and 19 feet depth including 2 feet of free board. The anoxic tanks have approximately 24,415 gallons of storage volume and 15 minutes of retention time.

Aeration Basins:

Construction of two trains of first, second and third stage aeration tanks. Two first stage aeration tanks each with 24 feet of length and 16.5 feet of width and 19 feet of side water depth and 100,710 gallons combined capacity and 2.54 hours of detention time. Two second stage aeration tanks each with 24 feet of length and 8 feet of width and 19 feet of side water depth, each with 48,829 gallons combined capacity and 1.23 hours of detention time. Four third stage/selector tanks each with 20.42 feet of length and 4.33 feet of width and 19 feet of side water depth, a combined capacity of 44,973 gallons and 1.14 hours of detention time. Installation of two identical 10 HO submersible pumps capable of delivering 350 GPM at 9 feet of TDH to return sludge.

Aeration basins are equipped with wall mounted aerators. first stage aeration basin will have eight aerators with Six 0.75 m tubular diffusers per drop pipe, second stage aeration basin will have 10 aerators with two 24-inche diffusers per drop pipe and the third stage aeration basin/selector tanks will have eight aerators with two 12-inche diffusers per drop pipe.

Clarifiers :

Construction of four new identical clarifiers each with 24 feet of depth, 20.67 feet of width and 19 feet of side water depth and each with 490 square feet of surface area and with a total surface area of 1960 square feet. The clarifiers have a 252,285 gallons effective volume. Each clarifier is equipped with Floating-skimmers and the skimmers have floating head with telescoping pipe.

Aerobic sludge digester:

Construction of a new aerobic sludge digester with 24 feet length, 18 feet width and 19 feet sider depth and approximately 56,549-gallon total volume. Construction of one new 5 HP sludge pump capable of delivering 200 gallons per minutes at 31 feet of TDH. Installation of one sludge pump capable of delivering 200 GPM at 31 feet of TDH.

Sludge Processing and storage:

Construction of three identical Reed Beds each with 2,025 square feet of effective area and 20-inch depth of gravel and six-inch depth of sand for further sludge processing and storage.

Blowers:

Replacement of existing three aeration system blowers with three identical positive displacement 40 HP VFD blowers each capable of delivering 586 SCFM air under maximum conditions and one 40 HP VFD standby blower capable of delivering 586 SCFM air under maximum condition to the existing aeration basins.

Mixed Liquor, RAS and WAS Pumps:

Replacement of two identical 3 HP simplex- ACL WAS pumps capable of delivering 300 gpm at 8 feet of TDH. Replacement of one identical 5 HP simplex-ACL sludge pumps capable of delivering 200 gpm at static pump head.

Sweet's Lift Station:

Construction of a new lift station with two identical submersible centrifugal variable frequency drive 7.5 HP pumps each capable of delivering 150 gpm at 46 feet of TDH.

UV Disinfection System Improvements:

Construction of new UV building to accommodate the new UV disinfection system. The installation of a low pressure, high density, closed channel gravity flow UV disinfection system capable of treating the design peak wet weather flow of 1.600 mgd at 65 % UV transmittance and minimum dosage of 30,000 μ W-Sec/cm². The system will have two banks with parallel lamp arrangements. The system will have eight lamps four ballasts set aside as spare parts, and associated electrical and all other appurtenances as specified in the approved plans and specifications.

Project Background:

The City of La Porte City is located approximately 12 miles southeast of Waterloo, Iowa in Blackhawk County. The City owns and operates a sequencing batch reactor (SBR) wastewater treatment system that was constructed in 1987 that serves residential and commercial customers within the City. This system consisted of an influent pump station, a building to house the screening and grit removal equipment, blowers, and electrical and controls, two (2) SBR tanks, and aerobic digester, and sludge drying beds. The sludge drying beds are out of commission so currently the facility does not have an adequate sludge storage system. The existing facility has wet weather excessive infiltration and inflow issues and the current NPDES permit has a compliance schedule for E.Coli limits that requires effluent disinfection.

ELIGIBILITY:

The facility has opted to utilize State Revolving Loan Funds (SRF) for financing the proposed project. Therefore, the required environmental review (ER) to assess the environmental impacts of the project in accordance with procedures in 40 CFR Part 6 was conducted and a finding of no significant impact (FNSI) issued on December 2, 2022, after the thirty-day publication of the determination. The project is approved conditionally based strictly on the technical review of the proposed project. Any significant project change resulting from the environmental review may require an amendment to this facility plan or revised facility plan to retain eligibility for SRF funding.

The construction of the project shall be initiated within one year of issuance of this permit or this permit is no longer valid. Within thirty days after completion of construction, the permit holder shall submit a certification by a licensed professional engineer that the project was completed in accordance with the approved project documents. The issuance of this permit in no way relieves the permittee of the responsibility for complying with any other local, state, and federal laws, ordinances, regulations or other requirements applicable to this facility.

The facility is designed to treat the following Flows and Loads and is expected to meet the following effluent limits at all the time based on the below specified receiving stream classifications:

Design Flows and Loads:

Design Hydraulic Loading, Million Gallons per Day (MGD)

Average Dry Weather (ADW)	0.131
Average Wet Weather (AWW)	0.950
Maximum Wet Weather (MWW)	1.512
Peak Hourly Wet Weather (PHWW)	1.600

Design Organic Loading, Pounds per Day:

	30 Day Max. Average lbs/day	Daily Max. lbs/day
BOD5	265	600
TSS	335	950
TKN	70	87

Waste Load Allocation determination dated December 01, 2021

ENVIRONMENTAL SERVICES DIVISION WATER QUALITY-BASED PERMIT LIMITS				
SECTION VI: WATER QUALITY-BASED PERMIT LIMITS				
Facility Name: La Porte City, City of STP			Sewage File Number: 6-07-43-0-01	
Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 001	ADW = 0.131 MGD & AWW = 0.950 MGD			
CBOD5	Secondary Treatment Levels Will Not Violate WQS			
Total D.O.	Minimum Concentration (mg/l)			
January - December	2.0			
Ammonia - Nitrogen				
January	19.1	19.1	76.4	129.1
February	18.5	18.5	87.9	122.1
March	15.3	18.5	45.5	124.9
April	11.5	18.8	33.9	131.6
May	13.2	18.6	38.7	128.1
June	9.9	17.8	29.2	122.0
July	7.6	21.4	22.4	148.1
August	7.2	19.8	21.2	136.7
September	8.0	19.7	23.5	138.2
October	11.8	18.8	34.8	131.7
November	17.7	17.7	52.0	123.2
December	18.8	19.1	55.3	133.8
Bacteria*	Geometric Mean (#org./100 ml)		March 15 th – November 15 th	
E. coli	126			
Chloride	922	922	5,230	5,303
Sulfate	2,230	2,230	12,775	12,775
TRC**	0.028	0.028	0.129	0.161
Total Nitrogen*	--	--	116.7	191.0
pH	6.3-14.0 Standard Units			
Stream Network/Classification of Receiving Stream: Wolf Creek (A1, B(WW-1), HH)				

The outfall location will remain the same and the effluent will continue to be discharged in the Wolf Creek.in accordance with the current and valid NPDES permit.

A complete operation and maintenance (O&M) manual for the wastewater collection and conveyance system described in this construction permit shall be prepared prior to the operation of the system. Within one year after initiation of operations, one copy of the final O&M manual approved by the design engineer for the permit holder's use shall be forwarded by the permit holder to the IDNR Field Office in Manchester, Iowa.

Pursuant to Section 455B.174.4, Code of Iowa, you have the right to appeal any condition of this permit by filing with the Director of the Department of Natural Resources a notice of appeal and request for administrative hearing within thirty days of receipt of this permit.

Contact Suresh Kumar at 515/725-8429 with any questions or comments.

For the Department of Natural Resources
Kayla Lyon

By **Suresh Kumar** Digitally signed by Suresh Kumar
Date: 2023.01.11 09:29:55 -06'00'

ENVIRONMENTAL SERVICES DIVISION
January 10, 2023

C: La Porte City Wastewater File 0743001
Clint Wienen, MSA, Dubuque, Iowa
Iowa DNR Field Office 2
CWSRF file # CS1920620 01



May 11, 2022

Honorable Mayor
City of La Porte City
202 Main Street
La Porte City, Iowa 50651

RE: City of La Porte City Wastewater Project, W2022-0008A.
SUBJECT: Anti-degradation Alternatives Analysis Approval.
CWSRF #

Honorable Mayor:

The Iowa Department of Natural Resources (DNR) has reviewed the Anti-degradation Alternatives Analysis for the City of La Porte City wastewater treatment facility improvements that was received in our office on April 05, 2022. We are in agreement with the selected alternative and it is reasonable alternative identified and that the analysis is in accordance with the Iowa Antidegradation Implementation Procedure (567 IAC 61.2(2)) and the 2010 EPA-approved Iowa Antidegradation Implementation Procedure.

The following is a brief summary of the approved anti-degradation alternatives analysis:

Design Hydraulic Loading, Million Gallons per Day (MGD)

Average Dry Weather (ADW)	0.131
Average Wet Weather (AWW)	0.950
Maximum Wet Weather (MWW)	1.512
Peak Hourly Wet Weather (PHWW)	1.600

Design Organic Loading, Pounds per Day:

	30 Day Max. Average lbs/day	Daily Max. lbs/day
BOD5	265	713
TSS	335	1172
TKN	70	105

Six alternatives, three Non-Degrading Alternative (NDA), two Less Degrading Alternative (LDA), and one Base Pollution Control Alternative (BPCA) were evaluated in the submitted report. The BPCA, alternative one, is the selected alternative and it consists construction of a new activated sludge treatment facility. This alternative is reasonable and economically efficient and will provide adequate treatment to meet the required effluent limits.

Treatment alternatives that have been considered include:

Alternatives	Description
1	New Activated Sludge Facility BPCA- LDA
2	SBR Expansion with 1.5 MG EQ Lagoon LDA
3	SBR with 5 MG EQ Lagoon LDA
4	Regional Treatment NDA
5	Treatment and Groundwater Discharge NDA
6	Treatment and Land Application NDA

Classification and Reasonableness

Alternatives	BPCA, NDA or LDA	Practicable?	Economically Efficient?	Affordable?	Reasonable?	Percentage of MHI
New Activated Sludge Facility	BPCA, LDA	Yes	Yes	Yes	Yes	1.63%
SBR Expansion with 1.5 MG EQ Lagoon	LDA	Yes	No	Yes	Yes	1.69%
SBR with 5 MG EQ Lagoon	LDA	Yes	No	Yes	Yes	1.82%
Regional Treatment	NDA	No	No	No	No	-
Treatment and Groundwater Discharge	NDA	No	No	No	No	-
Treatment and Land Application	NDA	No	No	No	No	-

Public and interagency participation has been completed in the analysis. No comments from the public were received by the end of notification date, April 02, 2022.

Alternative one is the selected alternative and it consists construction of a new activated sludge treatment facility.

In approving the Analysis the Department has made the following findings:

1. The level of water quality necessary to protect applicable beneficial uses is fully maintained. Water quality shall not be degraded to a level that does not comply with the applicable Water Quality Standards (WQS).

Wasteload allocation calculated Water Quality Based Effluent discharge criteria for the selected alternative are included in the Analysis. The selected alternative is shown as practicable. The Department is in agreement that the selected alternative is practicable as described in the report and capable of providing the Minimum Level of Pollution Control as defined in the AIP.

2. The highest statutory and regulatory requirements for new and existing point sources are achieved.

Secondary and wasteload allocation calculated Water Quality Based Effluent discharge criteria for the selected alternative are included in the Analysis. The Department is in agreement that the selected alternative is practicable as described in the report and capable of providing the Minimum Level of Pollution Control as defined in the AIP.

3. All cost-effective and reasonable for nonpoint source pollution control are implemented.
4. Allowing degradation of water quality is necessary and accommodates important economic or social development in the area where the surface water is located.

The Department is in agreement that the selected alternative is the least degrading reasonable alternative and therefore degradation is "necessary" as defined in the AIP. Important social and economic development associated with the project is described in the report.

Based on the above findings, the anti-degradation review is accepted and the Department has made a final determination to approve the analysis for the above project. Our approval is limited to the selected treatment and disposal alternatives described in the analysis under the stated flow and loading conditions. If the design conditions or selected alternative are modified subsequent to this approval, a new or revised alternatives analysis may be required. You may proceed with the preparation and submittal of project facility plans for the departmental review and further processing.

If you have any further questions, please feel free to call me at 515-725-8429 or email me at Suresh.Kumar@dnr.iowa.gov.

Sincerely,

Suresh Kumar

Suresh Kumar
Environmental Engineer/Industrial
Coordinator Iowa Department of
Natural Resources

 Digitally signed by Suresh Kumar
Date: 2022.05.11 09:42:08 -05'00'

C: La Porte City Wastewater File 0743001
Clint Wienen, MSA, Dubuque, Iowa
Iowa DNR Field Office 2

WALLACE BUILDING, 502 E 9TH ST, DES MOINES IA 50319

Phone: 515-725-8200

www.iowaDNR.gov

Fax: 515-725-8202

Date	Chloride			
	Concentration		Mass	
	30-day avg	max	30-day avg	max
08/31/2026	136.00000	136.00000	690.75216	690.75216
07/31/2026	59.00000	59.00000	433.50486	433.50486
06/30/2026	409.00000	409.00000	627.63504	627.63504
05/31/2026	159.00000	159.00000	351.40590	351.40590
04/30/2026	408.00000	408.00000	483.18624	483.18624
03/31/2026	331.50000	362.00000	454.12551	458.90016
02/28/2026				
01/31/2026	414.00000	414.00000	414.33120	414.33120
12/31/2025	373.00000	373.00000	391.96332	391.96332
11/30/2025	437.00000	437.00000	448.28334	448.28334
10/31/2025	324.00000	324.00000	437.74992	437.74992
09/30/2025	288.00000	288.00000	725.37984	725.37984
08/31/2025	158.00000	158.00000	504.68676	504.68676
07/31/2025	325.00000	325.00000	561.07350	561.07350
06/30/2025	571.00000	571.00000	842.89878	842.89878
05/31/2025	290.00000	290.00000	486.13860	486.13860
04/30/2025	467.00000	467.00000	560.84832	560.84832
03/31/2025	414.00000	414.00000	459.21708	459.21708
02/28/2025	802.00000	802.00000	862.83972	862.83972
01/31/2025	494.00000	494.00000	453.19560	453.19560
12/31/2024	563.00000	563.00000	558.75498	558.75498
11/30/2024	256.00000	256.00000	276.70118	276.70118
10/31/2024	765.00000	765.00000	1102.48128	1102.48128
09/30/2024	411.00000	472.00000	507.28550	510.16781
08/31/2024				
07/31/2024	365.00000	365.00000	526.02048	526.02048
06/30/2024	275.00000	275.00000	594.47520	594.47520
05/31/2024	531.00000	531.00000	765.25171	765.25171
04/30/2024	298.00000	298.00000	322.09747	322.09747
03/31/2024	520.00000	520.00000	749.39904	749.39904
02/29/2024	582.00000	582.00000	629.06285	629.06285
01/31/2024	397.00000	397.00000	429.10301	429.10301
12/31/2023	391.00000	391.00000	422.61782	422.61782
11/30/2023	386.00000	386.00000	695.35584	695.35584
10/31/2023	801.00000	801.00000	1154.36275	1154.36275
09/30/2023	742.00000	742.00000	802.00109	802.00109
08/31/2023	693.00000	693.00000	749.03875	749.03875
07/31/2023	848.00000	848.00000	916.57267	916.57267
06/30/2023	755.00000	755.00000	544.03488	544.03488
05/31/2023	253.00000	253.00000	272.19258	272.19258
04/30/2023	519.00000	519.00000	560.96842	560.96842
03/31/2023	596.00000	596.00000	1073.65824	1073.65824
02/28/2023	319.00000	319.00000	459.72749	459.72749
01/31/2023	379.00000	379.00000	409.64746	409.64746
12/31/2022	477.00000	477.00000	343.71475	343.71475
11/30/2022	688.00000	688.00000	495.75629	495.75629
10/31/2022	506.00000	506.00000	364.61146	364.61146
Reasonable probability:				
long term ave	448.3444	450.3778	575.8691	576.0392
std	187.9425	187.5152	211.3328	211.2525
cv	0.4192	0.4164	0.3670	0.3667
n	45	45	45	45
max	848.000	848.000	1154.363	1154.363
Pn	0.9027	0.9027	0.9027	0.9027
ND	1.2972	1.2972	1.2972	1.2972
a^2	0.1619	0.1599	0.1263	0.1262
a	0.4023	0.3998	0.3555	0.3552
mult	1.5127	1.5088	1.4415	1.4412
c	1282.7988	1279.4780	1663.9999	1663.6138
WLA	922.0000	922.0000	5230.0000	5303.0000
Is c > WLA?	yes	yes	no	no
Violations	0	0	0	0
% compliance	100.0	100.0	100.0	100.0
% limit	49%	49%	11%	11%