INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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Eric J. Holcomb
Governor

Brian C. Rockensuess
Commissioner

VIA ELECTRONIC MAIL

January 17, 2024

Marshall County Regional Sewer District
112 W. Jefferson Street
Plymouth, IN 46

Dear Board of Trustees,

RE: Marshall County Regional Sewer District Plan

Pursuant to Indiana Code (IC) 13-26-2-10, and as required in the Order Forming the Marshall County Regional District (District) signed December 12, 2022, a district plan (Plan) was required to be submitted by the District to the Indiana Department of Environmental Management (IDEM).

IDEM has received and reviewed the revised Plan and determined the Plan to be complete. No further action regarding the Plan is required at this time. Please note that the District should send updates to the Plan to IDEM as they occur.

If you have any questions, please feel free to contact me at (317) 232-5727 or at efaust@idem.in.gov.

Respectfully,

Emily Faust
RSD Coordinator
Office of Water Quality

DISTRICT PLAN

PREPARED FOR:

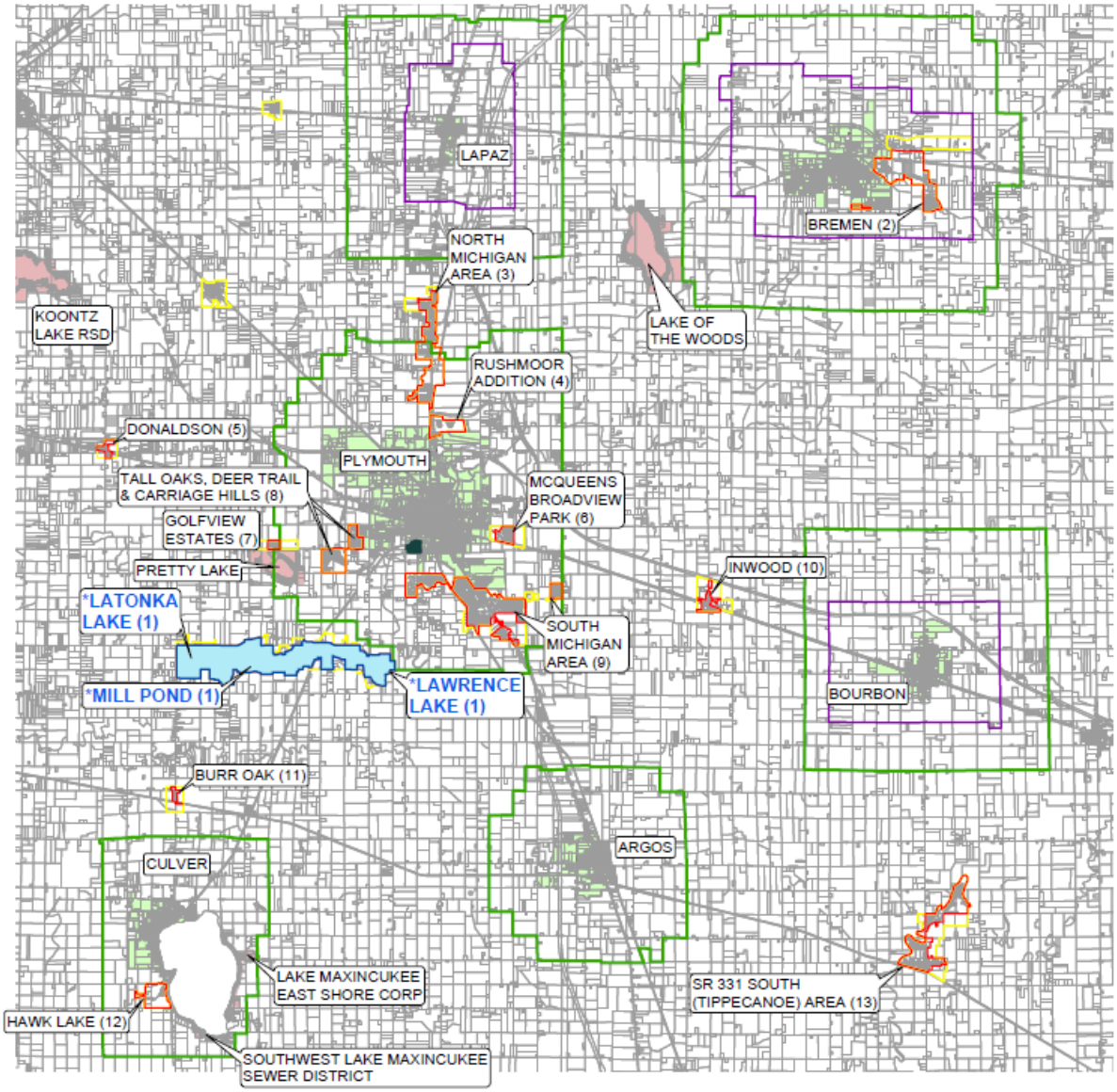
MARSHALL COUNTY REGIONAL SEWER DISTRICT
MARSHALL COUNTY, INDIANA

March 2022

PREPARED BY:

JONES PETRIE RAFINSKI

MARSHALL COUNTY MCHD HEALTH DEPARTMENT



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1.0 MARSHALL COUNTY REGIONAL SEWAGE DISTRICT (PROPOSED) INTRODUCTION

The information presented within this section will provide an overview of the Marshall County Clean Water Task Force wastewater collection system and treatment study. Ultimately, the accumulated data, the analysis of that data, and the resultant recommended plan will serve to guide the Marshall County Commissioners and the community in the consideration of the formation of a new Regional Sewer District for the considered service areas.

The overall study area consists of areas (a part) of Marshall County, which includes thirteen (13) Priority Service Areas (PSAs). Each area was evaluated for low pressure sewer, septic tank effluent pump (STEP) sewer, and regionalization with a nearby WWTP or a new Extended Aeration WWTP. The PSAs are listed below.

- Latonka, Lawrence Lakes, Mill Pond - PSA 1
- East Bremen – PSA 2
- North Michigan Area – PSA 3
- Rushmoor Addition – PSA 4
- Donaldson & Ancilla Domini Convent – PSA 5
- McQueen's Broadview – PSA 6
- Golfview Estates – PSA 7
- Deer Trail, Tall Oaks, Carriage Hills – PSA 8
- South Michigan Area – PSA 9
- Inwood – PSA 10
- Burr Oak – PSA 11
- Hawk Lake – PSA 12
- State Road 331 S. Tippecanoe – PSA 13

The completed work will also help to provide solutions for sustaining the housing viability of communities and neighborhoods where no current municipal sewer system exists. See Figure 1 for an overview of all selected PSAs, which also includes multiple unincorporated communities and medium to high density residential developments across the county. See Figures 1.1 through 1.13 for individual maps of each area.

Following is a brief description of each PSA:

P.S.A. 1., Latonka, Lawrence Lakes, Mill Pond
This waterfront community is located 2.3 miles southwest of Plymouth along Olive Trail. The area includes five interconnected water bodies within the Illinois River Watershed. The area includes 596 homes, two businesses, and three campgrounds. Some homesites are as small as one fifth of an acre with no options for repair or replacement of their on-site systems. Others may have adequate on-site space, but have conflicting improvements, wells, or neighboring wells. The closest sanitary sewer system with adequate capacity is located at the City of Plymouth near the Saint Joseph Plymouth Medical Center on State Highway 17, 2.5 miles northeast of the PSA. See Figure 1.1 for this PSA.

P.S.A. 2., East Bremen
This PSA is partially developed and includes residential subdivisions that are unserved by town utilities. These areas are within the Town's area of planning influence and within the Town's recently adopted area of urban service. The area includes 158 homes, one church, and two businesses. There are reports of septic system problems within the area and the Town advises that there is sufficient capacity to provide wastewater service if requested. There is substantial open land that could offer future growth areas for the Town in business or residential land uses. See Figure 1.2 for this PSA.

P.S.A 3., North Michigan Area
Located in Section 8 of North Township, these neighborhoods were developed between the 1950's and 1970's remote from the City of Plymouth utilities. Homes, and therefore wells and septic systems would have been originally installed during that time. Lot sizes, soil conditions and development density constrain the approval of compliant replacement wells or septic systems. The PSA includes approximately 221 homes and eight businesses. The nearest provider of municipal sewer service would be the City of Plymouth. See Figure 1.3 for this PSA.

P.S.A. 4., Rushmoor Addition
This golf course community lies in Section 11 of the Michigan Road and lands within Center Township. Including approximately thirty-one homes, the neighborhood is adjacent to the City of Plymouth limits and therefore, nearby utilities. In addition to the homes and the Woodbury Golf Course and Clubhouse, this community includes one bed & breakfast and nine businesses. Home sites average less than one third of an acre with homes being thirty years of age or older. Replacement or repair of septic systems has likely already occurred; therefore, no reserve areas remain. See Figure 1.4 for this PSA.

P.S.A. 5., Donaldson and Ancilla Domini Convent
This is a small unincorporated community located within Sections 29, 30, 31, and 32 of West Township, about seven miles west of Plymouth. Approximately twenty-nine homes are located on homesites that average less than one third of an acre. Donaldson also includes one post office and one church. The community was originally laid out in the 1870's and took advantage of the route of the railroad and later the Lincoln Highway. The community is also home to the Ancilla Domini Convent, which is about 1.5 miles south of the main portion of the Town. No municipal utilities exist within the Town and the nearest municipal sewer system is located at Koontz Lake. See Figure 1.5 for this PSA. However, the convent does operate a private wastewater treatment facility. The facility is an extended aeration concept rated A 0.046 MGD. This facility was not considered as a treatment center.

P.S.A. 6., McQueen's Broadview Park
The neighborhood is adjacent to the City of Plymouth and is in Section 3 of Center Township. Platted in the 1970's, the development includes approximately sixty-five homes located on less than half-acre sites. The age of the homes is approximately thirty to forty years. The municipal building at Plymouth is just 600 feet from the nearest edge of this PSA. The area also includes four businesses and one church, all with commercial septic systems. The nearest utility provider is in the City of Plymouth with active sewer and water lines within a half-mile of the site. See Figure 1.6 for this PSA.

P.S.A. 7., Golfview Estates
This small residential neighborhood includes approximately thirty-three homes with most located on just over a half-acre site. The subdivision is immediately adjacent to the Pretty Lake Conservancy District. In fact, the District's force main connection to the Town is located within the Right-of-Way of State Highway 17. The neighborhood is 1.7 miles west of the Plymouth city limits and is therefore within the City's area of planning influence. See Figure 1.7 for this PSA.

P.S.A. 8., Deer Trail, Tall Oaks, and Carriage Hills Subdivision
The developments date to late 80's and early 90's and combined, include 177 homes and one church. Many homes are over thirty years old and may be operating with the original septic system or a replacement absorption component. Some areas of the Tall Oaks subdivision are immediately adjacent to the City of Plymouth and sanitary sewer is within 300 feet. These neighborhoods are well within the City's area of planning influence. See Figure 1.8 for this PSA.

P.S.A. 9., South Michigan Area
This area is south of and adjacent to the southern city limits of Plymouth. Some areas of this PSA continue to develop new homesites but only when the Health Department can approve an on-site system where adequate space is available for an absorption area reserve. The area includes 659 homes, three businesses, and one church. Sanitary sewer is adjacent to the PSA along South Michigan Street and at the elementary school at Discovery Lane within the City. The development areas with the South Michigan area began in the early 80's. On-site systems exist throughout the PSA and are originals with repairs or replacement systems that are nearing their life expectancy. See Figure 1.9 for this PSA.

P.S.A. 10., Inwood
This unincorporated community was originally called Pearsonville and was then platted as Inwood in 1854. Inwood is located along the Chicago, Fort Wayne, and Eastern Rail Line and is adjacent to U.S. 30, 4.5 miles northwest of Bourbon and 5 miles southeast of Plymouth along the Lincoln Highway. The closest sanitary sewer is at the Town of Bourbon, approximately 3.75 miles southeast. Some homes may be as old as seventy years. Many lot sites are sub-standard; however, some are adequate size to support updated absorption fields. The community includes approximately forty homes, eighteen mobile homes (within a manufactured home community), and one church. See Figure 1.10 for this PSA.

P.S.A. 11., Burr Oak
Platted in 1882, this tiny unincorporated community consists of a cluster of twenty-six homes, four businesses, and one church. Lots are small and some homes ages are more than seventy years. Most homesites will not support a code compliant septic system replacement without the acquisition of adjoining land. Soils are classified by USDA as "very limiting", meaning added measures such as aerobic treatment and constructed filter beds would likely be needed to overcome on-site constraints. See Figure 1.11 for this PSA.

P.S.A. 12., Hawk Lake
Located just south of Culver and adjacent to the West/South Lake Maxinkuckee Conservancy District. The PSA includes only twenty-six homes. This area is within the area of planning influence and the urban service area for the Town of Culver. The nearest sanitary sewer is owned by the above noted Conservancy District and both the District and the Town have indicated that they may be willing to allow connection. See Figure 1.12 for this PSA.

P.S.A. 13., State Road 331 S. Tippecanoe
This unincorporated area is situated along the Tippecanoe River in southern Marshall County and was founded in 1882. This PSA includes area north of the original settlement that have developed residentially over the last 137 years, including 188 homes, nine businesses, one cemetery, two churches, and one fire station. The area relies completely on septic systems for disposal and treatment of sanitary waste. Recently, local officials advised that flood waters have rendered some systems unusable. The nearest wastewater system is located at Bourbon, 4.5 miles north of the community. See Figure 1.13 for this PSA.

All the above priority service areas rely upon on-site septic systems for wastewater handling. All these areas also rely upon individual private wells for their drinking water supply. Residential septic systems are permitted through the Marshall County Health Department. Commercial systems are authorized through review by the Indiana Department of Health and permits are issued locally.

Age and condition of some systems in the sewered areas can only be tracked through the permitting records of the local health department. A record's search by property code was provided by the Marshall County Health Department and that information is provided in table 19.

Based on the above, most of the on-site systems within all the PSAs are undocumented or have been replaced or repaired. This indicates that systems older than twenty years continue to function or have been repaired, replaced, or initially constructed without a permit.
Systems beyond twenty years of age have reached the typical life expectancy for on-site systems. This means that the need to replace or repair the absorption field or dry well is imminent.

2.0 CURRENT SITUATION

As discussed in the previous section, the purpose of the report is to consider providing wastewater service for the below service areas in Marshall County thru the formation of a new regional sewage District. Understanding this, an inventory of existing wastewater treatment facilities is needed, along with an understanding of how and under what conditions wastewater is being managed within all of the municipal jurisdictions as well as the identified priority service areas.

2.1 EXISTING WASTEWATER TREATMENT FACILITIES – BOURBON, INDIANA

The Town of Bourbon's Wastewater Treatment Plant is located at 13478 Elm Street Bourbon, Indiana in Marshall County.

The facility is a Class I-SP, 0.30 MGD controlled discharge waste stabilization lagoon facility consisting of two treatment cells and one storage cell. The plant also includes a pump station and spray irrigation equipment. Influent flow is metered, effluent flow is measured with a six-inch Parshall flume flow meter and stream flow is measured by staff gauge. Stream discharge typically occurs during the winter months. Effluent is typically disposed via spray irrigation during the summer months in accordance with land application permit INA000397.

The collection system is comprised of 100% separate sanitary sewers by design with one Sanitary Sewer Overflow (SSO) point.

In general, the condition of the existing WWTP can be described as excellent. The facility has been in service for over 30 years. Since the initial commissioning, the existing treatment facility has been operating as designed.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the Bourbon facility.

Table 1 – Existing Bourbon Effluent Permit Limits

Parameter	Monthly Avg (mg/L)	Weekly Avg (mg/L)
CBOD	25	40
TSS	70	105
Ammonia-Nitrogen, Summer	8.6	12.9
Ammonia-Nitrogen, Winter	9.3	14
pH	6.0 min to 9.0 max	
Effluent/Stream Ratio	0.10	Daily Maximum
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max	

A review of the Monthly Reports of Operation (MROs) for 2018 through September 2021 reveals that the existing facility averages 0.20 MGD.

The table below provides an average of influent and effluent concentrations and loadings for the three primary wastewater constituents.

Table 2 – Existing Bourbon Wastewater Parameters

EXISTING WASTEWATER PARAMETERS											
Influent Loading						Effluent Loading					
CBOD		TSS		Ammonia		CBOD		TSS		Ammonia	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
120.11	186.87	112.40	174.68	27.33	38.60	5.71	16.71	4.97	15.79	0.58	2.36

Based on review of records (for the past four years) available through the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) online database, the facility does not appear to have any violations as it relates to permitting. Available capacity is limited to approximately 9% of the plants 0.30 MGD.

2.2 EXISTING WASTEWATER TREATMENT FACILITIES – BREMEN, INDIANA

The WWTP is located at 561 North Keyser Street, Bremen, Indiana, and discharges to the Yellow River, which is a tributary to the Kankakee River. The average daily design flow (ADF) is 1.5 million gallons per day (MGD) with a peak design flow (PDF) of 2.5 MGD.

The plant is currently a Class III treatment facility consisting of a fine screen, grit removal system, an influent flow meter, three (3) primary settling tanks, two (2) biological oxidation towers, two (2) secondary clarifiers, a rock bed trickling filter for ammonia oxidation, a final clarifier, gas chlorination/dechlorination facilities, a post-aeration tank, and an effluent flow meter. Sludge is treated by an aerobic digester followed by sludge drying beds. Dewatered biosolids are hauled off-site to a landfill.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the Bremen facility.

Table 3 – Existing Bremen Effluent Permit Limits

	Summer (Monthly Avg)		Summer (Weekly Avg)		Winter (Monthly Avg)		Winter (Weekly Avg)	
Parameter	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**
CBOD	10	209	15	313	15	313	23	480
TSS	10	209	15	313	30	626	45	939
Ammonia-Nitrogen	3.1	65	4.7	98	5	104	7.5	156
Phosphorus	1 mg/L WQ Rule 327 IAC 5-10-2(b)							
pH	6.0 min to 9.0 max							
Dissolved Oxygen	7.0	Daily Minimum			5.0	Daily Minimum		
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max							

A review of the Monthly Reports of Operation (MROs) for 2018 through September 2021 reveals that the facility averages 1.08 MGD.

The tables below show the average influent and effluent concentrations and loadings for the four primary constituents.

Table 4 – Existing Bremen Influent Wastewater Parameters

EXISTING WASTEWATER PARAMETERS							
Influent Loading							
CBOD		TSS		Ammonia		Phosp	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
98.37	868.07	140.70	1257.52	13.69	118.88	4.07	35.19

Table 5 – Existing Bremen Effluent Wastewater Parameters

EXISTING WASTEWATER PARAMETERS							
Effluent Characteristics							
CBOD		TSS		Ammonia		Phosp	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
6.20	42.71	10.18	70.40	0.22	1.59	1.01	6.95

Based on review of these records, the facility does not appear to have any violations with CBOD, TSS, or Ammonia concentrations. However, the facility is required to meet a total phosphorus limit of 1.0 mg/L as of July 2021. The facility does have available capacity to receive additional flows.

2.3 EXISTING WASTEWATER TREATMENT FACILITIES – PLYMOUTH, INDIANA

The City of Plymouth is served by the City's wastewater facility located at 900 Oakhill Avenue, Plymouth, IN 46563. The facility is permitted under NPDES IN0020991. The Plymouth facility is Class III, 3.5 MGD activated sludge treatment facility consisting of an automatic bar screen, a grit removal system, two primary clarifiers, two plastic media bio-roughing towers, four aeration tanks, two secondary clarifiers, ultraviolet light disinfection, and influent and effluent flow meters. The treatment system also includes a 0.42 MGD equalization/storm water basin and two wet weather in-line storage systems with 0.15 MGD and 0.14 MGD storage capacities. Biosolids are treated anaerobically and mechanically dewatered. Final solids are disposed of by land application. The collection system is comprised of combined sanitary and storm sewers with ten Combined Sewer Overflow (CSO) locations.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the Plymouth facility.

Table 6 – Existing Plymouth Effluent Permit Limits

	Summer (Monthly Avg)		Summer (Weekly Avg)		Winter (Monthly Avg)		Winter (Weekly Avg)	
Parameter	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**
CBOD	18	991	27	1487	20	1102	30	1652
TSS	22	1212	33	1818	24	1322	36	1983
Ammonia-Nitrogen	2	110	3	165	3	165	4.5	248
Phosphorus	1 mg/L WQ Rule 327 IAC 5-10-2(b)							
pH	6.0 min to 9.0 max							
Dissolved Oxygen	6.0 Daily Minimum							
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max							

A review of the Monthly Reports of Operation (MROs) for 2018 through September 2021 shows the facility's average influent flow is 1.6 MGD.

The table below provides an average of influent and effluent concentrations and loadings for the four primary wastewater constituents for the four-year period.

Table 7 – Existing Plymouth Influent Wastewater Parameters

EXISTING WASTEWATER PARAMETERS							
Influent Loading							
CBOD		TSS		Ammonia		Phosphorus	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
314.58	4385.63	236.58	3323.74	22.20	81.18	13.02	194.89

Table 8 – Existing Plymouth Effluent Wastewater Parameters

EXISTING WASTEWATER PARAMETERS							
Effluent Loading							
CBOD		TSS		Ammonia		Phosphorus	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
4.90	64.93	11.27	159.10	0.24	3.26	1.29	14.67

Based on review of records (for the past year) available through the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) online database, the facility does appear to have available capacity for added service areas.

2.4 EXISTING WASTEWATER TREATMENT FACILITIES – CULVER, INDIANA

The City of Culver is served by the City's wastewater facility located at 1280 Hoosier Ln, Culver, IN 46511. The facility is permitted under NPDES IN0021288.

The facility is a Class II, 0.548 MGD conventional activated sludge treatment plant with effluent chlorination/dichlorination, post aeration and an effluent flow meter. Biosolids are treated by aerobic digestion followed by dewatering and landfill disposal. The collection system is comprised of 100% separate sanitary sewers by design with no overflow or bypass points.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the Culver facility.

Table 9 – Existing Culver Effluent Permit Limits

Parameter	Monthly Avg (mg/L)	Monthly Avg (lbs/day)	Weekly Avg (mg/L)	Weekly Avg (lbs/day)
CBOD	15	68.6	23	105.2
TSS	18	82.3	27	123.5
Ammonia-Nitrogen, Summer	1.1	5	1.6	7.3
Ammonia-Nitrogen, Winter	1.6	7.3	2.4	11
pH	6.0 min to 9.0 max			
Dissolved Oxygen	6.0	Summer Min	5.0	Winter Min
Total Residual Chlorine, Contact Tank	0.5	Daily Minimum		
Total Residual Chlorine, Final Effluent	0.01	Monthly Avg	0.020	Daily Maximum
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max			

The Town currently provides extraterritorial service to the West/South Shore Conservancy District and to Culver Academies.

The table below provides an average of influent and effluent concentrations and loadings for the three primary wastewater constituents for 2018 through September 2021.

Table 10 – Existing Culver Wastewater Parameters

EXISTING WASTEWATER PARAMETERS											
Influent Loading						Effluent Loading					
CBOD		TSS		Ammonia		CBOD		TSS		Ammonia	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
183.37	877.05	205.00	1000.12	26.06	127.11	2.36	5.69	10.56	26.34	0.09	0.21

Based on review, the facility has not had any violations.

2.5 EXISTING WASTEWATER TREATMENT FACILITIES – ARGOS, IN

The City of Argos is served by the City's wastewater facility located at 16720 Linden Rd, Argos, IN 46501. The facility is permitted under NPDES IN0022284.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the Argos facility.

Table 11 – Existing Argos Effluent Permit Limits

Parameter	Monthly Avg (mg/L)	Monthly Avg (lbs/day)	Weekly Avg (mg/L)	Weekly Avg (lbs/day)
CBOD	25	44.2	40	70.8
TSS	30	53.1	45	79.6
Ammonia-Nitrogen, Summer	1.1	1.95	1.6	2.83
Ammonia-Nitrogen, Winter	1.6	2.83	2.4	4.25
pH	6.0 min to 9.0 max			
Dissolved Oxygen	6.0	Summer Min	5.0	Winter Min
Total Residual Chlorine, Contact Tank	0.5	Daily Minimum		
Total Residual Chlorine, Final Effluent	0.01	Monthly Avg	0.02	Daily Maximum
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max			

A review of the Monthly Reports of Operation (MROs) for 2018 through September 2021 shows the facility has an average influent flow of 0.13 MGD. The facility is rated for 0.212 MGD. The facility discharges into Myers Ditch and is considered a Class II activated sludge type wastewater treatment plant. The activated sludge type plant includes treating sewage and industrial waste through aeration and biological processes. From review of the facility's records, the facility receives peak flows during weather events that are higher than typical. This is normal for Indiana community systems.

The table below provides an average of influent and effluent concentrations and loadings for the three primary wastewater constituents for the four-year period.

Table 12 – Existing Argos Wastewater Parameters

EXISTING WASTEWATER PARAMETERS											
Influent Loading						Effluent Loading					
CBOD		TSS		Ammonia		CBOD		TSS		Ammonia	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
207.68	184.99	353.70	314.27	38.01	33.14	7.17	6.54	9.16	8.77	0.16	0.13

The facility does not appear to have violations as it relates to permitting and appears to have capacity for growth.

2.6 EXISTING WASTEWATER TREATMENT FACILITIES – LA PAZ, INDIANA

The La Paz Municipal Wastewater Treatment Plant is located at 12911 US 6, La Paz, Indiana 46537. The facility is permitted under NPDES IN0040223.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the La Paz facility.

Table 13 – Existing La Paz Effluent Permit Limits

	Summer (Monthly Avg)		Summer (Weekly Avg)		Winter (Monthly Avg)		Winter (Weekly Avg)	
Parameter	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**
CBOD	15	15.8	23	24.2	20	21	30	31.5
TSS	18	18.9	27	28.4	24	25.2	36	37.9
Ammonia-Nitrogen	1	1.1	1.5	1.6	1.3	1.4	2	2.1
pH	6.0 min to 9.0 max							
Dissolved Oxygen	6.0	Daily Minimum		Summer	5.0	Daily Minimum		Winter
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max							

The facility is rated for .126 MGD and is a Class I activated sludge wastewater treatment plant. The plant treats waste through aeration and biological processes. The facility does receive peak flows during holidays and wet weather that are higher than average, however, these are within the plants' capabilities for peak flows. Average flows to the La Paz Facility average 0.057 MGD.

The table below provides an average of influent and effluent concentrations and loadings for the three primary wastewater constituents for 2018 through September 2021.

Table 14 – Existing La Paz Wastewater Parameters

EXISTING WASTEWATER PARAMETERS											
Influent Loading						Effluent Loading					
CBOD		TSS		Ammonia		CBOD		TSS		Ammonia	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
136.86	63.95	107.70	49.94	38.82	18.06	8.52	4.34	16.65	7.83	1.89	0.97

Based on review of records (for the past four years) available through the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) online database, the facility has had some violations when it comes to permitting. It should be noted that typically this database has a few months lag time for updating records.

2.7 EXISTING WASTEWATER TREATMENT FACILITIES – KOONTZ LAKE REGIONAL SEWAGE DISTRICT, INDIANA

The Koontz Lake Regional Sewer District is located at 10625 E Prairie Ave, Walkerton, IN 46574. The facility is permitted under NPDES N0063606.

According to the latest and applicable NPDES permit, the facility is rated for 0.219 MGD and receives an average flow of 0.204 MGD. The following are the current effluent limits for the Koontz Lake facility.

Table 15 – Existing Koontz Lake Effluent Permit Limits

Parameter	Monthly Avg (mg/L)	Monthly Avg (lbs/day)	Weekly Avg (mg/L)	Weekly Avg (lbs/day)
CBOD	10	18.3	15	27.4
TSS	12	21.9	18	32.9
Ammonia-Nitrogen, Summer	1.1	2	1.6	2.9
Ammonia-Nitrogen, Winter	1.6	2.9	2.4	4.4
pH	6.0 min to 9.0 max			
Dissolved Oxygen	6.0 Daily Minimum			
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max			

The District operates an extended aeration treatment plant consisting of a fine bar screen, two aeration tanks, a clarifier, an ultraviolet light disinfection system, post aeration, and an effluent flow meter. Sludge is dewatered and is hauled off-site. The collection system is comprised of 100% separate sanitary sewers by design with no overflow or bypass points. The District provides service to one out-of-District customer at Swan Lake Resort.

The table below provides an average of influent and effluent concentrations and loadings for the three primary wastewater constituents for the four-year period.

Table 16 – Existing Koontz Lake Wastewater Parameters

EXISTING WASTEWATER PARAMETERS											
Influent Loading						Effluent Loading					
CBOD		TSS		Ammonia		CBOD		TSS		Ammonia	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
265.16	416.44	192.24	322.31	44.30	85.57	2.64	1.28	5.40	2.54	0.15	0.07

Based on review of records (for the past year) available through the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) online database, the facility does not appear to have any violations and has available capacity for additional customers.

2.8 EXISTING WASTEWATER TREATMENT FACILITIES – LAKE OF THE WOODS CONSERVANCY DISTRICT, INDIANA

The Lake of the Woods RSD is located at 3388 E Shore Drive in Bremen, Indiana, 46506. The NPDES Permit number is IN0057002. The facility is permitted under NPDES IN0057002.

According to the latest and applicable NPDES permit, the facility is rated for 0.135 MGD for the Lake of the Woods. The facility receives an average flow of 0.046 MGD.

Table 17 – Existing Lake of The Woods Effluent Permit Limits

Parameter	Monthly Avg (mg/L)	Weekly Avg (mg/L)
CBOD	25	40
TSS	70	105
Ammonia-Nitrogen, Summer	9.5	14.3
Ammonia-Nitrogen, Winter	12.1	18.2
Effluent/Stream Ratio	0.1	Daily Max
pH	6.0 min to 9.0 max	
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max	

Since this facility is a lagoon type, there are several months where the effluent rate is not accounted for. The MROs were calculated from 2018 through September 2021. The listed effluent monthly average is based on January through March and November through December for the past four years. However, the influent rate was accounted for all 12 months of the year.

The table below provides an average of influent and effluent concentrations and loadings for the three primary wastewater constituents for the four-year period.

Table 18 – Existing Lake of the Woods Wastewater Parameters

EXISTING WASTEWATER PARAMETERS											
Influent Loading						Effluent Loading					
CBOD		TSS		Ammonia		CBOD		TSS		Ammonia	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
142.62	48.18	154.40	51.67	28.82	9.57	16.43	31.32	72.96	123.94	3.06	5.19

Based on review of records (for the past year) available through the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) online database, the facility does not appear to have any violations as it relates to permitting. However, it is unlikely that the facility could accept any additional flows.

2.9 EXISTING WASTEWATER TREATMENT FACILITIES–MARSHALL COUNTY

All the above priority service areas (PSA 1 thru PSA 13) rely upon on-site septic systems for wastewater handling. All of these areas also rely upon individual private wells for their drinking water supply. Residential septic systems are permitted through the Marshall County Health Department. Commercial systems are authorized through review by the Indiana Department of Health and permits are issued locally.

Age and condition of some systems in the sewered areas can only be tracked through the permitting records of the local health department. A record's search by property code was provided by the Marshall County Health Department and that information is provided in the following table.

Table 19 – Marshall County PSA On-Site System Records

PSA	No. of Sites	Documented Systems	Undocumented Systems
Latonka, Lawrence Lakes, Mill Pond, PSA 1	601	205	396
East Bremen, PSA 2	161	102	59
North Michigan Area, PSA 3	229	29	200
Rushmoor Addition, PSA 4	45	44	1
Donaldson & Ancilla Domini Convent, PSA 5	32	1	31
McQueens Broadview, PSA 6	70	48	22
Golfview Estates, PSA 7	33	33	0
Deer Trail, Tall Oaks, and Carriage Hills Subdivision, PSA 8	178	145	33
South Michigan Area, PSA 9	663	127	536
Inwood, PSA 10	42	6	36
Burr Oak, PSA 11	31	5	26
Hawk Lake, PSA 12	26	5	21
SR 331 S. Tippecanoe, PSA 13	201	5	196
Totals	**2,312**	**755**	**1,557**

Based on the above, the majority of the on-site systems within all the PSAs are undocumented or have been replaced or repaired. This indicates that systems older than twenty years (limit of available records) continue to function or have been repaired, replaced, or were initially constructed without a permit. Those that have been replaced or repaired are in the second, and in most cases, the last repair cycle possible due to site conditions and available space.

3.0 SITE CONDITIONS – SOILS SUITABILITY/ABSORPTION FIELDS

Suitability ratings are provided by the USDA Natural Resources Conservation Service (NRCS). Detailed information is derived from the Custom Soil Resource Report for Marshall County.

The soils found in these services areas consist of loamy sands, sandy loams, muck, and sands, which are rated as "very limited", "slightly limited", or "unusable" in respect to use as absorption fields for septic systems. Onsite systems located within soils classified as moderately limited and very limited result in poor performance and high maintenance. Therefore, the soils are not conducive for the intended treatment results without, special design, or expensive installation procedures. In fact, most of the soils in the PSAs are considered inadequate for onsite system location and performance.

Table 20 – Marshall County PSA Soil Conditions Summary

In all the PSA's the following provides an inventory of soil conditions.

PSA		% of Soil Conditions Slightly Limited	% of Soil Conditions Moderately Limited	% of Soil Conditions Very Limited	% of Soil Conditions Un-Rated	% of Soil Conditions Unusable
PSA 1	Latonka, Lawrence Lakes, Mill Pond	27%		60%		13%
PSA 2	East Bremen	2%		97%		>1%
PSA 3	North Michigan Area	2%		86%		12%
PSA 4	Rushmoor Addition	22%		68%		10%
PSA 5	Donaldson & Ancilla Domini Convent	>1%		99%		>1%
PSA 6	McQueens Broadview	6%		94%		
PSA 7	Golfview Estates	31%		69%	21%	
PSA 8	Deer Trail, Tall Oaks, and Carriage Hills Subdivision	6%		57%	23%	16%
PSA 9	South Michigan Area	6%		70%		>1%
PSA 10	Inwood	8%		89%		3%
PSA 11	Burr Oak			85%	15%	
PSA 12	Hawk Lake	13%		77%		10%
PSA 13	SR 331 S. Tippecanoe	2%		89%		9%
Average Rating		**12%**		**76%**	**N/A**	**12%**

Note: No soil conditions rated as "moderate" exist in any of the PSA's

Soil conditions within the PSA's are represented in Figure Set 2 for each area. Table 20 above is a summary of the soil conditions for all service areas.

3.1 SITE CONDITIONS – COLLATERAL CONSTRAINTS

Residents of the proposed service areas have experienced significant problems with individual on-site septic systems as a means of wastewater treatment and disposal. Many of the septic systems are undocumented and are likely using substandard methods for disposal. Failing septic systems allow untreated sewage to discharge to the groundwater and surrounding lakes and rivers, thus resulting in the potential for serious health and safety issues.

Other serious constraints to the continued use of onsite systems include:

- Most home sites are under 22,000 sq. ft. many are less than ¼ acre
- Well isolation areas cannot be achieved in most settings
- Water tables are high in many areas with less than 10 feet of isolation from surface to free water
- Some neighborhoods are subject to flood conditions
- Most home sites will not allow for state or local code compliant systems to be permitted

As noted above, the residents within the proposed service areas rely on private wells for drinking water, and most of the building lots in the service areas are compact and therefore, do not allow for proper separation between the septic systems and the groundwater wells. Accordingly, the risk for the development of preferential contaminant pathways between on-site systems and water wells is substantial and may have already occurred in many cases.

As part of this study, the Marshall County Health Department was contacted relative to their concerns for their continued use of on-site septic systems in the PSA's. The Health Department Administrator responded with a letter supporting the elimination of septic systems and the installation of a sanitary sewer system in the selected service areas. Appendix A presents the letter of support from the Administrator of the Health Department as performed in Section 8.2, along with additional letters of support from individuals or businesses within the community. The Health Department conducted a record search for septic system documentation by permit for original or repair installations of all the identified PSA's. The findings are provided in Table 19.

4.0 EXISTING MARSHALL COUNTY WASTEWATER TREATMENT FACILITIES – CURRENT FLOWS

Tables 21 through 33 present current estimated wastewater flows for the considered service areas. The tables also present the anticipated Equivalent Dwelling Unit (EDU) chart for residential and businesses as well as anticipated connection counts for the service areas.

Based on the history for nearby districts with multiple service areas covering a wide variety of land uses, an average daily flow (ADF) of 150 gallons per day (GDP) per single-family residential dwelling was used as the volumetric multiplier for residential wastewater flow. Commercial/Industrial flow factors were based on standard multipliers, employee counts, and seat counts, where applicable.

Table 21 – Existing Wastewater Flows and EDU's – PSA 1, Latonka, Lawrence Lakes, Mill Pond

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	596	596	89,400	4	357,600
B	Montgomery Well Drilling	1	each	1	1	150	4	600
C	Tree Service	1	each	1	1	150	4	600
D	Camper's Roost	0.25	per site + office	51	13.75	2,063	4	8,250
E	Hidden Lake Campground	0.25	per site + office	41	11.25	1,688	4	6,750
F	Redwood Campground	0.25	per site + office	16	5	750	4	3,000
				Total Edu's	**628**			
				Total	**94,200**			**376,800**

Note: 601 connections

Table 22 – Existing Wastewater Flows and EDU's – PSA 2, East Bremen

EXISTING WASTEWATER PARAMETERS									
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Notes**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	158	158		23,700	4	94,800
B	Missionary Church of Bremen	0.04	per seat	100	4		600	4	2,400
C	Turf Tenders	1	each	1	1		150	4	600
D	Patrick Industries	0.1	per employee	100	10	(4 buildings)	1,500	4	6,000
Note: 161 connections				**Total Edu's**	**173**				
				Total	**25,950**				**103,800**

Table 23 – Existing Wastewater Flows and EDU's – PSA 3, North Michigan Area

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	221	221	33,150	4	132,600
B	Bread of Life Food Pantry	1	each	1	1	150	4	600
C	Auto Sales	1	each	1	1	150	4	600
D	Indiana Tool Mfg.	0.1	per employee	100	10	1,500	4	6,000
E	Big Red Storage, Cars and Carts Office	1	each	2	2	300	4	1,200
F	Bargin Barn	1	each	1	1	150	4	600
G	Don's Locksmith Office	1	each	1	1	150	4	600
H	Reichert & Knepp Wrecker	1	each	1	1	150	4	600
I	Daycare	1	each	1	1	150	4	600
Note: 229 connections				**Total EDU's**	**239**			
				Total	**35,850**			**143,400**

Table 24 – Existing Wastewater Flows and EDU's – PSA 4, Rushmoor Addition

EXISTING WASTEWATER PARAMETERS									
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Notes**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	31	31		4,650	4	18,600
B	Woodbury Golf Course	1	each	1	1		150	4	600
C	Woodbury Clubhouse	1.5	per 1,000 sft clubhouse	3,000	4.5		675	4	2,700
		0.1	employee	0.5	1		150	4	600
D	Vacant Store for Sale (Barn/Warehouse)	1	each	1	1		150	4	600
E	RSS Holdings Auction Center	1	each	1	1		150	4	600
F	Church	0.04	per seat	200	8		1,200	4	4,800
G	NAPA Store	1	each	1	1		150	4	600
H	Car Master	1	each	1	1		150	4	600
I	Country Auto	1	each	1	1		150	4	600
J	Sears	1	each	1	1		150	4	600
K	Indiana Tool Building	1	each	1	1		150	4	600
L	Rayne Enterprise	1	each	1	1		150	4	600
M	Irish Inn Bed & Breakfast	0.14	per room	14	2	(14 rooms & 200 seat restaurant).	300	4	1,200
		0.06	per seat	200	12		1,800	4	7,200
				Total Edu's	**67.5**				
				Total	**10,125**				**40,500**

Note: 45 connections

Table 25 – Existing Wastewater Flows and EDU's – PSA 5, Donaldson

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	29	29	4,350	4	17,400
B	Post Office	1	each	1	1	150	4	600
C	Evangelical Church	0.04	per seat	200	8	1,200	4	4,800
D	Ancilla Domini Convent	-	-	-	307	46,050	4	184,200
				Total Edu's	**345**			
Note:32 Connections				**Total**	**51,750**			**207,000**

Table 26 – Existing Wastewater Flows and EDU's – PSA 6, McQueens Broadview Park

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	65	65	9,750	4	39,000
B	Plymouth Community Church	0.04	per seat	100	4	600	4	2,400
C	Ferrellgas	1	each	1	1	150	4	600
D	Home Comfort Experts	1	each	1	1	150	4	600
E	AC Delco	1	each	1	1	150	4	600
F	Plymouth LP Gas Corp.	1	each	1	1	150	4	600
				Total Edu's	**73**			
Note: 70 connections				**Total**	**10,950**			**43,800**

Table 27 – Existing Wastewater Flows and EDU's – PSA 7, Golfview Estates

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	33	33	4,950	4	19,800
				Total Edu's	**33**			
Note: 33 connections				**Total**	**4,950**			**19,800**

Table 28 – Existing Wastewater Flows and EDU's – PSA 8, Deer Trail, Tall Oaks, and Carriage Hills Subdivision

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	177	177	26,550	4	106,200
B	Latter Day Saints Church	0.04	per seat	200	8	1,200	4	4,800
				Total Edu's	**185**			
Note: 178 connections/ Latter Day Saints Church Unit/Calculation based on 200 seats				**Total**	**27,750**			**111,000**

Table 29 – Existing Wastewater Flows and EDU's – PSA 9, South Michigan Area

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	659	659	98,850	4	395,400
B	Wesleyan Church	0.04	per seat	800	32	4,800	4	19,200
C	Nipsco Substation	1	each	1	1	150	4	600
D	John's Welding & Fabrication	1	each	1	1	150	4	600
E	Conservation Club	1	each	1	1	150	4	600
				Total Edu's	**694**			
Note: 663 connections				**Total**	**104,100**			**416,400**

Table 30 – Existing Wastewater Flows and EDU's – PSA 10, Inwood

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	40	40	6,000	4	24,000
B	Methodist Church	0.04	per seat	100	4	600	4	2,400
C	Mobile Home Park	0.75	per unit	18	13.5	2,025	4	8,100
				Total Edu's	**57.5**			
Note: 42 connections				**Total**	**8,625**			**34,500**

Table 31 – Existing Wastewater Flows and EDU's – PSA 11, Burr Oak

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	26	26	3,900	4	15,600
B	Sunstar Seed	1	each	1	1	150	4	600
C	Overmyer Farm Homestead	1	each	1	1	150	4	600
D	Baptist Church	0.04	per seat	100	4	600	4	2,400
E	General Store – Burr Oak Whistle Stop	1	each	1	1	150	4	600
F	Burroughs Store Front	1	each	1	1	150	4	600
				Total Edu's	**34**			
Note: 31 connections/ Baptistl Church Unit/Calculation bases on 100 seats				**Total**	**5,100**			**20,400**

Table 32 – Existing Wastewater Flows and EDU's – PSA 12, Hawk Lake

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	26	26	3,900	4	15,600
				Total Edu's	**26**			
Note: 26 connections				**Total**	**3,900**			**15,600**

Table 33 – Existing Wastewater Flows and EDU's – PSA 13, Tippecanoe

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	188	188	28,200	4	112,800
B	Hensley Fabricating & Equipment	0.1	per employee	34	3.4	510	4	2,040
C	Cemetary	1	each	1	1	150	4	600
D	Steel Ridge	1	each	1	1	150	4	600
E	Riverside Welding & Fabrication, LLC	1	each	1	1	150	4	600
F	St Motors	1	each	1	1	150	4	600
G	CT Sales	1	each	1	1	150	4	600
H	Post Office	1	each	1	1	150	4	600
I	Cafe	1	each	1	1	150	4	600
J	Vacant Filling Station	1	each	1	1	150	4	600
K	Tippy Mart	1	each	1	1	150	4	600
L	Fire Station	1	each	1	1	150	4	600
M	Tippecanoe Community Church	0.04	per seat	100	4	600	4	2,400
N	Grace Outreach Church	0.04	per seat	100	4	600	4	2,400
				Total Edu's	**209.4**			
Note: 201 connections				**Total**	**31,410**			**125,640**

4.1 FUTURE WASTEWATER SITUATION – UNINCORPORATED MARSHALL COUNTY PSA's

According to the United States Census Bureau, there were 46,095 people in Marshall County in 2020. Based on information from the Indiana Business Research Center, which is a research unit in the Kelley School of Business at Indiana University, Marshall County is expected to grow to approximately 47,916 people by 2040, which is an increase of about 3.9%.

PSA 1 is primarily located within West Township, but a portion of this area is located within Center Township. The United States Census Bureau indicates that the population of West Township in 2020 was about 3,849 people, and in Center Township, the population was 15,601 people. In 2010, the population of West Township was 4,008, which shows the population has decreased about 4%. In Center Township, the population in 2010 was 15,593, which shows the population over the last decade has slightly increased.

Although the Township population projections did not have a high increase like Marshall County did, a 3.9% growth factor is used to determine the most accurate potential growth in this area.

While the typical projections for infrastructure planning is 20-year horizon, the year of 2041 is used in anticipation that the considered projects for the current service areas will take years to design, permit, and construct if considering all thirteen PSA's.

Due to the current level of build-out, future residential development in the service areas is anticipated to expand up to ten years modestly. However, some growth is anticipated due to infill development of the existing undeveloped platted lots in the existing PSAs.

Relative to the future commercial growth, we are not recommending application of a growth rate to this land use type for undeveloped land over the planning period. This is based on the fact that the land use within the service areas is predominantly residential and also within a lake community, where commercial growth would not likely be expected.

As the service areas include mostly residential properties, it is anticipated that the waste stream will be typical, household domestic strength wastewater. The potential does exist that the future development within the service areas may include some minor commercial strength waste, however, any future development of these service areas must be monitored to ensure the waste load parameters are appropriate to the selected treatment facility's capabilities. For planning purposes, the concept of simultaneous and instantaneous use is routinely applied using the "peaking factor". The peaking factor applied in the tables above is typical for residential waste streams. It is anticipated that any commercial wastewater flow characteristics will be like residential flow factors.

If the considered communities activate a plan to provide sanitary sewer systems, then prudent planning should include sizing of systems for growth over a 20-year planning horizon.

The anticipated future wastewater flows and expected waste loads are presented below.

Table 34 – Future Wastewater Flows & Waste Load

PSA		Avg Flow (GPD)	Peaking Factor	Flow	CBOD (@Average Flow)		TSS (@ Average Flow)		NH3-N (@ Average Flow)		Phos (@ Average Flow)	
					mg/l	lbs./day	mg/l	lbs./day	mg/l	lbs./day	mg/l	lbs./day
1	Latonka, Lawrence Lakes, Mill Pond	97,874	4	391,495	350	285.69	350	285.69	40	32.65	10	8.16
2	East Bremen	26,962	4	107,848	350	78.70	350	78.70	40	8.99	10	2.25
3	North Michigan Area	37,248	4	148,993	350	108.73	350	108.73	40	12.43	10	3.11
4	Rushmoor Addition	10,520	4	42,080	350	30.71	350	30.71	40	3.51	10	0.88
5	Donaldson & Ancilla Domini Convent	53,768	4	215,073	350	156.95	350	156.95	40	17.94	10	4.48
6	McQueen's Broadview	11,377	4	45,508	350	33.21	350	33.21	40	3.80	10	0.95
7	Golfview Estates	5,143	4	20,572	350	15.01	350	15.01	40	1.72	10	0.43
8	Deer Trail, Tall Oaks, and Carriage Hills Subdivision	28,832	4	115,329	350	84.16	350	84.16	40	9.62	10	2.40
9	South Michigan Area	108,160	4	432,640	350	315.72	350	315.72	40	36.08	10	9.02
10	Inwood	8,961	4	35,846	350	26.16	350	26.16	40	2.99	10	0.75
11	Burr Oak	5,299	4	21,196	350	15.47	350	15.47	40	1.77	10	0.44
12	Hawk Lake	4,052	4	16,208	350	11.83	350	11.83	40	1.35	10	0.34
13	State Road 331 S. Tippecanoe	32,635	4	130,540	350	95.26	350	95.26	40	10.89	10	2.72
Total		**430,832**		**1,723,327**		**1,258**		**1,258**		**144**		**36**

5.0 PRIORITIZATION OF NEED

Given the number of unserviced areas throughout the County and that all of them will likely have to address the future of sanitary waste management, some comparative analysis is needed to determine how the community leaders will decide which areas are to be addressed early in the process.

To prioritize the many unserved areas in Marshall County a ranking matrix was developed as to the level of need, the potential for a partnership, and environmental benefit. The following categories and ranking values were applied.

Table 35 – Priority Ranking Matrix

MARSHALL COUNTY PRIORITY RANKING MATRIX						
Category No.	**Ranking Category**	**5**	**4**	**3**	**2**	**1**
1	Proximity to Existing Sewer	Within 300'	Within 1/4 mile	Within 1 mile	Within 3 miles	Greater than 3 miles
2	Proximity to Established Urban Services Boundary	Within boundary	Adjacent to boundary	Within 1/4 mile	Within 1 mile	Greater than 1 mile
	Proximity to Established Area of Planning Influence	Within boundary	Adjacent to boundary	Within 1/4 mile	Within 1 mile	Remote from any municipality
4	Limitations in Local Aquifer	High water table and shallow wells nearby	Shallow wells nearby	High water table		No known limitations
5	Soil Survey Profile for Sanitary Facilities	(1) Very Limited		Moderately Limited		Slightly Limited
6	Proximity to a Surface Water Body or Protected Wetland	Within 300'	Within 600'	Within 1/4 mile	Within 1/2 mile	Greater than 1/2 mile
7	Ability to Issue Code Compliant Permits for On-Site Systems	ATU Required with Mound	Pressure or Flood Dosed Mound Req.			Conventional System
8	Relative Density (per acre)	<4:1	3:01	2:01	1:01	Greater than 1:1
9	Flood Plain	Any Portions in Flood Plain				No portion in the Flood Plain
10	Septic Repair Permits Issued within Last 20 Years	<50% (of Home Sites)		Between 25% and 50%		Between 0% and 25%
11	Records Found for On-Site Systems	Between 0% and 25%		Between 25% and 50%		<50% (of Home Sites)
12	Land Use Type	Existing Industrial/ Commercial Area	Existing Residential			Lot Sizes >1 Acre
13	Level of Support	Requests By Residents to Local Officials	Request/Recommended by Local Officials	Opposed		No Support from Health Officials

(1) If any given PSA included very limited soil conditions are more than 50% of the area within that PSA, then the PSA scored a 5 in that category. All of the PSAs included > 60%.

(2) Category 13 allows scores to be added from both columns 4 and 5.

Figure 1 provides identification (by number) of each service area within unincorporated Marshall County. The service areas are numbered based on ranking from the wastewater matrix (The highest priority areas coincide with the highest ranking. The matrix evaluations for each area are included herein as Appendix B.

The balance of this report will provide details and alternates for initiating that important project.

6.0 PROJECT INFORMATION AND LOCATION

The information presented in this report will provide a basis of design for the wastewater collection system for PSA 1. Based on existing conditions, environmental impacts level of support, and proximity to existing sewer, it has been decided that PSA 1 – Latonka, Lawrence Lakes, Mill Pond is the primary focus for the initial project after District formation. The new District will provide service to households, the existing campgrounds, and commercial users within the area, and will allow the community to better plan for growth and ensure that essential resources are available to do so.

PSA 1 consists of several lakes and ponds within the community, including Latonka Lake, Lawrence Lake, Mill Pond, Myers Lake, Cook Lake, Holem Lake, Kreighbaum Lake, and Thomas Lake. This service area is located approximately 2.3 miles southwest of Plymouth, IN along Olive Trail and approximately 5 miles north of Culver, IN in Sections 21, 22, 23, 24, 19, 13 Township 33 North, Range 2 East and Township 33 North, Range 1 East.

7.0 PROPOSED DISTRICT, SELECTED INITIATING PROJECT

The local officials, including the Health Department, County Commissioners, and County Council have selected PSA 1 as the area with the most urgent need and the highest level of support. PSA 1 also scored highest when applying the ranking matrix presented above (see Appendix B).

8.0 CURRENT SITUATION, PROPOSED REGIONALIZATION

As discussed above, the information below provides strategies for the provision of wastewater services for PSA 1 within Marshall County. The information provided in prior sections discusses existing conditions, facilities, flows, and health hazards. Based on our analysis the initiating project sections regionalize with a nearby existing wastewater treatment facility. The recommended existing facilities and conditions are discussed below.

The recommended connection would be at the city's WWTF. The connection details would be as recommended by the city utility. The facility is located 2.82 miles from the PSA 1 service area.

8.1 EXISTING WASTEWATER TREATMENT FACILITIES – PLYMOUTH, INDIANA

The City of Plymouth is served by the City's wastewater facility located at 900 Oakhill Avenue, Plymouth, IN 46563. The facility is permitted under NPDES IN0020991. The Plymouth facility is Class III, 3.5 MGD activated sludge treatment facility consisting of an automatic bar screen, a grit removal system, two primary clarifiers, two plastic media bio-roughing towers, four aeration tanks, two secondary clarifiers, ultraviolet light disinfection, and influent and effluent flow meters. The treatment system also includes a 0.42 MGD equalization/storm water basin and two wet weather in-line storage systems with 0.15 MGD and 0.14 MGD storage capacities. Biosolids are treated anaerobically and mechanically dewatered. Final solids are disposed of by land application. The collection system is comprised of combined sanitary and storm sewers with ten Combined Sewer Overflow (CSO) locations.

According to the latest and applicable NPDES permit, the following are the current effluent limits for the Plymouth facility.

Table 36 – Existing Plymouth Effluent Permit Limits

	Summer (Monthly Avg)		Summer (Weekly Avg)		Winter (Monthly Avg)		Winter (Weekly Avg)	
Parameter	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**	**(mg/L)**	**(lbs/day)**
CBOD	18	991	27	1487	20	1102	30	1652
TSS	22	1212	33	1818	24	1322	36	1983
Ammonia-Nitrogen	2	110	3	165	3	165	4.5	248
Phosphorus	1 mg/L WQ Rule 327 IAC 5-10-2(b)							
pH	6.0 min to 9.0 max							
Dissolved Oxygen	6.0 Daily Minimum							
E. Coli	125 count/100 mL monthly, 235 count/100 mL daily max							

A review of the Monthly Reports of Operation (MROs) for 2018 through September 2021 shows the facility's average influent flow is 1.6 MGD.

The table below provides an average of influent and effluent concentrations and loadings for the four primary wastewater constituents for the four-year period.

Table 37 – Existing Plymouth Influent Wastewater Parameters

EXISTING WASTEWATER PARAMETERS							
Influent Loading							
CBOD		TSS		Ammonia		Phosphorus	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
314.58	4385.63	236.58	3323.74	22.20	81.18	13.02	194.89

Table 38 – Existing Plymouth Effluent Wastewater Parameters

EXISTING WASTEWATER PARAMETERS							
Effluent Loading							
CBOD		TSS		Ammonia		Phosphorus	
mg/L	lbs.	mg/L	lbs.	mg/L	lbs.	mg/L	lbs.
4.90	64.93	11.27	159.10	0.24	3.26	1.29	14.67

Based on review of records (for the past year) available through the Indiana Department of Environmental Management (IDEM) Virtual File Cabinet (VFC) online database, the facility does appear to have available capacity for added service areas.

The table below shows design treatment plant flows for the facility.

Table 39 – Design Treatment Plant Flows

Design Treatment Plant Flows (MGD)	
Plymouth	
Domestic (D)	0.905
Industrial/Commercial (C)	0.845
Infiltration/Inflow (I)	1.75
Average Design Flow	3.5
Average Design Peak Flow	6.6
Maximum Plant Flow Capacity	8

Capacity certification and interlocal agreements have not yet been acquired, but this process will proceed in the near future as this project advances through the funding commitment process.

8.2 PUBLIC HEALTH HAZARDS / NEED FOR PROJECT PSA 1

As previously mentioned, PSA 1 currently relies on septic systems, which are permitted either through the Marshall County Health Department or the Indiana Department of Health. As shown in Table 20, most of these soils are considered very limited, which means that these soils have one or more features that are unfavorable for the use of septic systems. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. As a result of poor filtering and permeability, the groundwater may become contaminated. This indication justifies the need for this project. Appendix A includes a letter of support from the Marshall County Health department regarding the above information. This letter mentions that septic systems (tank and absorption field) are the main cause of groundwater

contamination in the United States. A study was done on the Yellow River, which is the receiving stream from the City of Plymouth WWTP. This study indicated that there have been high levels of bacteria due to human sources. Furthermore, the letter also discusses the existing situation in Marshall County and the advantages of eliminating septic systems.

8.3 EXISTING MARSHALL COUNTY PSA 1 WASTEWATER – CURRENT FLOWS

Table 40 below presents current estimated wastewater flows for the considered service area. The table also presents the anticipated Equivalent Dwelling Unit (EDU) chart for residential lots and businesses, as well as anticipated connection counts for the service areas. There are three (3) campsites within this PSA, which also generate large amounts of flow.

Based on the history for nearby districts with multiple service areas covering a wide variety of land uses, an average daily flow (ADF) of 150 gallons per day (GPD) per single-family residential dwelling was used as the volumetric multiplier for residential wastewater flow. Several factors justify this lower per day wastewater value. First, collection systems constructed today typically utilize vastly improved construction materials, such as fused HDPE or push on PVC pipe, which has inherently better joint sealing characteristics than previously used vitrified clay or concrete pipe. Second, local governments are much more cognizant of strictly enforcing their building connection and sewer use ordinances to prevent illicit connections and discharges to the sanitary sewer (such as sump pumps, roof drains, yard drains, etc.). Commercial/Industrial flow factors were based on standard multipliers, employee counts, and seat counts, where applicable. Refer to Appendix C for the Wastewater Treatment Plant Design Summary and more information on the existing facilities.

Table 40 - Existing Wastewater Flows and EDU's – PSA 1, Latonka, Lawrence Lakes, Mill Pond

EXISTING WASTEWATER PARAMETERS								
Map Code	**Service Connection Description**	**Unit/Calculation Factor**		**Count**	**EDU's**	**Est. Flows (GPD)**	**Peaking Factor**	**Peak Flows**
A	Residential	1	each	596	596	89,400	4	357,600
B	Montgomery Well Drilling	1	each	1	1	150	4	600
C	Tree Service	1	each	1	1	150	4	600
D	Camper's Roost	0.25	per site + office	51	13.75	2,063	4	8,250
E	Hidden Lake Campground	0.25	per site + office	41	11.25	1,688	4	6,750
F	Redwood Campground	0.25	per site + office	16	5	750	4	3,000
				Total Edu's	**628**			
				Total	**94,200**			**376,800**

Note: 601 connections

9.0 FUTURE WASTEWATER SITUATION – PSA 1

According to the United States Census Bureau, there were 46,095 people in Marshall County in 2020. Based on information from the Indiana Business Research Center, which is a research unit in the Kelley School of Business at Indiana University, Marshall County is expected to grow to approximately 47,916 people by 2040, which is an increase of about 3.9%.

PSA 1 is primarily located within West Township, but a portion of this area is located within Center Township. The United States Census Bureau indicates that the population of West Township in 2020 was about 3,849 people, and in Center Township, the population was 15,601 people. In 2010, the population of West Township was 4,008, which shows the population has decreased about 4%. In Center Township, the population in 2010 was 15,593, which shows the population over the last decade has slightly increased.

Although the Township population projections did not have a high increase like Marshall County did, a 3.9% growth factor is used to determine the most accurate potential growth in this area.

While the typical projections for infrastructure planning is 20-year horizon, the year of 2041 is used in anticipation that the considered projects for the current service areas will take years to design, permit, and construct if considering all thirteen PSA's.

Due to the current level of build-out, future residential development in the service areas is anticipated to expand up to ten years modestly. However, some growth is anticipated due to infill development of the existing undeveloped platted lots in the existing PSAs.

Relative to the future commercial growth, we are not recommending application of a growth rate to this land use type for undeveloped land over the planning period. This is based on the fact that the land use within the service areas is predominantly residential and also within a lake community, where commercial growth would not likely be expected.

As the service areas include mostly residential properties, it is anticipated that the waste stream will be typical, household domestic strength wastewater. The potential does exist that the future development within the service areas may include some minor commercial strength waste, however, any future development of these service areas must be monitored to ensure the waste load parameters are appropriate to the selected treatment facility's capabilities. For planning purposes, the concept of simultaneous and instantaneous use is routinely applied using the "peaking factor". The peaking factor applied above (in Table 40) is typical for residential waste streams. It is anticipated that any commercial wastewater flow characteristics will be like residential flow factors.

9.1 PROJECTED FUTURE WASTEWATER FLOWS

If the considered communities activate a plan to provide sanitary sewer systems, then prudent planning should include sizing of systems for growth over a 20-year planning horizon.

The anticipated future wastewater flows and expected waste loads are presented below.

Table 41 - Future Wastewater Flows & Waste Load

PSA		Avg Flow (GPD)	Peaking Factor	Peak Flow (GPD)	CBOD (@Average Flow)		TSS (@ Average Flow)		NH3-N (@ Average Flow)		Phos (@ Average Flow)	
					mg/l	lbs./day	mg/l	lbs./day	mg/l	lbs./day	mg/l	lbs./day
1	Latonka, Lawrence Lakes, Mill Pond	97,874	4	391,496	350	285.69	350	285.69	40	32.65	10	8.16

10.0 EVALUATION OF ALTERNATIVES

Several alternatives were considered for the wastewater collection and treatment of PSA 1. Both construction and non-construction costs were also developed for these alternates. It should be noted that the costs provided for these alternates are for planning and budgeting purposes only and actual costs may vary depending on the final design. The preliminary costs provided were developed based upon past bids for projects of similar nature, engineering judgment, and vendor quotes, which can change based on the actual design.

Further, the general state of the economy and, construction market during the bidding will have an impact on the actual costs.

There are several wastewater collection and treatment system design concepts that could be applied for the considered service areas. However, the most effective alternates will be some version of a proven and reliable collection and treatment system; as well as a system that the future District staff can operate and maintain efficiently and cost effectively, as a rural utility.

Each alternative has the potential for water and energy efficiency. Every effort should be made to assemble project design recommendations that maximize efficiencies while balancing project cost.

The following alternates for each PSA were evaluated further in subsequent sections:

Collection System Alternatives
- No Action
- Option 1 – Pressure Collection System
- Option 2 – STEP Collection System

Wastewater Treatment
- No Action
- Option 3 – Regionalization with a Local Treatment Provider
- Option 4 – New Extended Aeration WWTP

10.1 COLLECTION SYSTEM ALTERNATIVES

10.1.1 NO ACTION

The “No Action” alternative implies that the County Health Department does nothing to plan for future wastewater infrastructure needs for the long term.

This alternative also implies that the Department, local officials, and end-users take no action towards protecting their private wells from inadequate septic systems and take no action to improve the health and safety of their community or protection of their investment in property value.

The community has evaluated these areas over the years multiple times and until this point in time, there has not been a cost-effective and affordable solution that would replace the existing septic systems. However, with the need for wastewater service becoming an acute issue, the “No Action” Option alternate appears to be unfeasible.

While this alternate results in no capital costs, and in our opinion, it is not a logical solution for the long term. Therefore, this alternate should not be considered any further.

10.1.2 OPTION 1 – PRESSURE COLLECTION SYSTEM

The pressure system consists of prefabricated grinder pump station units installed on each or every other property. This unit is equipped with an electrically powered grinder pump, which receives gravity flow from the building sewer, grinds the wastewater with special rotating cutter blades, and forces the liquid slurry under pressure through a small diameter pressure main network that typically ranges from 1.25” to 8”. A pressure system is a more cost-effective means of wastewater collection from the areas not easily accessible by other collection system alternatives.

A pressure system is technically feasible and reliable and can be implemented. Since the pressure system can be installed using the directional drilling method, the environmental impacts and restoration associated with the construction of this system are minimized as it results in reduced street paving and restoration costs. Typically, the package grinder pump stations, pressure sewer laterals, and electrical service for the grinder pumps are owned, operated, and maintained by the District. Septic tank abandonment will be the responsibility of the property owners. A variation of this concept can place the ownership of individual grinder pump basins with property owners. In that scenario, the pumps are discharged from the District and installed by pre-qualified contractors. All future maintenance and pump power needs are then the responsibility of the property owner. Normally service is provided by pre-qualified providers.

See Figure 4.1 for the preliminary design of the pressure sewer option for PSA 1. Refer to Appendix D for the cost estimates for this alternative.

At this time, the assumed connection point would be a manhole located at the intersection of 11th Road and Olive Trail, which will then convey flows to the Plymouth WWTP.

10.1.3 OPTION 2 – EFFLUENT SEWER COLLECTION SYSTEM

Effluent sewer systems, also called Septic Tank Effluent Pump (STEP) or solids-free sewer (SFS) systems, including septic tanks (or trash tanks) that collect sewage from residences and businesses, and then only the effluent from the tank is sent to either a centralized sewage treatment plant or a distributed treatment system for final treatment. As the solids remain in the septic tanks, treatment plants can be much smaller than typical. In addition, because of the vast reduction in solid waste, a relatively simple pumping system can be used to move the wastewater in lieu of grinder pumps or gravity sewage lines.

Under this design concept, certain homes with aging septic tanks will be provided with a new composite two-compartment tank, and every home will be provided with an effluent pump tank. Normally, the pump tank would be connected to the home's power supply and control panel, and the alarm is also included in the installation. The pump system is normally owned and maintained by the rural utility and periodic septic tank pumping is included in the utility's schedule of operations. Service and pumping are included in the customer's monthly charge. Figure 5.1 provides the preliminary STEP sewer layout for PSA 1.

Summarized costs for these alternatives are shown in Section 10.3, and details of the costs are provided in Appendix D.

10.2 WASTEWATER TREATMENT ALTERNATIVES

10.2.1 OPTION 3 – REGIONALIZATION WITH A LOCAL TREATMENT PROVIDER

Based on a review of nearby wastewater collection and treatment systems, the most feasible option for regionalization would be the Plymouth wastewater treatment plant.

In each case, a facility is within reasonable distance to each considered service area.

For this option, the wastewater collected from the considered service area would be conveyed from the chosen collection system to a pump station, then through a force main to the point of connection to the treatment providers.

Based on the review of the existing information, the local treatment systems have adequate capacity.

Based on the analysis included in Section 4.0 above, average daily flows from the new service areas are provided in Table 40. Please see Appendix D for the itemized cost estimates and operating budgets for this option.

10.2.2 OPTION 4 – NEW EXTENDED AERATION WWTP

Assuming an interlocal agreement for treatment of PSA 1 waste is not possible or is not approved by the local provider, a second option for treatment would include constructing a new facility. The new facility would be located within or close to the service area and would be sized to provide treatment for the initial volumes from the community. As a result, the extended-aeration activated-sludge treatment process is considered further for a new WWTP.

The treatment process occurs within a series of rectangular concrete tanks constructed with common walls and features continuous discharge clarifiers. This system consists of a selector tank, primary and secondary aeration tanks, secondary clarifiers, and an anaerobic sludge digestion tank. It would be preceded by a mechanically cleaned fine screen headwork structure, and followed by post-aeration, disinfection, and flow measurement prior to eventual stream discharge.

For option 4, it is important to understand that IDEM may require an anti-degradation study and will require acknowledgment from nearby treatment providers that an interlocal agreement for wastewater treatment is not possible.

See Appendix D for the itemized cost estimates for the construction of a new extended aeration treatment plant for the individual service areas.

10.3 SUMMARIZED COSTS FOR ALL OPTIONS

The table below provides a summary of project costs for each of the options for PSA 1. Refer to Appendix D for the itemized cost estimate breakdown.

Table 42 - Summarized Costs for All Options – PSA 1, Latonka, Lawrence Lakes, Mill Pond

	Construction Costs	O, M, & R Costs	Salvage Value
Collection System Alternatives			
Pressure Sewer	$15,230,000	$228,000	$4,927,000
Effluent Sewer	$17,016,000	$177,000	$5,132,000
Treatment System Alternatives			
Transmission/Regionalization	$1,080,000	$186,000	$451,000
Extended Aeration WWTP	$5,014,000	$258,000	$2,364,000

10.4 PRESENT WORTH ANALYSES FOR ALL OPTIONS

A cost and effective analysis or Present Worth Cost Analysis, as required, was completed for the above collection system and treatment options. This analysis was performed for a 20-year planning period using the real discount rate of -0.5% OMB Circular A-094. This rate is the updated value for 2022 as of November 2020. The Present Worth Cost Analysis can be seen on the following pages.

Table 43 - PSA 1 – Latonka, Lawrence Lakes, Mill Pond, Present Worth Analysis, Collection Alternatives

PRESENT WORTH ANALYSIS OF COLLECTION SYSTEM ALTERNATIVES		
Cost Summary	**Pressure Sewer System**	**Effluent Sewer System**
Construction Cost	$15,230,000.00	$17,016,000.00
Annual O, M & R Cost	$228,000.00	$177,000.00
Salvage Value	$4,927,000.00	$5,132,000.00
Present Worth Analysis (20 Yrs @ -0.50% Interest)		
Construction Cost	$15,230,000.00	$17,016,000.00
PW of Annual O, M & R (1)	$4,808,436.55	$3,732,865.22
PW of Salvage (2)	$5,446,543.13	$5,673,160.01
Present Worth of Costs (3)	**$14,591,893.42**	**$15,075,705.21**

(1) PW Factor = 21.090 using the formula $P=A[((1+i)^n-1)/(i(1+i)^n)]$

(2) PW Factor = 1.1054 using the formula $P=F(1+i)^n$

(3) Total PW = Construction Cost + PW of O, M & R – PW of Salvage

Table 44- PSA 1 – Latonka, Lawrence Lakes, Mill Pond, Present Worth Analysis, Treatment Alternatives

PRESENT WORTH ANALYSIS OF TREATMENT ALTERNATIVES		
Cost Summary	**Regionalization**	**Extended Aeration WWTP**
Construction Cost	$1,080,000.00	$5,014,000.00
Annual O, M & R Cost	$186,000.00	$258,000.00
Salvage Value	$451,000.00	$2,364,000.00
Present Worth Analysis (20 Yrs @ -0.50% Interest)		
Construction Cost	$1,080,000.00	$5,014,000.00
PW of Annual O, M & R (1)	$3,922,671.92	$5,441,125.57
PW of Salvage (2)	$498,557.12	$2,613,279.47
Present Worth of Costs (3)	**$4,504,114.80**	**$7,841,846.10**

(1) PW Factor = 21.090 using the formula $P=A[((1+i)^n-1)/(i(1+i)^n)]$

(2) PW Factor = 1.1054 using the formula $P=F(1+i)^n$

(3) Total PW = Construction Cost + PW of O, M & R – PW of Salvage

A cost and effectiveness analysis will be completed to meet the minimum requirements of the Water Resources Reform and Development Act of 2014.

11.0 EVALUATION OF ENVIRONMENTAL IMPACTS

This chapter will identify, review, and discuss the negative environmental impacts that could result from the construction of the proposed system for PSA 1. This section only provides a discussion on the selected alternatives for this project.

Pressure Sewer System - With the pressure sewer, the main pressure line will be located primarily immediately adjacent to the existing roadway in existing grassed side ditches or stone/grass road shoulders. The pressure sewer will be installed using the directional drill method of installation, which reduces the number of trenches and land disturbances. However, existing landscaping of individual properties will be disturbed from the installation of package grinder pump stations. The proposed pressure sewer service laterals will extend from the main pressure sewer in the road right of way and extend to the proposed grinder pump stations. A curb stop and check valve assembly will be installed at the right of way line. Each customer will be responsible to connect their private sewer lateral to the package grinder pump station.

The pump stations will be installed using the open-cut method of installation.

Erosion control measures will be required via project specifications and enforced throughout the construction process. The Contractor will be required to restore disturbed areas to preconstruction conditions, or better, prior to project completion.

11.1 LOCATION OF DISTURBED AND UNDISTURBED LAND

Projects of this nature and scale involve land-disturbing activities. The project will be designed to keep as much of the pipeline as possible within the previously disturbed roadway rights-of-way. Where possible, the project improvements will be located within the pavement limits, or within the right of way. As mentioned in Section 1.0, this PSA is located within a waterfront community, about 2.3 miles southwest of Plymouth, along Olive Trail.

Most of the proposed wastewater collection system will be constructed within the existing public road apparent rights-of-way just under the pavement or within five (5) feet of the pavement. Segments of county roads do not have documented rights-of-way. In these segments, the District may need to acquire easements for the sewer system that will be located within the apparent right of way. See Figures 6.1.1 and 6.1.2 for segments of pressure sewer and force mains that will be located outside of the apparent right of way in either farm fields or other undisturbed lands and areas where the District may need to acquire easements.

The main pressure sewer lines, force mains, and pump stations will be installed in or adjacent to existing roadway systems controlled by Marshall County (asphalt, stone, stone shoulders, grassed shoulders, grassed roadside drainage swales).

The pressure sewer will be installed using the directional drill method of installation, which will minimize land disturbance activities. It is anticipated that there will be excavations at each crossover connection point along with the pressure sewer, service lateral connection point, each manhole structure (junction points, end of lines, and air release valve locations). The approximate disturbed area for each excavation will be as follows:

Table 45 – Summary of Excavations – Pressure Sewer System

Description	Area
Manhole Structure- includes air release valve structures and flushing stations	8’ x 8’x 6’ depth
Pressure sewer Lateral connection at mainline	5’ x 5’ x 6’ depth
Package grinder pump station	6’ x 10’ x 8’ depth
Electrical riser	2’ x 2’ x 3’ depth
Crossover connection	5’ x 8’ x 6’ depth
Launch/Receive Points	6' x 20' x 6' depth
Air Release Valve Structure	8' x 8' x 6' depth
Tie-In/Crossover Connection	5' x 8' x 6' Depth
Pump Station	25' x 25" - 15' depth
Valve Vault	9' x 6' x 9' depth

In addition, some surface disturbance can be expected with the excavators and directional drill machines used for a project of this nature. The approximate footprint of the drilling machine and resulting disturbed area would be about 8’ x 20’. This disturbance would occur at structure locations and at crossover connection locations.

The proposed pump station sites will be located within farmland sites, approximately 75-feet by 75-feet and adjacent to existing roadways. It is anticipated that the pump station sites will be disturbed with a large excavation occurring for the wet well and valve vault.

Erosion control measures will be required via project specifications and enforced throughout the construction process. The contractor will be required to restore disturbed areas to preconstruction conditions, or better, prior to project completion.

11.2 HISTORIC AND ARCHAEOLOGICAL RESOURCES

A Historical and Archaeological Report will be completed for the project and will be included in a future pre-funding qualification and application following the selection of the appropriate funding resource.

Existing yards and some roadside vegetative plantings could be impacted with installation of the pump stations, force mains, pressure sewer laterals, and package grinder pump stations. The Contractor will be required to stabilize areas disturbed by construction and restore yards, lawns, street side plantings, and other disturbed areas as part of the project. The Contractor will be required to video record the existing conditions prior to construction to document the existing conditions to help resolve any disputes that might arise from the construction of the project. See Figure Set 7 for the historical maps for the PSAs.

11.3 WETLANDS, HYDROLOGY, GROUNDWATER, AND 100-YEAR FLOODPLAIN

A wetland screening will be conducted for this project. The investigations and reviews will be included in Appendix E once the study is complete. See Figure Set 8 for the wetlands maps of the PSAs.

Wetland crossings are anticipated within PSA 1 in the following areas:

- S SR 17 (Riverine)
- Latonka Trail (Freshwater Forested Shrub/Wetland)
- Rose Road (Lake)
- S Rose Road (Freshwater Forested Shrub/Wetland and Freshwater Pond)
- Happy Acres Trail to Olive Trail through vegetated areas (Freshwater Forested Shrub/Wetland, Freshwater Pond, Freshwater Emergent Wetland)

It is anticipated that the sewer corridor width will be less than 30 feet. Total wetland disturbance will be confirmed with the Wetland Study. Appropriate permits will be submitted with the proposed crossings. The disturbed wetland area will be restored with native plantings appropriate for the wetland areas.

The project will not affect waters of high quality listed in 327 IAC 2-1-2(3), exceptional use streams listed in 327 IAC 2-1-11(b), Natural, Scenic and Recreational Rivers and Streams listed in 312 IAC 7-(2), Salmonid Streams listed in 327 IAC 2-1.5-5(a)(3), or waters on the Outstanding Rivers List (Natural Resources Commission Non-Rule Policy Document).

Construction activities will be located directly adjacent to or will cross existing floodplains and floodways. Crossings will be accomplished via directional drilling. An IDNR Flood Control Permit will be submitted. See Figure Set 9 for the floodplain maps.

Floodplain crossings are anticipated within PSA 1 in the following areas:

- S SR 17
- Rose Road
- S Rose Road
- Mill Pond Trail
- Queen Road
- Chippewa Trail
- Choctaw Trail
- Havasu Trail
- Olive Trail

For the remainder of the project, construction activity in or near wetlands and floodplains will be avoided. Some wetlands and floodplains do exist directly adjacent to the proposed pressure sewer. The use of horizontal directional drilling installation will greatly reduce disturbed areas in general and allow the piping to be installed without disturbing the adjacent wetlands.

It is anticipated that some local dewatering will be needed for the installation of the structures and for the installation of package grinder pump stations. If dewatering is necessary, the Contractor will be required to discharge to a suitable location and provide a settling basin or filtering bag to

capture solids prior to the discharge. The project is not within the limits of the St. Joseph Sole Source Aquifer.

11.4 PLANTS AND ANIMALS

The project is expected to have minimal impact to plants and animals during construction and no impact afterward. As discussed previously, most of the project elements will be installed within the existing pavement or adjacent shoulder area of roadways. Existing yards and some roadside vegetative plantings could be impacted with the installation of the gravity sewer laterals and lift stations. The Contractor will be required to stabilize areas disturbed by construction and restore yards, lawns, street-side plantings, and other disturbed areas as part of the project. The Contractor will be required to video record the existing conditions prior to construction to document the existing conditions to help resolve any disputes that might arise from the construction of the project. Therefore, disturbance to plants and animals will be minimal to none. The Contractor will not be allowed to remove any trees without prior approval.

11.5 PRIME FARMLAND AND GEOLOGY

The construction of the project will have minimal impact on farmlands. Based on the proposed route of the sewer, there are no segments that will be built in or across farmland. However, the proposed pump stations are expected to be installed within farmland sites.

11.6 AIR QUALITY

Construction activities will generate noise, fumes, and dust, but are not expected to significantly affect air quality. The contractor will be required to control fumes and fugitive dust. Work hours will be limited to regular daylight hours to minimize disturbances to residents during early morning and evening/nighttime.

11.7 OPEN SPACE AND RECREATIONAL OPPORTUNITIES

The proposed project's construction and operation will neither create nor destroy open space and recreational opportunities.

11.8 LAKE MICHIGAN COASTAL PROGRAM

The proposed project will not affect the Lake Michigan Coastal Zone.

11.9 NATURAL LANDMARKS

The construction and operation of the proposed project will not impact National Natural Landmarks.

11.10 SECONDARY IMPACTS

The District, to the extent possible through its limited authority, will strive to ensure that future development, as well as future collection system or treatment works projects connecting to the State Revolving Funds (SRF) funded facilities will not adversely impact archaeological/ historical/ structural resources, wetlands, wooded areas, or other sensitive environmental resources. The District will, to the extent possible under its limited authority, strive to require that new development and treatment works projects be constructed within the guidelines of the U.S. Fish and Wildlife Service, IDNR, IDEM, and other environmental review authorities.

11.11 MITIGATION MEASURES

The Contractor will be required to comply with the requirements of the erosion control measures that will be part of the final design project plans and specifications. The Contractor will be required to comply with the terms and conditions of the permits and approval from the various agencies.

12.0 SELECTED PLAN & PROPOSED PROJECT

Based on review of the alternatives considered, the construction of a pressure collection system and regionalizing with Plymouth were determined to be the most feasible options when considering the 20-year present worth analysis and the operational capacity of the receiving treatment provider. The recommended & selected plan addresses current needs & provides flexibility to address future demands and needs.

A pressure sewer collection system and regionalization with the City of Plymouth was recommended and selected for the following reasons:

- It is the most cost-effective option from a present worth analysis
- The City of Plymouth's existing WWTP has sufficient capacity to provide treatment for **PSA 1** wastewater flows
- The need for septic system elimination is critical
- This alternative provides adequate capacity of existing and future wastewater flows

An anticipated overall project schedule is provided below on Table 46.

Table 46 – Project Schedule

Task	Date
PER Public Hearing	February 2024
PER Submittal	March 2024
PER Approval	April 2024
Begin Design	February/March 2024
Land and Easement Acquisition	March 2024 thru December 2024
Complete Design	November 2024
Plans and Specs Submittal	November 2024
Plans and Specs Approval	December 2024 thru January 2025
Submit Permit Applications	December 2024 thru January 2025
Permits Issued	February 2025 thru March 2025
Advertisement for Bids	April 2025
Receive Bids	May 2025
Loan Closing	June 2025
Contract Award	June 2025
Begin Construction	June 2025 thru July 2025
Construction Completion	October 2027
Begin Operations	November 2027

NOTE: *The project schedule presented above is based upon the overall Engineering & Permitting Process that the recommended project is subject to as well as various procedures and milestones associated with the non-local funding the project is in the process of procuring. This schedule may need to be updated from time to time throughout the same as these efforts continue.*

It is anticipated that the following permits will be required as a part of this project:

- IDEM Sanitary Sewer Construction Permit
- INDOT Cut Road and Right-of-Way Permit
- Marshall County Highway Department Right-of-Way/Road Cut Permit
- Indiana Rule 5 Stormwater Erosion Control Permit
- IDEM Section 401 Water Quality Certification Regional General Permit
- IDNR Flood Control Permit

The proposed wastewater collection system and force main will be primarily constructed within the existing county road and/or INDOT rights-of-way. Blanket easements will also be required for the installation of the grinder pump units on individual lots, where applicable.

12.1 EQUIPMENT PRESELECTION

It is intended that the District will, during the preliminary design phase, request competitive quotations for the package grinder pump station equipment and pump station pumps and controls due to them being a critical component to the project. Selecting the equipment as part of the design phase will ensure a smooth transition from design to construction and ensure the District will receive a reliable and quality product for the best long-term operation of the proposed wastewater system.

Upon a successful competitive quotation process, the project will be designed around the selected equipment. The bid documents will be set up to name the equipment procured in the bid form with an additional line item for installation costs of the selected equipment.

The successful competitive quotation package will be included in the project manual of the bidding and contract documents, including the terms and conditions, delivery time frames, etc.

13.0 LEGAL, FINANCIAL & MANAGERIAL CAPACITY

As discussed previously, the selected and recommended project will be owned, operated, and maintained by the District. The overall project cost construction cost summary and non-construction cost breakdown is presented in the following table.

Table 47 - Combined Total Project Cost Summary

Construction	
Collection System - Pressure Sewer System	$15,230,000
Treatment System - Regionalization	$1,080,000
Sub-Total	$16,310,000
Construction Contingency (10%)	$1,631,000
Total Estimated Construction Costs	**$17,941,000**
Non-Construction Costs	**TOTAL**
Preliminary Engineering Report	$40,000
Surveying/Design/ Permitting, Bidding	$1,794,000
Construction Administration/ Post Construction	$359,000
Inspection	$538,000
Easement Descriptions/Assistance and blanket easement assistance	$125,000
Land/Easement acquisition	$100,000
Rate Consultant	$125,000
Local Counsel	$100,000
Bond Counsel	$75,000
Misc. Administration Costs	$50,000
Davis-Bacon Labor Standards Administrator	$18,000
Outside Consulting (Soil Boring, Arch. & Historical, Wetland Survey, Etc.)	$125,000
Total Estimated Non-Construction Costs	**$3,449,000**
Total Project Costs	**$21,390,000**

It is understood that the actual land value/cost as presented in detailed cost estimate, is not eligible for SRF reimbursement. It is anticipated that the District via its customers will be directly responsible for these costs. Appendix F includes the SRF Project Financing Form and Appendix G includes the Preliminary Rate Analysis. Tables D1 through D8 in Appendix D include overall costs for each alternative.

The District will develop an Asset Management Program that meets the requirements defined by the State Revolving Fund's Asset Management Program Guidelines pursuant to Indiana Code 5-1.2-10-16, and will submit an Asset Management and Fiscal Sustainability Plan that meets the minimum requirements listed in the Federal Water Pollution Control Act Section 603(d)(1)(E)(i) and will submit a completed Asset Management Program Certification Form Inclusive of Fiscal Sustainability Plan Certification Form, prior to request for final disbursement related to the primary project. Appendix H will include the AMP-FSP Certification Form after its completion.

The District's Financial Advisor is:
Jeff Rowe
Baker Tilly Municipal Advisors, LLC
112 Ironworks Avenue
Mishawaka, IN 46544
(574) 935-5178

14.0 PUBLIC PARTICIPATION

The District held a public meeting on Monday February 21, 2022 at 6:00 pm at the Marshall County Building, located at 112 W Jefferson Street, Plymouth, IN 46563. At the meeting, the project details and overview were discussed, and customers were given the opportunity to ask questions and make comments. The documentation for the public meeting can be found in Appendix I and will include the following:

1. Public Meeting Sign-in Sheet
2. Meeting Minutes
3. All (if any) written comments submitted by the public, including comments submitted during the meeting and the 5-day post-meeting comment period
4. Press Release

A video of the public meeting can be found at the following link:
https://app.skysite.com/Download/Download?Key=%2fEbKeOdEFI1hSjBtSGVIMeLQlyXwbXfaE8IesMfoSRZS1%2fiOkvdQ44yIT5WpufQZ9q5vkXqo3lKojlOiJFDzfBLE38mjI9ErPNKRvRZ2%2fh66yxNAtnCHSJ7XA2DoLdYZ.

There have been additional public meetings where a presentation was given to the public.

IDEM will hold a public hearing for the project in the near future.

15.0 CONCLUSION / RECOMMENDATIONS

Based on the information presented in this report, it is clear that a Regional Sewer District that includes PSA 1 thru PSA 13 should be approved By IDEM's Commissioner as soon as possible.

Assuming the District is formed and appointment of Trustees, the District should file the requisite facility plan and implement the initiating project as discussed above.

The Trustees should also conduct a long-range plan to establish a recommended schedule for the balance of the PSA project areas.