



**ACT 537 SEWAGE FACILITY PLAN-SPECIAL STUDY
FOR POTENTIAL PUBLIC SEWER AREA**

Prepared For:

Marion Township
Berks County, Pennsylvania

Prepared By:

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EXECUTIVE SUMMARY

The current planning effort has been prepared in accordance with PADEP guidelines. This Special Study focuses on the Public Sewer Area approved in the 2019 Act 537 Plan Update and considers the advantages and disadvantages of the Approved Alternative and a Low-Pressure Sewer Alternative for the potential Public Sewer Area.

Except for Dutch Valley Food Distributors, Inc., a commercial business, in the western section of the Township and Stonecroft Village, a residential community, in the southeastern part of the Township, all areas of the Township are served by private on-lot disposal systems. A sewage needs analysis was conducted in 2006 by reviewing Township SEO records and performing a house-to-house survey. The potential Public Sewer Area was determined by the needs analysis.

There has been limited development in the Township due to the significant amount of protected agricultural space. Future growth is expected to be minimal.

The potential Public Sewer Area includes Phase 1.B and Phase 2 as described in the Act 537 Plan Update. The total potential Public Sewer Area includes approximately 300 EDUs or a project flow of 67,500 GPD.

Due to the exceedingly high costs associated with the Approved Alternative, the Township conducted several evaluations to determine feasibility. A geotechnical exploration and evaluation concluded that significant rock could be encountered along the conveyance route to the Womelsdorf Sewer Authority (WSA) public sewer connection. The Alternative Analysis, including a present worth analysis, concludes that considerable savings could be realized by using a low-pressure sewer system to serve the potential Public Sewer Area.

The individual tapping fees and a reimbursement fee for a previous upgrade to the WSA will add more than \$3.6 million to the construction cost to provide public sewer to the potential Public Sewer Area. Construction costs and the WSA fees will translate to an equivalent connection fee of almost \$50,000 per EDU, nearly double the maximum PENNVEST Homeowner On-Lot Sewage Disposal and Lateral Repair Loan program funding offered to individual qualifying residents.

Upon detailed analysis of the Township's sewer needs, exploration of its geography, and estimates of the public sewer project costs, the Township believes that the public sewer project will only be feasible by securing State and Federal grants of no less than eight million dollars (\$8,000,000).

The Township has made recent applications for grant funding, received a partial grant award to complete the design, and has applied for an additional grant to complete a low-pressure sewer design. The Township plans to complete the low-pressure sewer design and apply for the necessary construction grants to complete the project.

PROJECT NARRATIVE

1. Current Act 537 Planning

- A. In May 2019, Marion Township received notice of the Official Plan Update approval dated May 15th from the Pennsylvania Department of Environmental Protection (PADEP). The Plan Update approval provides for the installation of public sewer to serve areas of Stouchsburg Village, US 422 area with Erdis Road, Upper Canal Road, Lower Canal Road, and Shady Cabin Circle (Public Sewer Area) through a combination of gravity and low-pressure sewer collection and pumping conveyance systems to the Womelsdorf Wastewater Treatment Plant (Approved Alternative). The remainder of the Township will continue to use on-lot sewage facilities for treatment. Please see the May 15, 2019, approval letter in **Appendix A**.
- B. The Official Plan Update provided three (3) alternatives for consideration:
- *Alternative 1 - "No Action Alternative"*: Typically considered when there is no threat to public health or water resources.
 - *Alternative 2 - "Continued Use of Existing OLDs"*: Considered for areas outside the Public Sewer Area.
 - *Alternative 3 - "Public collection conveyance and treatment"*: Considered use of one sewage treatment plant to serve the Public Sewer Area. Alternative 3 was separated into four sub-alternatives.
 - *Alternative 3.a (Approved Alternative)* – Collection and conveyance from the Public Sewer Area under the Tulpehocken Creek and into the Womelsdorf Sewer Authority public sewer around North 6th Street in Wolmelsdorf Borough.
 - *Alternatives 3.b; 3.c; and 3.d* – Considered the use of one municipally owned sewage treatment plant, as described in the Official Plan Update as the Feeg Tract; the Martin Tract, and the Brubaker Tract. It was determined that Alternatives 3.b through 3.d were not feasible due to the elevated costs required for property purchase and construction of treatment facilities.
- C. The Official Plan Update provides for the connection of the Public Sewer Area in two phases:
- Phase 1.B includes properties in and around Stouchsburg Village, several commercial properties along US 422; Erdis Road; several properties on Sheridan Road; and properties along Canal Road around Shady Cabins Circle and the Shady Cabins Circle development.
 - Phase 2 includes all other properties in the Public Sewer Area.

Please refer to **Plate 1** for the **Approved Public Sewer Area** phases and location of the public sewer connection.

2. Physical and Demographic Analysis

A. The following analysis is a summary of information provided in the Official Plan Update:

1. The Township drains into two major drainage basins. The land in the northwestern section drains into the Little Swatara Creek subbasin. This is Phase 1.A of the Official Plan Update. The remainder of the Township drains into the Tulpehocken Creek.
2. Over 80% of the Township is underlain by limestone formations.
 - o The only properties with a potable water supply are those that exist within the Stonecroft Village. All the other properties within the Township obtain a potable water supply from privately owned wells.
3. The Public Sewer Area is in the southeastern section of the Township.

3. Existing Sewage Facilities

A. The following description is a summary of the information provided in the Official Plan Update:

1. Dutch Valley Food Distributors, Inc., a commercial business, is in the western section of the Township and is provided sewer service by the Tulpehocken Township system in Mt. Aetna. This is the only area of the Township served by Tulpehocken Township.
2. Stonecroft Village, a residential community, in the southeastern part of the Township is provided public sewer service by the Womelsdorf Sewer Authority (WSA).
3. All other areas of the Township are served by private on-lot disposal systems.
4. A sewage needs analysis was conducted in 2006 by reviewing Township SEO records and performing a house-to-house survey. The Public Sewer Area was determined by the needs analysis.

B. Sewage Management Program Ordinance

1. In accordance with the May 15, 2019, PADEP Act 537 Official Plan Update approval letter, the Township has implemented a sewage management program ordinance requiring the regular pumping and observation of on-lot systems. The Township initiated the sewer management program in October 2021, setting the period for pumping and observation of District 1 from January 2022 until December 2023. As of January 12, 2024, the Township has received eighty-eight (**88**) observation reports. These reports have been logged into the system and will be included in the SMP 2023 Annual Report.
2. In October 2023, the Township adopted Ordinance #2023-1, amending Ordinance No. 2019-2.
3. In November 2023, the Township adopted Resolution #2023-10, revising the SMP guidance booklet to specify the information and documentation the Pumpers/Haulers must provide to the Township.

4. A complete copy of Ordinance # 2023-1, Ordinance #2019-2, and Resolution #2023-10 are provided in **Appendix B**.

4. Future Growth and Land Development

- A. According to the Official Plan, there has been limited development in the Township. Population increases from 2010 to 2020 were expected to be approximately 5%. Due to the significant amount of protected agricultural space, future growth is limited.

5. Equivalent Dwelling Unit (EDU) Evaluation

- A. In December 2022, the Township completed an EDU Evaluation of the Public Sewer Area to determine the potential number of connections and EDUs in Phase 1.B and 2. The EDU evaluation concluded that:

- Phase 1.B includes approximately 179 parcels serving approximately 202 EDUs.
- Phase 2 includes approximately 54 parcels serving approximately 65 EDUs.
- Phase 1.B and Phase 2 include approximately 233 parcels serving approximately 267 EDUs.
- Allowing for a small amount of growth, a total of 300 proposed and future EDUs should be used to size the low-pressure sewer system serving the Public Sewer Area (approximately 12% growth).

A complete copy of the EDU Evaluation is provided in **Appendix C**.

6. Expected Sewer Flow Rates

- A. Sewer flow rates for the public sewer areas were determined considering the 2020 US Census data showing an average of 2.5 persons per household in Marion Township and 90 gallons per day per capita or 225 gallons per EDU. Proposed and future flow rates were estimated as:

Public Sewer Area	EDUs	Gallons Per Day (GPD)
Phase 1.B Proposed	202	45,450
Phase 2 Proposed	65	14,625
Phase 1.B and Phase 2 Future	33	7,425
<i>Total Public Sewer Area</i>	300	67,500

- B. Actual flow rates are expected to be less than the planned flow rates, particularly when using a completely low-pressure sewer system.

7. Alternative Analysis

A. Background

- As outlined in the Official Plan Update, the Township Public Sewer Area requires a small number of properties connect to Womelsdorf Sewer Authority (WSA) through a remote public sewer system. The majority of the 233 properties in need are more than two (2) miles from the WSA point of connection.
- Due to the expensive costs associated with the Approved Alternative, the Township completed additional studies to develop a better understanding of a low-pressure sewer alternative available to serve the Public Sewer Area.

B. Sewer Design Comparison

In January 2023, the Township completed a Sewer Design Comparison of the Public Sewer Area comparing the Approved Alternative concept (combination gravity/ low-pressure sewer system) to a complete low-pressure sewer concept alternative (Low-Pressure Alternative). The comparison used the proposed and future flows from 300 EDUs of the Public Sewer Area and assumed the same point of connection into WSA.

The Comparison:

- Suggests that the location of the public pumping station should be reconsidered to reduce the amount of deep sewer required.
- Identifies the need for and the cost of the deep sewers along Canal Road and the deep wet well for the public pumping station.
- Considers the Township costs associated with operating the public pumping station.
- Considers the individual costs associated with the purchase of the low-pressure grinder pumps and the maintenance required for operation.
- Provides advantages and disadvantages of each alternative.

A complete copy of the Sewer Design Comparison is provided in **Appendix D**.

C. Geotechnical Exploration and Evaluation

During the summer of 2023, a geotechnical exploration and evaluation report was completed on behalf of the Township by Hillis Carnes Engineering Associates, Inc. Thirty-seven (37) soil/rock borings along Canal Road were completed to determine the depth to bedrock. A **Boring Location Key** is provided in **Plate 2**. A table provided on the Key shows the boring number, drilled depth, depth to bedrock, and the approximate depth of gravity sewer at the boring.

The complete geotechnical exploration and evaluation report is included in **Appendix E**. Section 4 of the report provides evaluations and recommendations and is summarized as follows:

- Auger probes performed along the southern side of Canal Road between Main Street and Sheridan Road obtained auger refusal on the apparent top of bedrock ranging from 2.6 to 7.5 feet below existing site grades, indicating a very shallow bedrock.
- Auger probes and test borings performed along the southern side of Canal Road between Sheridan Road and Shady Cabin Lane obtained auger refusal ranging from 4.2 to 11.0 feet in depth below existing site grades, indicating a shallow and variable bedrock surface.
- It should be noted that based on the results of the boring program and review of published geological data, the project site is underlain by Karst geology, resulting in a pinnacled bedrock surface. The irregularity of the rock surface means that the elevation of the rock surface can vary over even a short lateral distance. Therefore, the potential exists for bedrock to be encountered at elevations that vary significantly from the elevation in which bedrock was encountered in the boring program.
- Excavation difficulties are anticipated to increase with increased depth; oversized equipment and special excavation techniques may be necessary.

Given these and other evaluations and recommendations included in the Geotechnical Report, the depth and width of the sewer excavations will drastically increase construction costs.

D. Low-Pressure Alternative

The Low-Pressure Alternative will decrease the depth of sewer required and eliminate the need for a publicly owned pumping station. Pipe lengths required for the low-pressure alternative will be similar to the Approved Alternative; both are approximated to be 26,000 feet.

Pipe diameters for the Approved Alternative will include 4-inch private laterals, 6-inch public sewer stubs, and an 8-inch sewer main. Pipe diameters for the Low-Pressure Alternative will be reduced including 1-1/4-inch pressure sewer laterals and 2-inch to 4-inch pressurized sewer main.

Please refer to **Plate 3** for the **Low-Pressure Alternative concept plan**.

E. Present Worth Analysis of Approved Alternative vs. Low-Pressure Alternative

A present worth analysis was prepared for 267 EDUs considering a 20-year life cycle for the two alternatives. Conceptual construction costs are based on information received from pipeline and equipment vendors and contractors.

1. *Approved Alternative*: Publicly owned conventional gravity sewer service draining to a publicly owned sewage pumping station with conveyance to the point of connection with the WSA public sewer system. Several individually owned grinder pumps are proposed to provide sewerage from remote and/or low-lying areas. These individually owned grinder pumps are not included in the present worth analysis to simplify the analysis.

Present Worth Approved Alternative₂₀(PWAA)

Construction Costs	= \$14,600,000
Annual Operating Costs	= \$19,700
10-year Pump Maintenance	= \$20,000
15-year Control Panel Replacement	= \$15,000
20-year Pump Replacement	= \$30,000

$$\begin{aligned} \text{PWAA} &= \$14,600,000 + (\$19,700 \times 20) + \$20,000 + \$15,000 + \$30,000 \\ &= \$15,059,000 \end{aligned}$$

2. *Low-Pressure Alternative*: Individually owned low-pressure sewer grinder pumps connecting into a publicly owned low-pressure sewer system with a pressurized discharge to the point of connection with the WSA public sewer system. The Public Sewer Area is considered to include 267 EDUs and use 233 individual grinder pumps.

Present Worth Low-Pressure Alternative₂₀(PWLPA)

Construction Costs	= \$9,700,000
Annual Electric Costs	= \$25 x 233 Units = \$5,825
Annual Pump Maintenance	= \$100 x 233 Units = \$23,300
10-year Pump Maintenance	= \$900 x 233 Units = \$ 209,700
20-year Pump Replacement	= \$4,200 x 233 Units = \$ 978,600

$$\begin{aligned} \text{PWLPA} &= \$9,700,000 + (\$5,825 \times 20) + (\$23,300 \times 20) + \$209,700 + \$978,600 \\ &= \$11,470,800 \end{aligned}$$

Assuming the connection of 233 grinder pumps the Low-Pressure Alternative could save each connection \$15,400 over the 20-year lifespan.

F. WSA Tapping Fee, Reimbursement Fee, and User Fee

The Official Act 537 Plan Update provided estimates for the construction costs associated with the Approved Alternative. Individual tapping fees, user fees, and a reimbursement fee for previous WSA upgrades applicable to the Marion Township connection were discussed in a 2011 Agreement, included in **Appendix F**.

Tapping fees for connection to the WSA sewer system and a reimbursement fee for previous upgrades were agreed upon in the 2011 Agreement. A report from the WSA engineer, as of January 2, 2024, suggests that the WSA is considering 1) raise tapping fees significantly, to no more than \$10,790.80 per EDU based on a recently completed rate study and 2) charge a reimbursement fee of \$770,520 to Marion Township for the proposed connections to the WSA system. The Township is legally obligated to pay WSA those amounts pursuant to the 2011 Agreement; however, the parties are attempting to negotiate that Agreement to secure a reduced-price bulk rate for the Marion Township users. Fees presented below are consistent with the report from the WSA engineer.

A copy of the quarterly user fees was obtained from the Womelsdorf Borough website and is included in **Appendix G**. A minimum quarterly fee of \$58.75, or a minimum annual fee of \$235.00, is provided in the fee schedule.

G. Low-Pressure Alternative Overall Costs

Overall costs associated with the Low-Pressure Alternative¹ are estimated below:

Public Low-Pressure Sewer Main/Appurtenances	\$7,742,000
Private Low-Pressure Sewer Lateral and Individual Grinder Pump	\$1,958,000
WSA Tapping Fee	\$2,881,000
WSA Reimbursement	\$770,520
Total Overall Cost Estimate	\$13,351,520
Total Equivalent Individual Cost Estimate	\$50,000

¹Assuming 233 Connections, 267 EDUs

According to the PennVest website, Township residents may be eligible to finance up to \$25,000 of the total equivalent cost through a Pennsylvania Housing Finance Agency loan (PHFA). Township residents may also be eligible to finance the balance through conventional lending. Based on a 2023 published PHFA rate of 1.75% and an average 20-year lending rate of 7% for 2023, the monthly payments to finance the overall costs are as follows:

Approximate PHFA payment = \$123.53
Approximate Conventional payment = \$193.82
Total each monthly payment = \$317.35

8. Efforts To Mitigate Costs

Marion Township faces an intricate challenge in designing a feasible public sewage system alternative, with geotechnical realities and ever-increasing costs prompting a shift in project design, scope, cost, and direction. To this end, Marion Township's ongoing substantial financial commitment to the project is in effort to contain costs by moving forward with a best-fit design and exploring all avenues of potential funding, including grant application and viability of low-interest loan financing.

The Township has initiated design efforts by 1) completing an EDU evaluation; 2) completing a design comparison; and 3) applying for and obtaining a partial grant for the Approved Alternative (gravity sewer with public pump station) in 2022. Most of the grant award was applied to a geotechnical exploration and evaluation and physical survey of the Public Sewer Area. Unfortunately, as described above, significant rock is likely to be encountered along the conveyance route, exacerbating the cost of both public sewer alternatives.

In September 2023, Marion Township applied for an additional grant to complete the Low-Pressure Alternative design. The Township is hopeful of being awarded the full grant amount in 2024 and is eager to complete the Low-Pressure Alternative design.

However, the high future construction costs and expected WSA fees remain a major barrier, as the relatively small number of connections means equivalent individual costs would be astronomical. It is reported that a significant proportion of residents within Stouchsburg Village, who comprise many potential connections into the system and the majority of taxpayers in the Township, are retirees on fixed incomes or disability.

The Township itself faces significant project budget constraints exacerbated by a small annual budget of \$600,000 due to its limited tax base. Knowing this situation, community support for obtaining grant funding has gained substantial momentum and public interest.

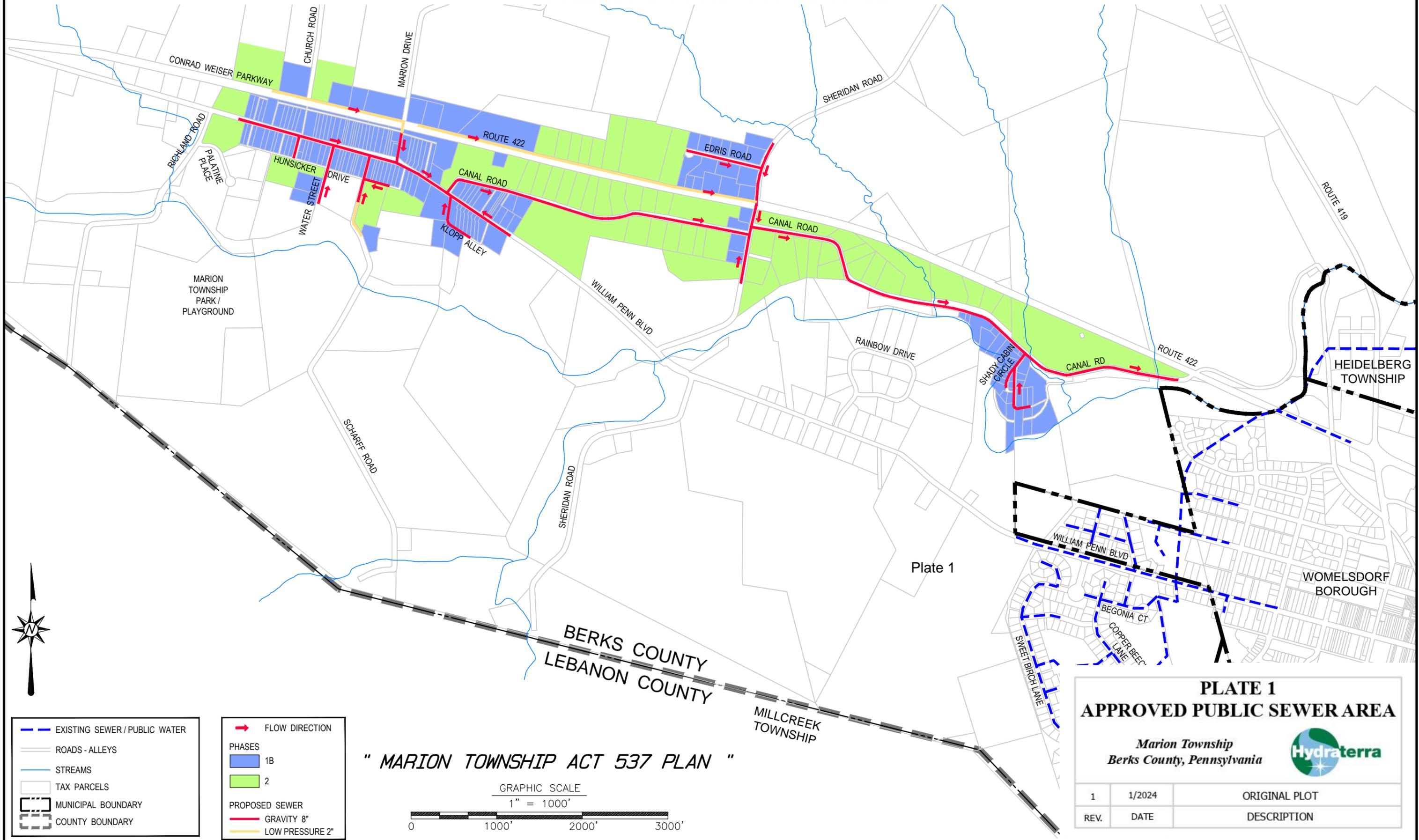
Depending on the cost of construction and WSA fees in place at the time of construction, grants of at least \$8,000,000 will be required to reduce the cost of an equivalent individual connection to a more reasonable fee of approximately \$20,000 each opposed to the current \$50,000 calculation.

Notably, while the PENNVEST Homeowner On-Lot Sewage Disposal and Lateral Repair Loan program provides low-cost financing for first-time sewer connections, individual homeowners are only eligible to receive up to a maximum of \$25,000 and must qualify for credit approval of a loan. Participation in the Community Development Block Grant Program (CDBG) must be approved by the Berks County Board of Commissioners and funds can only be used to offset eligible residential connection fees. However, even if approved, Berks County would not have CDBG Program grant funds available until 2025 to help pay the connection fee on behalf of low and moderate-income residents.

Without substantial construction grant funding, many residents would simply not be able to afford the requisite sewer connection fees. The Low-Pressure Alternative would consequently be substantially unfunded and thereby rendered infeasible from a financing perspective.

MAP 11A - PROPOSED PUBLIC SEWER - CONVENTIONAL ALIGNMENT (CANAL RD.) - PHASE 1B & 2

COLLECTION AND CONVEYANCE



- — — EXISTING SEWER / PUBLIC WATER
- ROADS - ALLEYS
- — — STREAMS
- TAX PARCELS
- MUNICIPAL BOUNDARY
- COUNTY BOUNDARY

→ FLOW DIRECTION

PHASES

- 1B
- 2

PROPOSED SEWER

- GRAVITY 8"
- LOW PRESSURE 2"

" MARION TOWNSHIP ACT 537 PLAN "

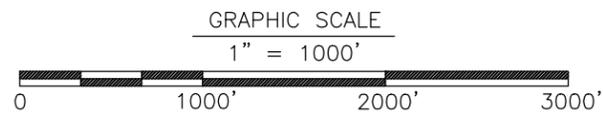


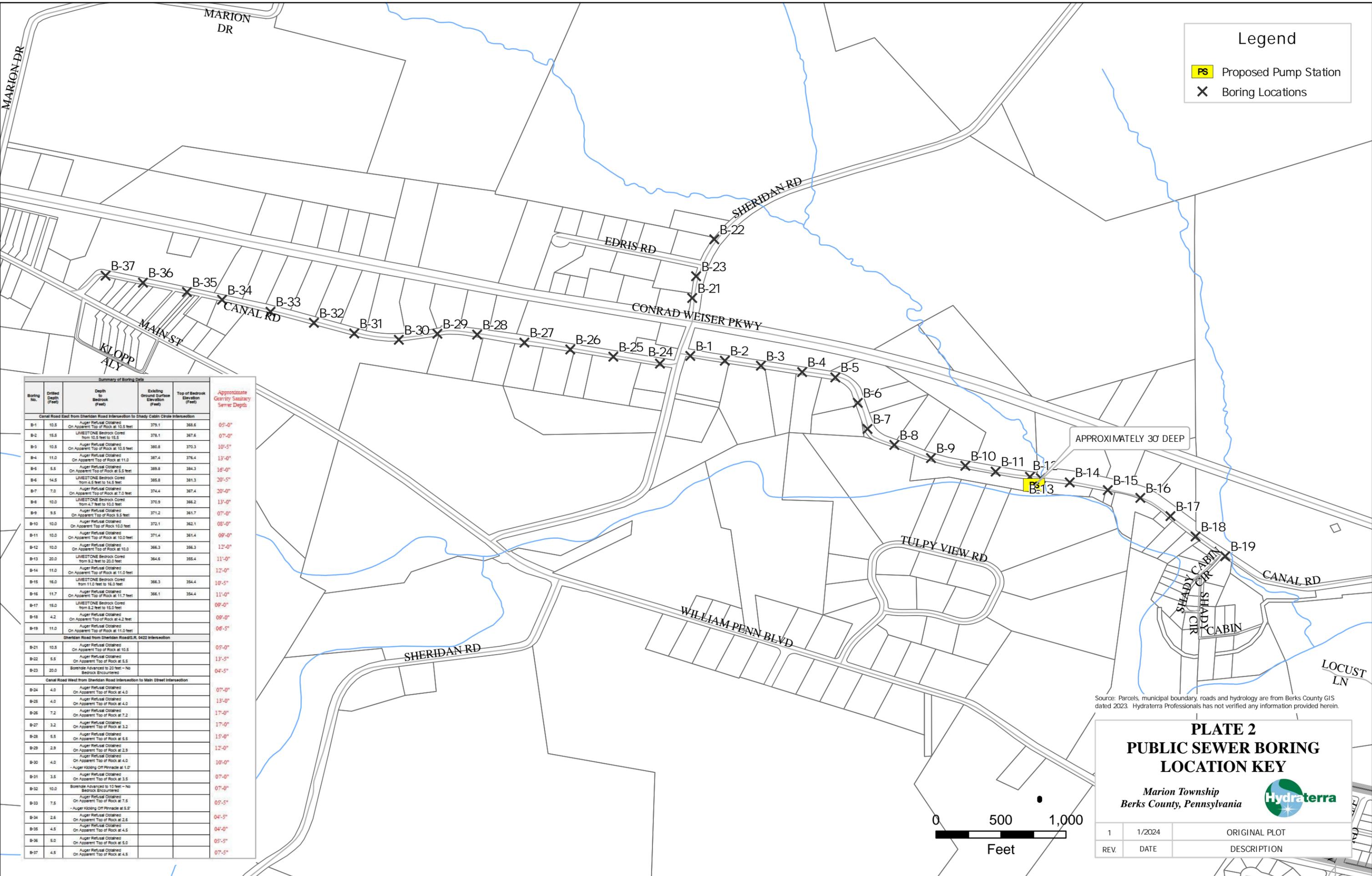
PLATE 1
APPROVED PUBLIC SEWER AREA

Marion Township
Berks County, Pennsylvania

REV.	DATE	DESCRIPTION
1	1/2024	ORIGINAL PLOT

Legend

- PS Proposed Pump Station
- ✕ Boring Locations



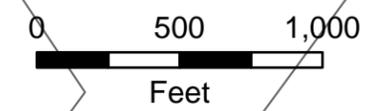
APPROXIMATELY 30' DEEP

Boring No.	Drilled Depth (Feet)	Depth to Bedrock (Feet)	Existing Ground Surface Elevation (Feet)	Top of Bedrock Elevation (Feet)	Approximate Gravity Sanitary Sewer Depth
Canal Road East from Sheridan Road Intersection to Shady Cabin Circle Intersection					
B-1	10.5	Auger Refusal Obtained On Apparent Top of Rock at 10.5 feet	379.1	368.6	05'-0"
B-2	15.5	LIMESTONE Bedrock Cored from 10.5 feet to 15.5 feet	378.1	367.6	07'-0"
B-3	10.5	Auger Refusal Obtained On Apparent Top of Rock at 10.5 feet	380.8	370.3	10'-5"
B-4	11.0	Auger Refusal Obtained On Apparent Top of Rock at 11.0 feet	387.4	376.4	13'-0"
B-5	5.5	Auger Refusal Obtained On Apparent Top of Rock at 5.5 feet	389.8	384.3	16'-0"
B-6	14.5	LIMESTONE Bedrock Cored from 4.5 feet to 14.5 feet	385.8	381.3	20'-5"
B-7	7.0	Auger Refusal Obtained On Apparent Top of Rock at 7.0 feet	374.4	367.4	20'-0"
B-8	10.0	LIMESTONE Bedrock Cored from 4.7 feet to 10.0 feet	370.9	366.2	13'-0"
B-9	9.5	Auger Refusal Obtained On Apparent Top of Rock 9.5 feet	371.2	361.7	07'-0"
B-10	10.0	Auger Refusal Obtained On Apparent Top of Rock 10.0 feet	372.1	362.1	08'-0"
B-11	10.0	Auger Refusal Obtained On Apparent Top of Rock at 10.0 feet	371.4	361.4	09'-0"
B-12	10.0	Auger Refusal Obtained On Apparent Top of Rock at 10.0 feet	366.3	356.3	12'-0"
B-13	20.0	LIMESTONE Bedrock Cored from 9.2 feet to 20.0 feet	364.6	355.4	11'-0"
B-14	11.0	Auger Refusal Obtained On Apparent Top of Rock at 11.0 feet			12'-0"
B-15	16.0	LIMESTONE Bedrock Cored from 11.0 feet to 16.0 feet	366.3	354.4	10'-5"
B-16	11.7	Auger Refusal Obtained On Apparent Top of Rock at 11.7 feet	366.1	354.4	11'-0"
B-17	15.0	LIMESTONE Bedrock Cored from 9.2 feet to 15.0 feet			09'-0"
B-18	4.2	Auger Refusal Obtained On Apparent Top of Rock at 4.2 feet			09'-0"
B-19	11.0	Auger Refusal Obtained On Apparent Top of Rock at 11.0 feet			06'-5"
Sheridan Road from Sheridan Road/R.R. 0422 Intersection					
B-21	10.5	Auger Refusal Obtained On Apparent Top of Rock at 10.5 feet			05'-0"
B-22	5.5	Auger Refusal Obtained On Apparent Top of Rock at 5.5 feet			13'-5"
B-23	20.0	Borehole Advanced to 20 feet - No Bedrock Encountered			04'-5"
Canal Road West from Sheridan Road Intersection to Main Street Intersection					
B-24	4.0	Auger Refusal Obtained On Apparent Top of Rock at 4.0 feet			07'-0"
B-25	4.0	Auger Refusal Obtained On Apparent Top of Rock at 4.0 feet			13'-0"
B-26	7.2	Auger Refusal Obtained On Apparent Top of Rock at 7.2 feet			17'-0"
B-27	3.2	Auger Refusal Obtained On Apparent Top of Rock at 3.2 feet			17'-0"
B-28	5.5	Auger Refusal Obtained On Apparent Top of Rock at 5.5 feet			15'-0"
B-29	2.9	Auger Refusal Obtained On Apparent Top of Rock at 2.9 feet			12'-0"
B-30	4.0	Auger Refusal Obtained On Apparent Top of Rock at 4.0 feet - Auger Kicking Off Pinhead at 1.0'			10'-0"
B-31	3.5	Auger Refusal Obtained On Apparent Top of Rock at 3.5 feet			07'-0"
B-32	10.0	Borehole Advanced to 10 feet - No Bedrock Encountered			07'-0"
B-33	7.5	Auger Refusal Obtained On Apparent Top of Rock at 7.5 feet - Auger Kicking Off Pinhead at 5.9'			05'-5"
B-34	2.6	Auger Refusal Obtained On Apparent Top of Rock at 2.6 feet			04'-5"
B-35	4.5	Auger Refusal Obtained On Apparent Top of Rock at 4.5 feet			04'-0"
B-36	5.0	Auger Refusal Obtained On Apparent Top of Rock at 5.0 feet			05'-5"
B-37	4.5	Auger Refusal Obtained On Apparent Top of Rock at 4.5 feet			07'-5"

Source: Parcels, municipal boundary, roads and hydrology are from Berks County GIS dated 2023. Hydraterra Professionals has not verified any information provided herein.

PLATE 2 PUBLIC SEWER BORING LOCATION KEY

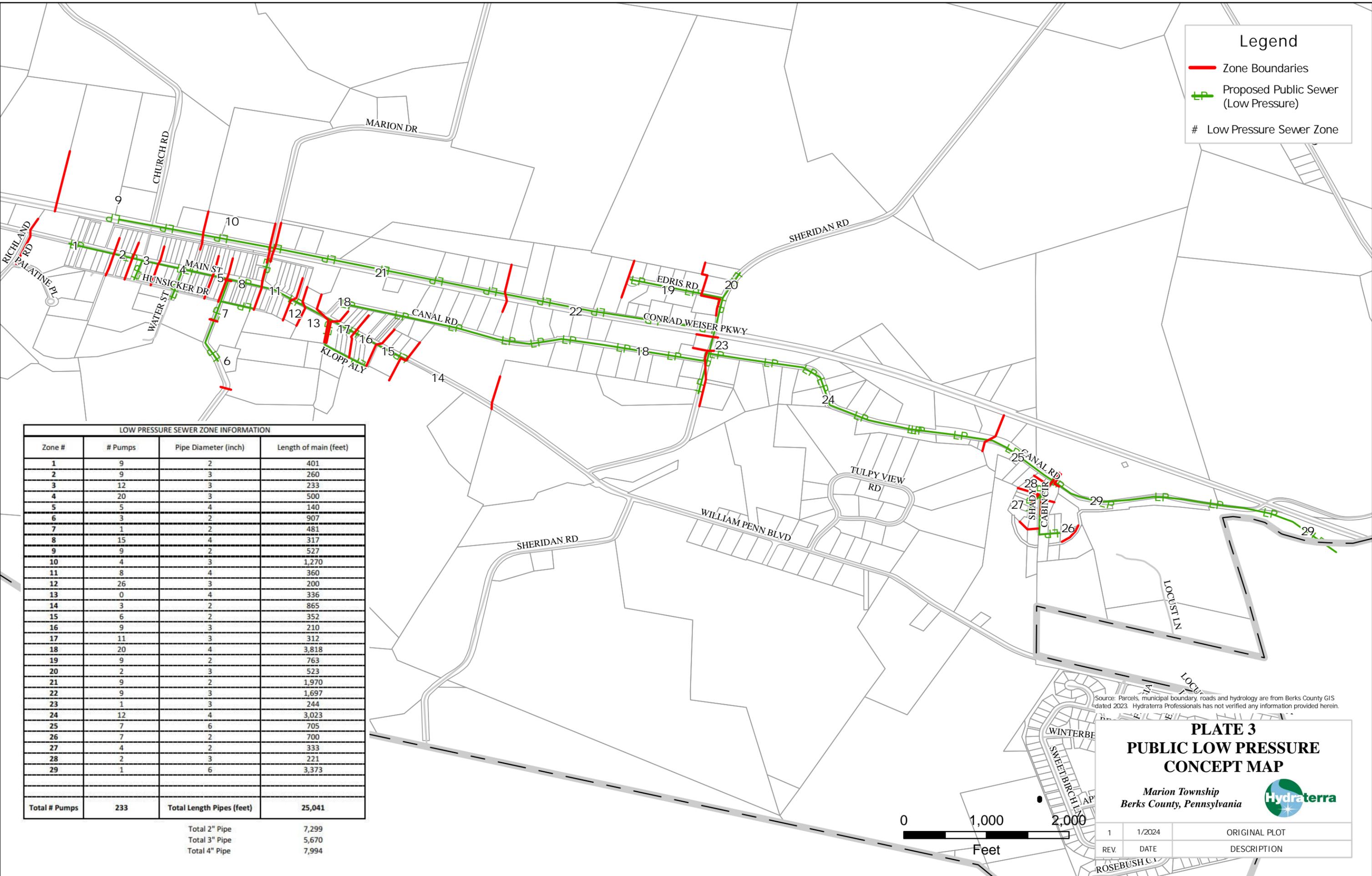
Marion Township
Berks County, Pennsylvania



REV.	DATE	DESCRIPTION
1	1/2024	ORIGINAL PLOT

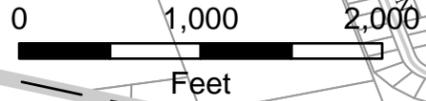
Legend

- Zone Boundaries
- Proposed Public Sewer (Low Pressure)
- # Low Pressure Sewer Zone



LOW PRESSURE SEWER ZONE INFORMATION			
Zone #	# Pumps	Pipe Diameter (inch)	Length of main (feet)
1	9	2	401
2	9	3	260
3	12	3	233
4	20	3	500
5	5	4	140
6	3	2	907
7	1	2	481
8	15	4	317
9	9	2	527
10	4	3	1,270
11	8	4	360
12	26	3	200
13	0	4	336
14	3	2	865
15	6	2	352
16	9	3	210
17	11	3	312
18	20	4	3,818
19	9	2	763
20	2	3	523
21	9	2	1,970
22	9	3	1,697
23	1	3	244
24	12	4	3,023
25	7	6	705
26	7	2	700
27	4	2	333
28	2	3	221
29	1	6	3,373
Total # Pumps	233	Total Length Pipes (feet)	25,041

Total 2" Pipe 7,299
 Total 3" Pipe 5,670
 Total 4" Pipe 7,994



Source: Parcels, municipal boundary, roads and hydrology are from Berks County GIS dated 2023. Hydraterra Professionals has not verified any information provided herein.

**PLATE 3
PUBLIC LOW PRESSURE
CONCEPT MAP**

Marion Township
Berks County, Pennsylvania



1	1/2024	ORIGINAL PLOT
REV.	DATE	DESCRIPTION

Appendix A

PADEP Official Plan Update Approval Letter
(May 15, 2019)

RECEIVED

MAY 20 2019

May 15, 2019

MARION TOWNSHIP

Marion Township
c/o Janis Zern, Township Secretary
420 Water Street
Stouchsburg, PA 19567

Re: Approval Letter – Official Plan Update
Act 537 Planning
DEP CODE NO. A2-06943-ACT
APS ID No. 859993; AUTH ID No. 1266097
Marion Township, Berks County

Ladies and Gentlemen:

The Department of Environmental Protection (DEP) has reviewed the proposed Official Plan Update submitted on March 21, 2019, prepared by McCarthy Engineering Associates, Inc., and entitled Marion Township Act 537 Plan Update. The submission is consistent with the planning requirements in Chapter 71 of DEP's regulations. The plan provides for installation of public sewer service to serve the areas of Stouchsburg Village, US 422 area with Edris Road, Upper Canal Road, Lower Canal Road, and Shady Cabins through a combination gravity and low pressure collection system, a conveyance system of gravity sewers with connection to the Womelsdorf Authority sewer system via pump station and force main with treatment at the Womelsdorf Wastewater Treatment Plant. The remainder of the township will continue to use on-lot sewage facilities. The plan also provides for the development of a well ordinance and implementation of a sewage management ordinance requiring regular pumping of the on-lot septic tanks and periodic inspection of the systems.

The plan is approved with the following comments:

1. The approved project will require a Water Management Part II Permit for construction and operation of the proposed sewerage facilities. The permit application must be submitted in the name of the municipality or authority, as appropriate. Issuance of a Part II Permit will be based upon a technical evaluation of the permit application and supporting documentation. Starting construction prior to obtaining a Part II Permit is a violation of the Clean Streams Law.
2. Other DEP permits may be required for construction if encroachment to streams or wetlands will result. Information regarding the requirements for such permits or approvals can be obtained from the Department's Permitting and Technical Services Section, Waterways &

Wetlands Program, Southcentral Regional Office, 909 Elmerton Avenue, Harrisburg, PA 17110, at 717.705.4802.

3. The Department notes the township's commitment to perform any required Phase I archaeological survey during the design phase of the project. Permits will not be issued without documentation from PHMC-BHP that any issues have been addressed to their satisfaction.
4. The Department notes the township's commitment to perform field investigations pursuant to establishing consistency with the requirements of the Jurisdictional Agencies (JA) involved in the PNDI review process during the design phase of the project. Permits will not be issued without documentation from the appropriate JA that their concerns have been addressed to their satisfaction.
5. Please submit copies of all adopted ordinances to DEP's Clean Water Program at the address found in the footer of page 1.

Since DEP has approved your Plan, you are now eligible to receive a 50 percent planning cost reimbursement grant as provided under Section 6 of the Sewage Facilities Act (Act 537). A copy of the reimbursement application can be downloaded from the DEP website at <http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-8773>.

Any person aggrieved by this action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. Section 7514, and the Administrative Agency Law, 2 Pa. C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, PO Box 8457, Harrisburg, PA 17105-8457, 717.787.3483. TDD users may contact the Board through the Pennsylvania Relay Service, 800.654.5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in braille or on audiotape from the Secretary to the Board at 717.787.3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

IF YOU WANT TO CHALLENGE THIS ACTION, YOUR APPEAL MUST REACH THE BOARD WITHIN 30 DAYS. YOU DO NOT NEED A LAWYER TO FILE AN APPEAL WITH THE BOARD.

IMPORTANT LEGAL RIGHTS ARE AT STAKE, HOWEVER, SO YOU SHOULD SHOW THIS DOCUMENT TO A LAWYER AT ONCE. IF YOU CANNOT AFFORD A LAWYER, YOU MAY QUALIFY FOR FREE PRO BONO REPRESENTATION. CALL THE SECRETARY TO THE BOARD (717.787.3483) FOR MORE INFORMATION.

Marion Township

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May 15, 2019

If you have any questions or concerns, please call Tim Wagner at 717.705.4794.

Sincerely,

A handwritten signature in black ink, appearing to read "Maria D. Bebenek". The signature is fluid and cursive, with the first name "Maria" and last name "Bebenek" clearly legible.

Maria D. Bebenek, P.E.
Program Manager

cc: McCarthy Engineering Associates, Inc.
Berks County Planning Commission
CAGE

Appendix B

Ordinances and Resolutions

**MARION TOWNSHIP
BERKS COUNTY, PENNSYLVANIA
ORDINANCE NO. 2019-2**

AN ORDINANCE OF THE BOARD OF SUPERVISORS OF MARION TOWNSHIP, BERKS COUNTY, PENNSYLVANIA ESTABLISHING REGULATIONS GOVERNING MUNICIPAL MANAGEMENT OF ON-LOT SUBSURFACE SEWAGE DISPOSAL SYSTEMS (OLDS) TO PROVIDE FOR THE INSPECTION, MAINTENANCE AND REHABILITATION OF ON-LOT SEWAGE DISPOSAL SYSTEMS; TO FURTHER PERMIT THE TOWNSHIP TO INTERVENE IN SITUATIONS WHICH ARE PUBLIC NUISANCES OR HAZARDS TO THE PUBLIC HEALTH AND TO ESTABLISH PENALTIES AND APPEAL PROCEDURES NECESSARY FOR THE PROPER ADMINISTRATION OF A SEWAGE MANAGEMENT PROGRAM, INCLUDING: TITLE, INTRODUCTION AND PURPOSE, TERMS AND DEFINITIONS, APPLICABILITY, SEWAGE PERMIT REGULATIONS, GROUND MARKERS, REPLACEMENT AREAS, INSPECTIONS, OPERATION, MAINTENANCE, SYSTEM REHABILITATION, MUNICIPAL LIENS, DISPOSAL OF SEPTAGE, ADMINISTRATION, APPEALS, AND PENALTIES; ADOPTING A SEPTIC TANK PUMPER'S REPORT; AND REPEALING ALL ORDINANCES INCONSISTENT WITH THIS ORDINANCE.

BE IT ENACTED AND ORDAINED by the Board of Supervisors of Marion Township, Berks County, Pennsylvania, and it is hereby ENACTED AND ORDAINED by the authority of same that the Board of Supervisors hereby adopts the following regulations governing municipal management of on-lot subsurface sewage disposal systems (OLDS):

SECTION 1. Title: Introduction and Purpose.

1. This Ordinance may be cited as the "OLDS (On-Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania".

2. As mandated by the municipal codes, the Clean Streams Law (35 P.S. 691.1 to 691.1001), and the Pennsylvania Sewage Facilities Act (Act of January 24, 1966, P.L. 1535 as amended, 35 P.S. 750.1 et seq., known as Act 537), municipalities have the power and the duty to provide for adequate sewage treatment facilities and for the protection of the public health by preventing the discharge of untreated or inadequately treated sewage. The Official Sewage Facilities Plan for Marion Township indicates that it is necessary to formulate and implement a sewage management program to effectively prevent and abate water pollution and hazards to the public health caused by improper treatment and disposal of sewage.

3. The purpose of this Ordinance is to provide for the inspection, maintenance and rehabilitation of on-lot sewage disposal systems; to further permit the Township to intervene in situations which are public nuisances or hazards to the public health and to establish penalties and appeal procedures necessary for the proper administration of a sewage management program.

SECTION 2. Terms and Definitions.

1. **General Terms.** In the interpretation of this Ordinance, the singular shall include the plural, and the masculine shall include the feminine and the neuter.

2. **Specific Terms.** For the purposes of this Ordinance, the terms used shall be construed to have the following meanings:

ACT or ACT 537 - The Pennsylvania Sewage Facilities Act, Act 537 of 1965, P.L. 1535; 35 P.S. § 750.1

ALTERNATIVE SYSTEM - A system for the disposal of domestic waste-waters not operating below ground level but located on or near the site of the building or buildings being served (e.g., composting toilets, gray water recycling systems, incinerating toilets, spray irrigation and black water recycling systems, etc.)

AUTHORIZED AGENT - A licensed sewage enforcement officer, professional engineer or sanitarian, plumbing inspector, soils scientist, or any other qualified or licensed person who is delegated to function within the specified limits as the agent of the Board of Supervisors of Marion Township to carry out the provisions of this Ordinance.

BOARD - The Board of Supervisors of the Township of Marion, Berks County, Pennsylvania.

CODES ENFORCEMENT OFFICER (hereinafter called CEO) - An individual employed by the Township to administer and enforce this and other ordinances in the Township.

COMMUNITY SEWAGE SYSTEM - Any system, whether publicly or privately owned, for the collection of sewage publicly, or industrial wastes of a liquid nature from two or more lots or uses, or two or more equivalent dwelling units, and the treatment and/or disposal of the sewage or industrial waste on one or more of the lots or at any other site and which shall comply with all applicable regulations of the DEP.

DEP - The Department of Environmental Protection of the Commonwealth of Pennsylvania or any successor agency.

DEVELOPER - Shall be defined as any person, partnership or corporation which erects or contracts to erect a building on property owned by it with the intent to sell the building to some other party upon its full or partial completion, or upon the conveyance of property on which the building is to be built.

EQUIVALENT DWELLING UNIT (EDU) - For the purpose of determining the number of lots in a subdivision or land development, that part of a multiple family dwelling, commercial, industrial establishment with sewage flows equal to four hundred (400) gallons per day.

IMPROVED PROPERTY - Any property within the Township upon which there is erected a structure intended for continuous or periodic habitation, occupancy or use by human beings or animals and from which structure sewage shall or may be discharged.

INDIVIDUAL SEWAGE SYSTEM - Any system of piping, tanks, or other facilities serving a single lot and collecting and disposing of sewage in whole or in part into the soil or any waters of the Commonwealth of Pennsylvania or by means of conveyance to another site for final disposal.

LAND DEVELOPMENT - A land development as defined in the Pennsylvania Municipalities Planning Code, Act of July 31, 1968, P.L. 805, No. 247, as amended, 53 P.S. §§ 10101 - 11202.

LOT - A designated parcel, tract, or area of land established by a plat or otherwise as permitted by law and to be used, developed or built upon as a unit.

MALFUNCTION - The condition, which occurs when an on-lot sewage disposal system causes pollution to the ground or surface waters, contamination of private or public drinking water supplies, nuisance problems or hazard to public health. Indications of malfunctioning systems include, but are not limited to, foul odors, lush grass growing over the system, backup of wastewater in the attached buildings, soggy ground over the system, surfacing sewage effluent flowing over the ground and occurring at any time of the year.

MANAGEMENT PROGRAM - The management program shall encompass the entire area of the Township serviced by sewage facilities or any other alternative system, which discharges into the soils of the Township. All systems shall be operated under the jurisdiction of the Board regulating the subsurface disposal and/or alternate systems, and other applicable laws of the Commonwealth of Pennsylvania.

OFFICIAL PLAN - A comprehensive plan for the provision of adequate sewage disposal systems adopted by the Township and approved by the DEP in accordance with the Act and with the applicable DEP regulations.

ON-LOT SEWAGE DISPOSAL SYSTEM - Any system disposing of sewage in whole or in part into the soil or any waters of the Commonwealth of Pennsylvania or by means of conveyance to another site for final disposal, and which is located upon the lot which it serves.

OWNER - Any person, corporation, partnership, etc. holding deed/title to lands within the Township.

PERSON - Any individual, association, partnership, public or private corporation whether for profit or not-for-profit, trust, estate, or other legally recognized entity. Whenever the term "person" is used in connection with any clause providing for the imposition of a fine or penalty or the ordering of action to comply with the terms of this Ordinance, the term "person" shall include the members of an association, partnership

or firm and the officers of any public or private corporation, whether for profit or not-for-profit.

PLANNING MODULE FOR LAND DEVELOPMENT - A revision to, or exception to the revision of, the Township Official Plan submitted in connection with the request for approval of a subdivision or land development in accordance with DEP regulations.

PUMP/HAULER - Any person, company, partnership or corporation, which engages in cleaning community or individual sewage systems and transports the septage cleaned from these systems.

PUMPERS REPORT/RECEIPT - Form, which shall be used by all, licensed Pumper/Haulers to report each pumping of on-lot sewage disposal systems in the Township, a copy of which is attached to this Ordinance and incorporated herein by reference and which may be amended from time to time by resolution.

REHABILITATION - Work done to modify, alter, repair, enlarge or replace an existing on-lot sewage disposal system.

REPLACEMENT AREA - An area designated as the future location of an individual on lot sewage system that shall be installed should the initial individual on-lot system installed or to be installed fail or otherwise become inoperable and which shall meet all the regulations of the DEP and all applicable Township ordinances for an individual on-lot sewage system, and shall be protected from encroachment by an easement recorded on the Final Plan as filed with the Berks County Recorder of Deeds.

SEPTAGE - The residential scum and sludge pumped from septic systems.

SEWAGE - Any substance that contains any of the waste products or excrement or other discharge from the bodies of human beings or any noxious or deleterious substance being harmful or inimical to the public health, or to animal or aquatic life or to the use of water for domestic water supply or for recreation.

SEWAGE ENFORCEMENT OFFICER (hereinafter called SEO) - A person appointed by the Board to administer the provisions of this Ordinance and authorized by the DEP in accordance with "Chapter 71, Administration of Sewage Facilities Program" of "Title 25, Rules and Regulations"; to perform percolation tests, site and soil evaluation, and issue sewage permits for on-lot disposal systems.

SEWAGE FACILITIES - Any method of sewage collection, conveyance, treatment, and disposal, which will prevent the discharge of, untreated or inadequately treated sewage into the waters of this Commonwealth or otherwise provide for the safe and sanitary treatment of sewage.

SINGLE AND SEPARATE OWNERSHIP - The ownership of a lot by one (1) or more persons which ownership is separate and distinct from that of any abutting or adjoining lot.

SUBDIVISION -A subdivision as defined by the Pennsylvania Municipalities Planning Code, Act of July 31, 1968, P.L. 805, No. 247, as amended, 53 P.S. §§ 10101 - 11202.

TOWNSHIP - Marion Township, Berks County, Pennsylvania.

ZONING HEARING BOARD - The appointed Board and its designated agents.

All other definitions of words and terms used in this Ordinance shall have the same meaning as set forth in "Chapter 73, Standards for Sewage Disposal Facilities" of "Title 25, Rules and Regulations, Department of Environmental Protection."

SECTION 3. Applicability.

From the effective date of this Ordinance, its provisions shall apply to all persons owning any property in the Township serviced by an on-lot sewage disposal system and to all persons installing or rehabilitating on-lot sewage disposal systems.

SECTION 4. Sewage Permit Regulations.

1. No person shall install, construct or request bid proposals for construction or alter an individual sewage system or community sewage system or construct or request bid proposals for construction or install or occupy any building or structure for which an individual sewage system or community sewage system is to be installed without first obtaining a permit indicating that the site and the plans for specifications of such system are in compliance with the provisions of the Act and the standards adopted pursuant to that Act.

2. No system or structure designed to provide individual or community sewage disposal shall be covered from view until approval to cover the same has been given by the SEO. If seventy-two (72) hours have elapsed, excepting Sundays and Holidays, since the SEO issuing the permit received notification of completion of construction, the applicant may cover said system or structure, unless permission has been specifically refused by the SEO.

3. The Township may require applicants for sewage permits to notify the SEO of the schedule for construction of the permitted on-lot sewage disposal system so that inspections(s) in addition to the final inspection required by Act 537 may be scheduled and performed by the SEO at the cost of the applicant.

4. No zoning, building or occupancy permit shall be issued by the Township or its CEO for a new building which will contain sewage generating facilities until a valid sewage permit has been obtained from the SEO.

5. No zoning, building or occupancy permit shall be issued and no work shall begin on any alteration or conversion of any existing structure, if said alteration or conversion will result in the increase or potential increase in sewage flows from the structure, until the CEO and the structure's owner receive from the SEO either a permit for alteration or a replacement of the existing sewage disposal system or written notification that such a permit will not be

required. In accordance with Chapter 73 regulations, the SEO shall determine whether the proposed alteration or conversion of the structure will result in increased sewage flows.

6. Sewage permits may be issued only by a certified SEO employed by the Township for that express purpose. The DEP shall be notified by the Township as to the identity of its currently employed certified SEO.

7. No sewage permit may be issued unless proof is provided that the lot of record has existed since May 15, 1972, or that Act 537 planning approval has been provided by the Township.

SECTION 5. Ground Markers.

Any person who shall install new or rehabilitated systems shall provide a marker or markers at ground level locating the subsurface waste disposal tank and other important components of the system requiring periodic inspection and maintenance. Requirements for marker types and locations will be determined by the SEO. In addition, a riser or access hatch shall be constructed so as to enable easy access to the waste disposal tank, and prevent odors from escaping and to prevent children from removing the hatch.

SECTION 6. Replacement Areas.

1. Requirements

a. After the effective date of this Ordinance, a Replacement Area for an individual on-lot sewage system shall be required for all lots or lots to be erected which are not serviced or to be serviced by the Township sewage system, or for which a valid permit for installation of an individual on-lot sewage system has not been issued. Lots existing prior to the effective date of this Ordinance shall be exempt from the requirements of this Section.

b. The Replacement Area provided shall comply with the Act and with all regulations issued by the DEP as incorporated into this Ordinance concerning individual on-lot sewage systems, including isolation distances, and with the terms of this Ordinance and any other applicable Township ordinances.

2. Identification of Replacement Area

a. Each Applicant who shall submit a plan for the subdivision or development of land or who shall apply for a permit for the installation of an individual on-lot sewage system, or who shall request approval of a Planning Module for Land Development or the adoption of a revision, exception to revision, or supplement to the Official Plan shall demonstrate to the satisfaction of the SEO that a suitable area exists on the lot or on each lot to be created for an initial individual on-lot system and for the Replacement Area. The SEO shall perform or observe all tests required for the location of an individual on-lot sewage system to confirm the suitability of the Replacement Area. Allowance of open land for the Replacement Area without testing performed or observed by the SEO shall not constitute compliance with the requirements of this Section.

b. The location of the initial individual on-lot sewage system and the Replacement Area as confirmed by the SEO shall be identified on the plot plans and diagrams submitted as part of the permit application.

c. If the application has been submitted as a part of an application for subdivision or land development approval or as part of a request that the Township approve a Planning Module for Land Development or amend its Official Plan, or a request for an exception to the revision of the Official Plan, the location of each initial individual on-lot sewage system and each Replacement Area shall be noted upon the plans. If the application is for subdivision or land development approval, a note constituting a permanent easement shall be added to the plans stating that no improvements shall be constructed upon the Replacement Area, and the deed to be recorded for each lot created as part of the subdivision or land development shall contain language reflecting this limitation.

d. Any revisions to a permit or plan affecting a Replacement Area, which previously has been approved pursuant to the provisions of this Ordinance, shall be reviewed for approval by the Board or its Authorized Agent.

3. Construction Restrictions

a. The easement for the Replacement Area noted upon the Plan and recorded with the Berks County Recorder of Deeds shall state that no permanent or temporary improvements of any character, other than shallow-rooted plant matter, shall be constructed upon the Replacement Area.

b. This provision shall be enforced by the Township unless the person who desires to construct such improvements shall demonstrate to the satisfaction of the SEO that an alternate Replacement Area, which complies with all applicable regulations of the DEP, this Ordinance and all other applicable Township ordinances, exists upon the lot. If such an alternate Replacement Area shall be identified, the alternate Replacement Area may be considered to be the Replacement Area required by this Ordinance and shall be designated as the Replacement Area. The newly designated Replacement Area shall thereafter be considered the Replacement Area for the purposes of this Ordinance.

4. Relief from Replacement Area Requirements:

a. If any lot held in single and separate ownership as of the effective date of this Ordinance does not contain land suitable for a Replacement Area, the applicant submitting a Land Development Plan or a Planning Module for Land Development or desiring to install an individual on-lot sewage system may request that the Board grant an exception to the requirement of providing a Replacement Area. The applicant for such an exception shall present credible evidence to the Board demonstrating (a) that the lot was held in single and separate ownership on the effective date of this Ordinance; (b) the size of the lot; (c) inability of the applicant to acquire adjacent land or the unsuitability of adjacent land which might be able to be acquired; and (d) the testing conducted to determine that the lot is not suitable to provide a Replacement Area.

b. At all times the burden to present credible evidence and the burden of persuasion shall be upon the Applicant for an exception from the terms of this Ordinance. In no case shall any lot be exempted from the requirements of this Subsection 4.

SECTION 7. Inspections.

1. Any on-lot sewage disposal system may be inspected by the Township's Authorized Agent at any reasonable time as of the effective date of this Ordinance.

2. The inspection may include a physical tour of the property, the taking of samples from surface water, wells, other ground water sources, the sampling of the contents of the sewage disposal system itself and/or the introduction of a traceable substance into the interior plumbing of the structure served to ascertain the path and ultimate destination of wastewater generated in the structure. A copy of the inspection report shall be furnished to the Owner and current resident which shall include all of the following information which is reasonably available to the individual or agency responsible for pumping the septic tank; date of inspection; name and address of system owner; description and diagram of the location of the system including location of access hatches, risers, and markers; sizes of tanks and disposal fields; current occupant's name and number of users; indication of any system malfunction observed; results of any and all soils and water tests; and any remedial action required.

3. The Township's Authorized Agent shall have the right to enter upon land for the purposes of inspections described above. In the event that access to inspect the property is denied, the following steps shall be taken:

a. The matter will be officially referred to the Board for action.

b. The Board may schedule a review at the next scheduled meeting of the Board, or, if the situation threatens the health or safety of the residents of the Township, the Board may commence an immediate procedure to obtain a search warrant from the District Justice.

c. Upon receipt of a search warrant to inspect the property, the Authorized Agent of the Township shall be accompanied by an officer of the Township or State Police, and the inspection shall be completed in accordance with this Section.

4. A schedule of routine inspections may be established by the Township, if necessary, to assure the proper function of the systems in the Township.

5. Upon written notification from a Township resident presented to a Township official, or its Authorized Agent, OLDS systems known to be, or alleged to be, malfunctioning shall be inspected by the Authorized Agent at a time mutually agreed upon by the Authorized Agent and the owner of the OLDS, but in no case, no later than thirty (30) days from receipt of the written notification. Should said inspections reveal that the system is malfunctioning, the Township shall take action to require the correction of the malfunction. If total correction is not

technically or financially feasible in the opinion of the Township and a representative of the DEP, action by the Owner to mitigate the malfunction shall be required.

6. There may arise geographic areas within the Township where numerous on-lot sewage disposal systems are malfunctioning. A resolution of these area-wide problems may necessitate detailed planning and a Township sponsored revision to that area's Act 537 Official Sewage Facilities Plan. When a DEP authorized Official Sewage Facilities Plan Revision has been undertaken by the Township, mandatory repair or replacement of individual malfunctioning sewage disposal systems within the area may be delayed, at the direction of the Township, pending the outcome of the plan revision process. However, the Township may compel immediate corrective action whenever a malfunction, as determined by Township officials and the Pennsylvania DEP, represents a serious public health or environmental threat.

SECTION 8. Operation.

1. Only normal domestic wastes shall be discharged into any on-lot sewage disposal system. The following shall not be discharged into the system:

- a. Industrial waste.
- b. Automobile oil and other non-domestic oil.
- c. Toxic or hazardous substances or chemicals, including but not limited to, pesticides, disinfectants, acids, paints, paint thinners, herbicides, gasoline and other solvents.
- d. Clean surface or ground water, including water from roof or cellar drains, springs, basement sump pumps and French drains.

SECTION 9. Maintenance.

1. Any person owning a building served by an on-lot sewage disposal system shall have the septic tank pumped by a qualified Pumper/Hauler after the effective date of this Ordinance based on the following schedule:

- a. Properties located in Marion Township, identified as follows:

SA - NORTHWEST; Map-3

Within one (1) year of the effective date of this Ordinance.

- b. Properties located in Marion Township, identified as follows:

SA - EAST; Map-3

Within two (2) years of the effective date of this Ordinance.

- c. Properties located in Marion Township, identified as follows:

SA - SOUTH; Map-3

Within three (3) years of the effective date of this Ordinance.

Thereafter that person shall have the tank pumped at least once every four (4) years. Receipts from the Pumper/Hauler shall be submitted to the Township as required herein.

2. Any person providing a receipt or other written evidence showing that their tank had been pumped within three (3) years of the first year anniversary of the effective date of this Ordinance, then the Township may delay that person's initial required pumping to conform to the general four (4) year frequency requirement.

3. The Township may allow septic tanks to be pumped out at less frequent intervals when the owner can demonstrate to the Township that the system can operate properly without the need for pumping out for a period longer than four (4) years, but in no case shall such period extend beyond six (6) months prior to the date when the next required pumping is to be completed. The request must be in writing with all supporting documents attached. The Township, in making its determination, shall take into account the information submitted by the applicant, the sewerage permit issued by the SEO upon installation or rehabilitation of the system and supporting documentation, reports of inspection and maintenance of the system, and other relevant information, and may conduct an on-site inspection. The applicant shall bear the cost of any inspection, surface or subsurface, and soil or wastes sampling conducted for the purpose of evaluating the request. The applicant shall receive a decision within sixty (60) days of accumulation of all necessary information by the Township.

4. The required pumping frequency may be increased at the discretion of the Authorized Agent if the septic tank is undersized, if solids buildup in the tank is above average, if the hydraulic load on the system increases significantly above average, if a garbage grinder is used in the building, if the system malfunctions or for other good cause shown.

5. Each time a septic tank or other subsurface waste disposal system tank is pumped out, the Township, its Authorized Agent, or a private septage Pumper/Hauler, whichever provides the service, shall provide to the owner of the sub-surface waste disposal system a signed Pumpers Report/Receipt containing at a minimum the following information:

- a. Date of pumping.
- b. Name and address of system owner.
- c. Address of tank's location, if different from owners.
- d. Description and diagram of the location of the tank, including the location of any markers, risers, and access hatches and size of the tank.
- e. The date existing system was installed.

- f. Last date of pump out.
- g. List of other maintenance performed.
- h. Any indications of system malfunction observed.
- i. Amount of septage or other solid or semi-solid material removed.
- j. List of recommendations.
- k. Destination of the septage (name of the treatment facility).

6. Upon completion of each required pumping, the Township, its Authorized Agent, or a private septage waste hauler, shall fill out and submit a Pumper Report/Receipt, copies of which shall be provided by the Township to all licensed Pumpers/Haulers. The Township's Authorized Agent, or a private septage Pumper/Hauler shall provide one (1) copy of the Pumper's Report/Receipt to the Owner and one (1) copy to the Township. Copies must be received at the Township's business office within thirty (30) days of the date of pumping. The Pumper's Report/Receipt will include verification that the baffles in the septic tank have been inspected and found to be in good working order.

7. Any person owning a building served by an alternative system or on-lot sewage disposal system which contains an aerobic treatment tank shall follow the operation and maintenance recommendations of the equipment manufacturer. A copy of the manufacturer's recommendations and a copy of the service agreement shall be submitted to the Township within six (6) months of the effective date of this Ordinance. Thereafter, service receipts shall be submitted to the Township at the intervals specified by the manufacturer's recommendations. In no case may the service or pumping intervals exceed those for those required for septic tanks.

8. Any person owning a building served by a cesspool or dry well shall have that system pumped according to the schedule prescribed for septic tanks in this Section.

9. The Township may require additional maintenance activity as needed including, but not necessarily limited to, cleaning and unclogging of piping, servicing and the repair of mechanical equipment, leveling of distribution boxes, tanks and lines, removal of obstructing roots or trees, the diversion of surface water away from the disposal area, etc.

SECTION 10. System Rehabilitation.

1. No person shall operate and maintain an on-lot sewage disposal system in such a manner that it malfunctions. All liquid wastes, including kitchen and laundry wastes and water softener backwash, shall be discharged to a treatment tank. No sewage system shall discharge untreated or partially treated sewage to the surface of the ground or into the waters of the Commonwealth of Pennsylvania unless a permit to discharge has been obtained from the DEP.

2. The Township shall issue a written notice of violation to any person who is the owner of a property in the Township which is found to be served by a malfunctioning on-lot sewage disposal system or which is discharging raw or partially treated sewage without a permit.

3. Within seven (7) days of notification by the Township that a malfunction has been identified, the owner shall make application to the SEO for a permit to repair or replace the malfunctioning system. Within thirty (30) days of initial notification by the Township, construction of the permitted repair or replacement shall commence. Within sixty (60) days of the original notification by the Township, the construction shall be completed unless seasonal or unique conditions mandate a longer period, in which case the Township shall set an extended completion date.

4. The SEO shall have the authority to require the repair of any malfunction by the following methods: cleaning, repair or replacement of components of the existing system, adding capacity or otherwise altering or replacing the system's treatment tank, expanding the existing disposal area, replacing the existing disposal area, replacing the gravity distribution system with a pressurized system, replacing the system with a holding tank, other alternatives as appropriate for the specific site.

5. In lieu of, or in combination with, the remedies described in Subsection 4 above, the SEO may require the installation of water conservation equipment and the institution of water conservation practices in structures served. Water using devices and appliances in the structure may be required to be retrofitted with water saving appurtenances or they may be required to be repaired by water conserving devices and appliances. Wastewater generation in the structure may also be reduced by requiring changes in water usage patterns in the structure served. The use of laundry facilities may be limited to one load per day or discontinued altogether, etc.

6. In the event that the rehabilitation measures in Subsection 5 above are not feasible or do not prove effective, the Township may require the owner to apply for a permit to construct a holding tank in accordance with the Township's ordinances. Upon receipt of said permit, the owner shall complete construction of the system within thirty (30) days.

7. Should none of the remedies described above prove totally effective in eliminating the malfunction of an existing on-lot sewage disposal system, the owner is not absolved of responsibility for that malfunction. The Township may require whatever action is necessary to lessen or mitigate the malfunction to the extent that it feels necessary.

SECTION 11. Liens.

The Township, upon written notice from the SEO that an imminent health hazard exists due to failure of a property owner to maintain, repair or replace an on-lot sewage disposal system as provided under the terms of this Ordinance, shall have the authority to perform or contract to have performed, the work required by the SEO. The owner shall be charged for the work performed and, if necessary, a lien shall be entered therefor in accordance with the law.

SECTION 12. Disposal of Septage.

1. All septage Pumper/Haulers operating within the Township shall be included on an approved list with the Township and shall comply with all reporting requirements established by the Township.

2. All septage originating within the municipal sewage management area shall be disposed of at sites or facilities approved by the DEP. Approved sites or facilities shall include the following: septage treatment facilities, wastewater treatment facilities (WWTF), composting sites, and approved farm lands.

3. Septage Pumper/Haulers operating within the Township shall operate in a manner consistent with the provisions of the Pennsylvania Solid Waste Management Act (Act 97 of 1980, 35 P.S., Sections 6018.101 - 6018.1003), and Regulations adopted pursuant to such Act.

a. Any septage Pumper/Hauler who violates any of the provisions of this Ordinance shall be guilty of a summary offense and, upon conviction thereof, shall be sentenced to pay a fine not exceeding One Thousand Dollars (\$1,000.00), plus costs, and in default of payment thereof, shall be subject to imprisonment for a term not to exceed thirty (30) days. Each day the violation continues shall constitute a separate offense.

b. If any Pumper/Hauler shall have been convicted on two (2) occasions of any violation of this Ordinance, or for violating the conditions of this State permit, or of any State or local law governing its operation, the Board shall have the power to suspend said Pumper/Hauler from operating within the Township for a period of not less than six (6) months or more than two (2) years for each violation, as determined by the Township. Each day the violation continues shall constitute a separate offense.

4. Upon the discontinuance of the use of any tank for sewage disposal purposes, whether by mandatory or voluntary connection to a community sewage system or abandonment for any other reason, the owner thereof shall have the tank pumped and flushed by a Pumper/Hauler and, at the owner's option, either physically remove from the premises or filled with soil and/or stone.

5. When the owner elects to have the tank filled with stone as permitted above, said tank may then be used for the discharge of storm water, sump pump discharge, or other effluent not qualifying for discharge into the community sewage system, providing said discharge is otherwise permitted by applicable law.

SECTION 13. Administration.

1. The Township shall fully utilize those powers it possesses through enabling statutes and ordinances to effect the purposes of this Ordinance.

2. The Township shall employ qualified individuals to carry out the provisions of this Ordinance. Those employees shall include a certified SEO, a CEO, a secretary,

administrator or other persons as required. The Township may also contract with private qualified persons or firms as necessary to carry out the provisions of this Ordinance.

3. All permits, records, reports, files and other written material relating to the installation, operation and maintenance and malfunction of on-lot sewage disposal systems shall become the property of the Township. Existing and future records shall be available for public inspection upon written request. All records pertaining to sewage permits, building permits, occupancy permits and all other aspects of the Township's OLDS Management Program shall be made available, upon request, for inspection by representatives of the DEP.

4. The Board shall establish all administrative procedures necessary to properly carry out the provisions of this Ordinance.

5. The Board may establish a fee schedule, and subsequently collect fees, to cover the cost to the Township of administering OLDS management.

SECTION 14. Appeals.

1. Appeals from decisions of the Township or its Authorized Agent under this Ordinance shall be made to the Zoning Hearing Board in writing with thirty (30) days from the date of the decision in question.

2. The appellant shall be entitled to a hearing before the Zoning Hearing Board at its next regularly scheduled meeting, if the appeal is received at least fourteen (14) days prior to that meeting. If the appeal is received within fourteen (14) days of the next regularly scheduled meeting, the appeal shall be heard at the subsequent meeting. The Township shall thereafter affirm, modify, or reverse the aforesaid decision. The hearing may be postponed for a good cause shown by the appellant or the Township. Additional evidence may be introduced at the hearing provided that it is submitted with the written notice of appeal.

3. A decision shall be rendered in writing within forty-five (45) days of the date of the hearing. If a decision is not rendered within forty-five (45) days, the relief sought by the appellant shall be deemed granted.

SECTION 15. Penalties.

Any person, other than a Pumper/Hauler, who violates any of the provisions of this Ordinance shall be guilty of a summary offense and, upon conviction thereof, shall be sentenced to pay a fine of not less than five hundred dollars (\$500.00) and costs, and not more than Five Thousand Dollars (\$5,000.00) and costs, or in default thereof shall be confined in the county jail for a period of not more than thirty (30) days. Each day of noncompliance shall constitute a separate offense.

SECTION 16. Repealer.

Any and all ordinances inconsistent with the terms of this Ordinance are hereby repealed to the extent of any such inconsistencies.

SECTION 17. Severability.

If any sentence, clause, section or part of this Ordinance is, for any reason, found to be unconstitutional, illegal or invalid, such unconstitutionality, illegality or invalidity shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of this Ordinance. It is hereby declared, as the intent of the Board of Supervisors of Marion Township, that this Ordinance would have been adopted had such unconstitutional, illegal or invalid sentence, clause, section or part thereof not been included herein.

SECTION 18. Effective Date.

This Ordinance shall become effective five (5) days after enactment.

DULY ENACTED AND ORDAINED this 19th day of December, 2019.

MARION TOWNSHIP
BOARD OF SUPERVISORS

By: 
(Vice) Chairman

ATTEST: 
Susan M. Staaby, Secretary

MUNICIPAL CERTIFICATION

I, Susan M. Staaby, the Secretary of Marion Township, Berks County, Pennsylvania, do hereby certify that the foregoing Ordinance No. 2019 - 2 was advertised in the *Reading Eagle*, a daily newspaper of general circulation in Marion Township, on Wednesday, December 11, 2019, and was duly enacted and approved as set forth at a Regular Meeting of the Board of Supervisors held on Thursday, December 19, 2019.

[SEAL]

Susan M. Staaby
Susan M. Staaby, Secretary

**MARION TOWNSHIP
BERKS COUNTY, PENNSYLVANIA
ORDINANCE NO. 2023-1**

AN ORDINANCE OF MARION TOWNSHIP, BERKS COUNTY, PENNSYLVANIA AMENDING ORDINANCE NO. 2019-2, "OLDS (ON LOT DISPOSAL SYSTEM) MANAGEMENT PROGRAM FOR MARION TOWNSHIP, BERKS COUNTY, PENNSYLVANIA," TO CHANGE THE DEFINITIONS OF PUMPER/HAUER AND PUMPER'S REPORT/RECEIPT; REQUIRE THAT ALL PUMPERS/HAULERS PROVIDE MARION TOWNSHIP WITH CERTAIN DOCUMENTATION AND INFORMATION BEFORE AND DURING OPERATION WITHIN THE JURISDICTION (INCLUDING BUT NOT LIMITED TO ALL PERMITS AND APPROVALS NECESSARY TO OPERATE, A LIST OF THE VEHICLES, AND EQUIPMENT OPERATING OR PROPOSED TO BE OPERATING IN THE TOWNSHIP, A CURRENT FEE SCHEDULE, AND AN AFFIDAVIT ATTESTING TO OPERATE IN ACCORDANCE WITH ALL APPLICABLE LAWS, RULES, AND REGULATIONS); AND, SPECIFY THAT PUMPERS/HAULERS HAVE THE SOLE RESPONSIBILITY OF OBSERVING ANY OLDS OR OTHER SEWAGE TREATMENT SYSTEM THAT THEY PUMP AS WELL AS COMPLETING AND SUBMITTING THE PUMPER'S REPORT TO THE TOWNSHIP IN A MANNER AND WITH SUCH INFORMATION AS PRESCRIBED BY RESOLUTION.

WHEREAS, the Township of Marion, Berks County, Pennsylvania ("Township") is a municipal corporation and township of the second class having a municipal office at 420 Water Street, Marion Township, Berks County, Pennsylvania, and operating pursuant to the Second Class Township Code, 53 P.S. § 67101, *et seq.*, the Solid Waste Management Act, 35 P.S. 6018.101, *et seq.*, the Pennsylvania Sewage Facilities Act, 35 P.S. 750.1, *et seq.*, and the Clean Streams Law, 35 P.S. 691.1, *et seq.*;

WHEREAS, the Township enacted Ordinance 2019-2 ("Ordinance") on December 19, 2019, titled "OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania," as required and approved by the Pennsylvania Department of Environmental Protection;

WHEREAS, amongst other requirements, the Ordinance provides that a Person owning real property in the Township served by an On Lot Sewage Disposal System must have its sewage tank pumped by a Pumper/Hauler within a certain period of time post-enactment and then every four (4) years thereafter (collectively, the "Pump(s)");

WHEREAS, the Township's prior Sewage Enforcement Officer was observing each Pump and, at the same time, observing the On Lot Sewage Disposal System as well as completing the information and observation form for it, i.e. the Pumper Report, required by Section 9, which imposed a costly, administrative burden upon the Township;

WHEREAS, the Township's current, secondary Sewage Enforcement Officer has developed a user-friendly, web-based application for Pumper/Haulers to complete and submit the Pumper Report and other information required;

WHEREAS, amongst other amendments, the Township is hereby amending the Ordinance to explicitly specify that Pumper/Haulers have the sole responsibility of observing any On Lot Sewage Disposal System that they pump, as well as completing and submitting the Pumper Report for such system with the Township during or immediately after any pump;

WHEREAS, the Township expects the new administration of the Ordinance by Pumper/Haulers will reduce its own administrative burden and enable the repeal of taxes, charges, and fees levied upon property owners in the jurisdiction to carry out that legislation.

NOW THEREFORE, BE IT ENACTED AND ORDAINED by the Board of Supervisors of Marion Township, Berks County, Pennsylvania as follows:

SECTION 1. Section 2(2) – Terms and Definitions: Specific Terms of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in relevant part as follows:

PUMPER/HAULER – Any person, company, partnership or corporation, which is engaged in the cleaning and observation of community or individual sewage systems as well as transporting the septage cleaned from them, and has any and all licenses for those services from the DEP and any other governmental agency.

PUMPER REPORT/RECEIPT – A list of information as established by resolution that a Pumper/Hauler must complete and submit with the Township pursuant to Section 9 herein.

SECTION 2. Section 9(1) – Maintenance of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in relevant part as follows:

Any person owning a building served by an on lot sewage disposal system shall have the septic tank pumped and observed by a Pumper/Hauler after the effective date of this Ordinance based on the following schedule:

...^[1]

Thereafter, that person shall have the tank pumped and observed by a Pumper/Hauler at least once every four (4) years.

¹ The use of ellipses anywhere throughout this Ordinance signifies that the language which would otherwise occupy that space remains unamended and included from Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” and therefore is not set forth at length herein.

SECTION 3. Section 9(5) – Maintenance of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in whole as follows:

Within five (5) calendar days of pumping any on lot sewage disposal system, septic tank, subsurface waste disposal system tank, cesspool, or drywell, a Pumper/Hauler shall complete and submit with the Township, in a form and manner prescribed by resolution, a sworn Pumper Report subject to penalty under 18 Pa.C.S. § 4904.

SECTION 4. Section 9(6) – Maintenance of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in whole as follows:

Within ten (10) calendar days of pumping any on lot sewage disposal system, septic tank, subsurface waste disposal system tank, cesspool, or drywell, the Pumper/Hauler shall provide a copy of the Pumper Report, and receipt of confirmation from the Township that the same was received, to the Owner of the on lot sewage disposal system, septic tank, subsurface waste disposal system tank, cesspool, or drywell.

SECTION 5. Section 9(7) – Maintenance of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in whole as follows:

Any person owning a building served by an alternative system or on lot sewage disposal system which contains an aerobic treatment tank shall follow the operation and maintenance recommendations of the equipment manufacturer. A copy of the manufacturer’s recommendations and a copy of the service agreement shall be submitted to the Township in a manner set forth by resolution within six (6) months of the effective date of this Ordinance. Thereafter, service receipts shall be submitted to the Township in a manner set forth by resolution at the intervals specified by the manufacturer’s recommendations. In no case may the service or pumping intervals exceed those required for septic tanks.

SECTION 6. Section 12(1) – Maintenance of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in whole as follows:

All Pumper/Haulers operating within the Township shall comply with all reporting requirements established by the Township in this Ordinance and by resolution, including but not limited to those set forth in Section 9 and Section 12(3) below.

SECTION 6. Section 12(3) – Maintenance of Ordinance No. 2019-2, “OLDS (On Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” is hereby amended in relevant part as follows:

Pumper/Haulers operating within the Township shall operate in a manner consistent with the provisions of the Pennsylvania Solid Waste Management Act (Act 97 of 1980, 35 P.S., Sections 6018.101 – 6018.1003), and Regulations adopted pursuant to such Act. Prior to operation with the Township, Pumper/Haulers shall provide or furnish the following information or documents, as applicable, in a manner set forth by resolution: (i.) any and all permits and approvals issued by any and all federal, state, and/or local governmental bodies to operate as a Pumper/Hauler; (ii.) a complete list of vehicles and equipment that will be operating in the Township to perform pumping/hauling services; (iii.) a current fee schedule; and (iv.) a signed affidavit from an officer of the Pumper/Hauler authorized to execute the same attesting that the Pumper/Hauler will operate pursuant to all applicable federal, state, and local laws, rules, and regulations. A Pumper/Hauler shall in a manner set forth by resolution update the aforementioned information on file with the Township whenever it changes.

...

SECTION 7. Any and all ordinances inconsistent with the terms of this Ordinance are hereby repealed to the extent of any such inconsistencies.

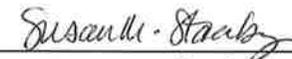
SECTION 8. If any sentence, clause, section or part of this Ordinance is, for any reason, found to be unconstitutional, illegal or invalid, such unconstitutionality, illegality or invalidity shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of this Ordinance. It is hereby declared, as the intent of the Board of Supervisors of Marion Township, that this Ordinance would have been adopted had such unconstitutional, illegal or invalid sentence, clause, section or part thereof not been included herein.

SECTION 9. This Ordinance shall become effective five (5) days after enactment.

DULY ENACTED AND ORDAINED this 26TH day of OCTOBER, 2023.

**MARION TOWNSHIP
BOARD OF SUPERVISORS**

By: 
(Vice) Chairman

ATTEST: 
Susan M. Staaby, Secretary

MUNICIPAL CERTIFICATION

I, Susan M. Staaby, Secretary of Marion Township, Berks County, Pennsylvania, hereby certify that the foregoing Ordinance No. 2023-1 was advertised in the *Reading Eagle* on October 12, 2023, and was duly enacted and approved at a regular meeting of the Marion Township Board of Supervisors held October 26, 2023.

[SEAL]


Susan M. Staaby, Secretary

**MARION TOWNSHIP
BERKS COUNTY, PENNSYLVANIA**

RESOLUTION 2023- 10

**A RESOLUTION OF MARION TOWNSHIP, BERKS COUNTY,
PENNSYLVANIA ADOPTING THE AMENDED ON-LOT
DISPOSAL SYSTEM (OLDS) OWNERS' SEWAGE
MANAGEMENT (SMP) GUIDANCE BOOKLET.**

WHEREAS, Marion Township, Berks County, Pennsylvania ("Township") is a municipal corporation and township of the second class operating pursuant to the Second Class Township Code, 53 P.S. 65101, *et seq.*, the Solid Waste Management Act, 35 P.S. 6018.101, *et seq.*, the Pennsylvania Sewage Facilities Act, 35 P.S. 750.1, *et seq.*, and the Clean Streams Law, 35 P.S. 691.1, *et seq.*;

WHEREAS, the Township recently enacted Ordinance No. 2023-1 ("Amendment") that amended the OLDS (On Lot Disposal System) Management Program Ordinance for Marion Township, Berks County, Pennsylvania, Ordinance No. 2019-2 ("Ordinance"), which was mandated and approved by the Pennsylvania Department of Environmental Protection ("DEP");

WHEREAS, the Amendment generally requires pumper/haulers operating in the Township to observe a property owner's on-lot disposal system when it is being pumped in accordance with the schedule set therein;

WHEREAS, the Township also recently adopted Resolution No. 2023-~~5A~~ ("Resolution"), which generally requires pumper/haulers operating in the Township to submit observation reports electronically with the Township's secondary sewage enforcement officer ("SSEO");

WHEREAS, the Township's purpose in enacting the Amendment and adopting the Resolution is to increase voluntarily participation with the Ordinance by Township residents to satisfy DEP's mandates;

WHEREAS, the Township's SSEO has therefore updated the On-Lot Disposal System (OLDS) Owners' Sewage Management Program (SMP) Guidance Booklet ("Updated OLDS Guidebook") in accordance with the Amendment and Resolution, which explains the requirements of the Ordinance, Amendment, and Resolution in plain and unambiguous terms to serve as reference material for all Township residents; and

WHEREAS, the Township desires to adopt the Updated OLDS Guidebook by this Resolution.

NOW THEREFORE, BE IT RESOLVED by the Board of Supervisors of Marion Township, Berks County, Pennsylvania as follows:

RESOLVED, that the Updated OLDS Guidebook, attached hereto and incorporated by reference herein as Exhibit "A," is hereby adopted for the use, reference, and benefit of all Township residents in understanding the requirements of the Ordinance, Amendment, and Resolution upon said residents, pumper/haulers, and SSEO, amongst others; and

BE IT FURTHER RESOLVED, that the Township's secretary and SSEO may take any and all lawful steps necessary to inform the Township's residents of the Updated OLDS Guidebook and distribute the same to them, and remove the Original OLDS Guidebook from circulation.

DULY ADOPTED this 16th day of November, 2023, by the Board of Supervisors of Marion Township, Berks County, Pennsylvania, in lawful session duly assembled.

**MARION TOWNSHIP
BERKS COUNTY, PENNSYLVANIA**

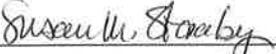


Vice Chairwoman



[SEAL]

Attest:



Susan M. Staaby, Secretary

MUNICIPAL CERTIFICATION

I, Susan M. Staaby, Secretary of Marion Township, Berks County, Pennsylvania, hereby certify that this is a true and correct copy of the Resolution adopted by the Board of Supervisors of Marion Township, Berks County, Pennsylvania on the date written above.



Susan M. Staaby, Secretary

EXHIBIT "A"



ON-LOT DISPOSAL SYSTEM (OLDS) OWNERS' SEWAGE MANAGEMENT PROGRAM (SMP) GUIDANCE



0 3,000 6,000
1" = 3500 feet

First Publication (2021): Berks Envirotech, Inc., West Reading, PA (2021)
Revised Publication (2023): Hydraterra Professionals (HtP), Glenmoore, PA (2023)
Available online: <https://www.mariontwpberks.com/>

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

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MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

I. INTRODUCTION

Purpose

On January 1, 2022, Marion Township began implementation of an On-Lot Sewage Management Program (SMP) as enacted by Ordinance No. 2019-02, known as the “OLDS (On-Lot Disposal System) Management Program for Marion Township, Berks County, Pennsylvania,” and recently amended by Ordinance No. 2023-4. The SMP was required to comply with an order of the Pennsylvania Department of Environmental Protection (DEP) as further discussed below. Its purpose is to ensure that persons who own real property in Marion Township served by an On-Lot Sewage Disposal System (OLDS) ensure that it is properly functioning, maintained, pumped, serviced, and repaired to minimize groundwater pollution and other environmental hazards. Therefore, this SMP Program Guidance booklet should help residents understand the nature of OLDS, the need for regular maintenance of them, how to address situations where they malfunction, and the requirements of the SMP.

Background

The majority of parcels within Marion Township are served by OLDS, which is any infrastructure (pipes, tanks, pumps, drainfields, etc.) located outside of a building that conveys, treats, and disposes of sewage wastewater. While most parcels have their own OLDS, some parcels share an OLDS. Accordingly, the specific nature of the components of the OLDS can range widely depending upon the age of the system, soil conditions, and size of the home(s) or building(s) that it is serving. Regardless, the commonality is that all OLDS must be regularly maintained to ensure their proper functioning, which reduces the likelihood of expensive repairs, groundwater pollution, and other environmental and health hazards.

The adoption of the SMP by Marion Township was required as part of the Official Sewage Facilities Plan for Marion Township (aka the Act 537 Plan) that Marion Township was also ordered to adopt by the DEP. The Act 537 Plan requires Marion Township to provide public sewer service for certain parcels within Marion Township, primarily those in the village of Stouchsburg along Main Street. Through its approval of the Act 537 Plan, however, the DEP permitted existing OLDS to remain in Marion Township provided that the SMP was adopted.

To further comply with the DEP’s order, Marion Township must report SMP data to DEP annually. Importantly, persons who own real property in Marion Township served by an OLDS must ensure that their OLDS are properly functioning, maintained, pumped, serviced, and repaired otherwise the DEP could subject other neighborhoods within Marion Township to the Act 537 Plan. How a property owner must properly maintain, pump, and service an OLDS is further discussed in Section V, but includes regular sewage pumping and observation of the OLDS by a pumper/hauler licensed to do such work in the Commonwealth of Pennsylvania.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

Costs

Under the original SMP pursuant to Ordinance No. 2019-2, Marion Township imposed a fee to cover the costs of its administration and enforcement of the SMP (as also required by the DEP) by a Pennsylvania certified sewage enforcement officer. Still effective today, the fee for the first four-year cycle (from 2021 to 2025) for each property owner in Marion Township is \$50.00 annually, which appears on the County/Township tax bill issued every March. Marion Township, however, has recently reduced its administrative burden through Ordinance No. 2023-1 and Resolution No. 2023-6, which in short requires Pumper/Haulers to observe and submit reports on OLDS while servicing and pumping them through a web-based application developed by Marion Township's new and current, secondary sewage enforcement officer. Previously, Marion Township's former sewage enforcement officer had no choice but to visit each property when its OLDS was being serviced and pumped to observe the OLDS and submit a report on it. As a result of these changes, Marion Township is hoping that the fees previously imposed can be wholly or partially repealed in the future.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

II. TYPES OF ON-LOT DISPOSAL SEWAGE SYSTEMS (OLDS)

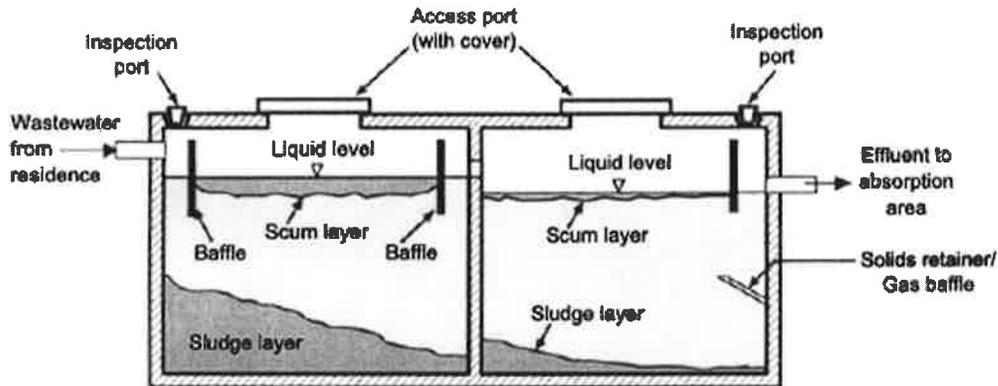
On-Lot Disposal Systems (OLDS) are designed to treat and dispose of domestic household sewage through natural processes. In its most basic form, an OLDS consists of a treatment tank (i.e., septic tank) and a disposal area (i.e. drainfield). Both components play important roles in cleaning up the wastewater and disposing it into the soil in an environmentally friendly manner. It is important to note that there are various types of OLDS. The information below describes a basic system (septic tank/drainfield) as well as older systems (cesspool and seepage pits) and newer “alternative” systems which can sometimes be found on properties with more challenging soil, slope, and/or area restrictions.

Septic Tank/Drainfield

The septic tank/drainfield system involves a treatment tank which is a large watertight “box”, usually made of concrete, with an inlet and outlet pipe. Wastewater flows from the home to the treatment tank through the sewer pipe. The treatment tank treats the wastewater naturally by holding it in the tank long enough for solids and liquids to separate. The wastewater forms three layers inside the tank. Solids lighter than water (such as fats, oils, and greases) float to the top forming a layer of scum. Solids heavier than water settle at the bottom of the tank, forming a layer of sludge. This leaves a middle layer of partially clarified wastewater. The layers of sludge and scum remain in the septic tank where bacteria found naturally in the wastewater continue to break the solids down. The sludge and scum that cannot be broken down are retained in the tank and build up until it is pumped.

Baffles in the tank serve a very important role in preventing accumulated solids from traveling out of the tank. Any solids that escape the tank can clog up the drainfield and cause premature (and expensive) failure. The illustration below shows how sludge and scum layers separate and how baffles serve to keep these layers from leaving the tank.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

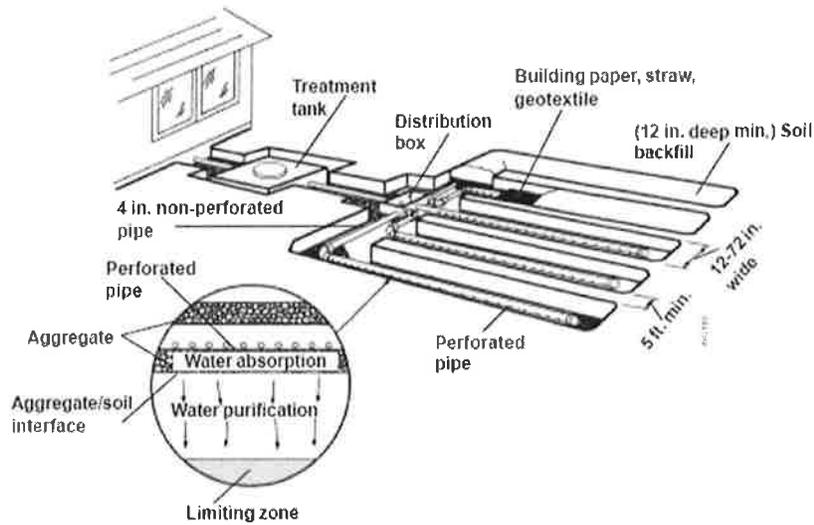


2.1 Cross Section of a typical Two Compartment Septic Tank

Illustration 2.1 shows a tank constructed with 2 compartments in series, which has been required in Pennsylvania for homes built since approximately 1997 so that an additional level of protection is in place to prevent solids or scum from flowing out of the tank. Sometimes two separate single compartment septic tanks are installed in series to achieve the same purpose.

The layer of clarified liquid, also known as effluent, flows from the septic tank to the disposal area. A drainfield (also known as a leach field, disposal field, or a soil absorption area) represents the most common disposal component of a septic system. This is the place where the effluent from the septic tank percolates through the soil for final treatment and disposal. There are many different kinds of drainfields, but most involve an excavation in the ground with perforated pipe set in crushed stone. The diagram below shows one of the more common layouts in Marion Township, with several long and narrow excavations, or trenches.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)



2.2 Diagram of Typical Drainfield Showing Underground Trenches

The most common types of drainfields are:

➤ Subsurface Beds and Trenches

Subsurface beds and trenches are the most conventional on-lot sewage system absorption area configuration. In both cases, perforated pipe is placed in a layer of stone within an excavation in the ground. Wastewater from a treatment tank flows into the perforated pipe and seeps through the stone to the underlying soil. The technology is essentially the same for both beds (single large rectangular excavation) and trenches (multiple narrower rectangular excavations), and the type used is largely a function of site slope; at slopes of greater than 8%, trenches are required in Pennsylvania. These designs may also include a pump and associated pump tank to convey wastewater from the septic tank to the bed or trenches in cases where gravity flow is not possible, or in cases where a poor percolation rate requires the piping in the bed or trenches to be pressurized. This type of design is typically called "pressure dosing".

A variation of subsurface beds and trenches is often used called a subsurface sand filter. Subsurface sand filters include sand placement over the entire excavated area to bypass soils with unacceptable permeability prior to placement of stone and pipe. Minimum sand depth is twelve (12) inches and all such designs require pressure dosed distribution.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

➤ Elevated Sand Mounds

An elevated sand mound is typically used when rock or a water table is too close to the ground surface to allow for an in-ground system. Sand is placed on top of the ground to make up for the lack of soil depth, and the stone and pipe are placed on top of the sand. All of this is covered and surrounded by a soil berm. As with subsurface sand filters, DEP regulations require that all elevated sand mounds be pressure dosed.

Cesspools and Seepage Pits

Given the age of many of the residences in Marion Township, there are numerous cesspools or seepage pits that provide on-lot sewage disposal. A typical cesspool is a cylindrical excavation with an open bottom and walls lined with un-mortared stone or concrete block. Raw sewage is discharged into the cesspool from a sewer pipe connected to the building drain. Most solids accumulate in the cesspool, and the remaining liquid sewage waste is absorbed into the soil through the open bottom and porous sides of the cesspool.

Cesspools were used frequently in the past but have been prohibited for new homes in Pennsylvania for over 40 years due to a high risk for groundwater contamination. Many of the natural processes that “clean up” wastewater in a modern septic system do not occur with a cesspool.

Of particular concern is the depth where wastewater seeps into the soil. Most cesspools were constructed without regard for soil limitations which may affect groundwater quality. These limitations commonly include a high groundwater table or fractured bedrock which may cause wastewater to flow through open channels directly to groundwater. Sewage which is discharged close to groundwater or fractured bedrock greatly increases the chance that groundwater may become contaminated. Sewage that seeps into the soil at the depths that are usually found in cesspools also does not get renovated by aerobic bacteria as much as would be the case with modern, shallower drainfields. Aerobic bacteria are naturally occurring microorganisms that live in an oxygen rich environment, and there’s much more oxygen in shallow soil than there is in deeper soil.

A seepage pit is very similar to a cesspool in design, but wastewater flows first into a septic tank, and then into the seepage pit, which is a porous block or stone lined pit like a cesspool. The addition of a septic tank improves the quality of the wastewater that seeps into the ground, since septic tanks are designed to filter out solids and scum, as well as provide some microbial decomposition of sewage wastes. From an environmental standpoint, this type of sewage system is an improvement over a cesspool but still deficient with regards to current criteria. A seepage pit still has much greater potential for groundwater contamination than a modern drainfield, since the wastewater seeps into the soil at depths that don’t support the beneficial aerobic bacteria, and which may be too close to groundwater and/or rock.

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As with any existing septic system, cesspools and seepage pits are generally “grandfathered” from a regulatory standpoint. If sewage does not appear on the ground surface or back up into a dwelling, their use may generally continue. However, should a property served by these technologies exhibit any of these problems; repair will usually entail replacing the cesspool or seepage pit with a new sewage system that meets all current standards.

Although these designs work a little differently than more modern sewage systems, a similar level of maintenance is still required to help them last longer and minimize the threat of groundwater pollution.

Alternate On-Lot Disposal Sewage Systems (OLDS)

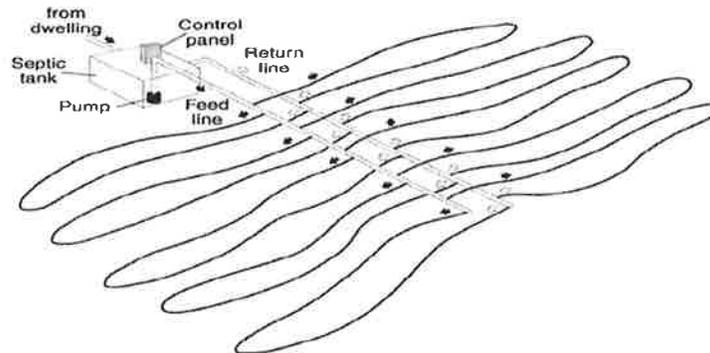
The information above describes the “conventional” type of on-lot system, the septic tank/drainfield system, as well as the older types of systems found in the Township – cesspools/seepage pits. Due to the varied environmental conditions in the Township, some on-lot systems have been installed which are classified as “alternate” systems by DEP. Alternate systems typically employ more sophisticated treatment components which are specially designed in order to overcome limitations such as poor soils, shallow bedrock, steep slopes, and limited space, among others. Many of these alternate systems require more intensive operation and maintenance efforts than a typical septic tank /drainfield system because of the more sophisticated technology, and regular oversight by a qualified maintenance contractor is needed in these cases.

DEP considers alternate systems as those which generally have a proven track record but are not currently described in the regulations governing sewage treatment facilities. There is also a category for “experimental” systems, which are considered for the purpose of testing and observation. The use of any “experimental” system is highly regulated, and generally limited to the most severe situations, often in cases where no other feasible repair can be made for an existing house. A few of the more common alternate systems that have been approved for use in Pennsylvania are discussed below.

➤ Drip Irrigation

This technology employs the use of small diameter flexible tubing to distribute effluent into the upper 12 inches of the soil at a controlled rate. Its primary advantage is applicability for sites that may otherwise require an elevated sand mound. In these cases, many homeowners prefer the buried drip tubing for aesthetic reasons. Other advantages include use on steeper slopes with marginal soils, and increased soil oxygen (due to shallow tubing depth) for more efficient renovation.

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2.3 Schematic of Typical Drip Field Installation

Drip irrigation sometimes requires more advanced treatment technologies than a conventional septic tank. The advanced treatment component(s) and the drip irrigation itself may require regular maintenance oversight by a qualified contractor.

➤ Leaching (“Gravel-less”) Chambers

Leaching chambers are semi-cylindrical plastic chambers installed with the open face on the bottom of a seepage bed or trench excavation. Multiple rows of chambers connected end-to-end may be installed in lieu of stone and pipe. Wastewater flows through the void space created by the chambers and is absorbed by the soil at the bottom of the absorption area excavation. DEP has approved a reduction of up to 40% in minimum absorption area square footage when using leaching chambers to repair an existing on-lot sewage system, which can facilitate installation where limited space is available. Although this area reduction can be beneficial in repairing on-lot systems, leaching chambers are also commonly used due to homeowner preference and site access concerns; it is much easier for an installer to transport plastic chambers than truckloads of stone to a site with difficult access. Unlike most other alternate sewage systems, the use of leaching chambers typically does not require any more maintenance activities than those associated with a conventional on-lot sewage system.



2.4 Typical Leaching Chambers

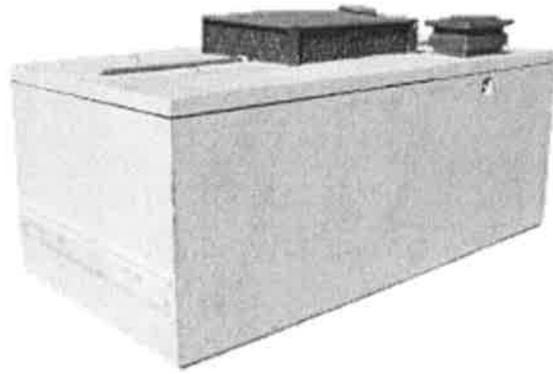
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➤ Peat/Coco Filters

A peat filter is typically an enclosed unit which contains specially harvested peat. Peat is the byproduct of the partial decomposition of organic matter, in an oxygen-poor environment. It contains an abundance of carbon and is very effective in wastewater treatment. Peat filters are large tanks typically installed downstream of a treatment tank, and before the disposal area, to “clean up” the wastewater more than a conventional system. Regular maintenance is crucial, as the peat typically must be replaced after several years for the filter to function correctly. Coconut husk fibers are now also in use.



Polyethylene



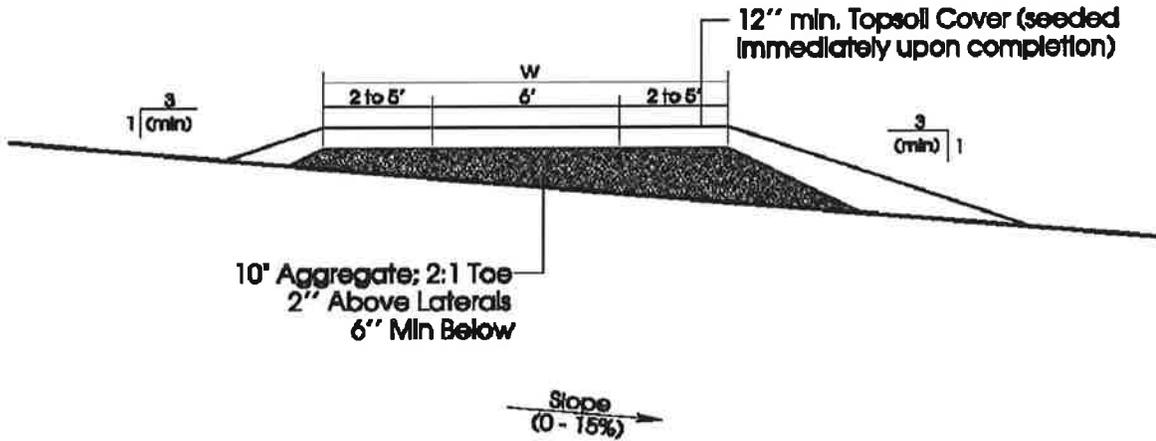
Concrete

2.5 Typical Peat/Coco Filters

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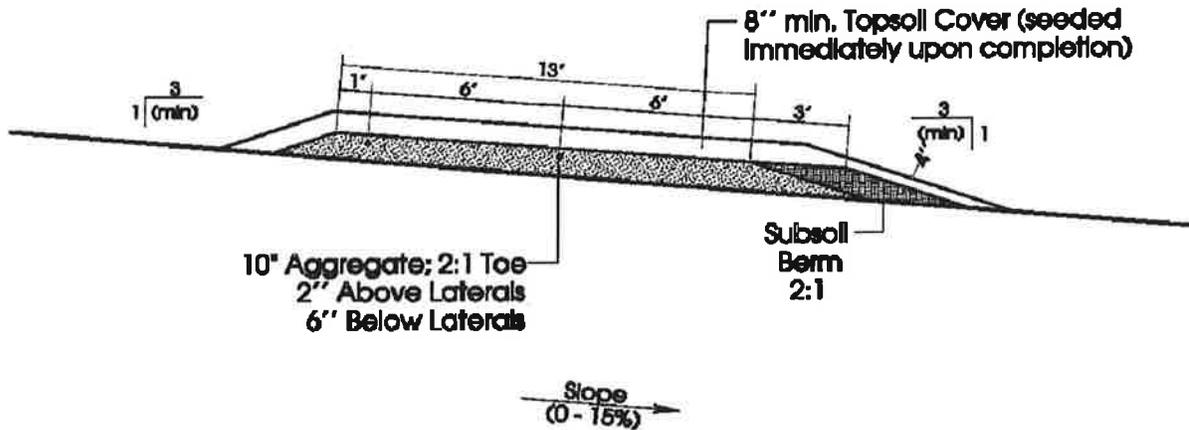
➤ At-Grade Absorption Areas

These are a variation on the conventional elevated sand mound system, whereby the use of a pre-treatment filter (such as a peat filter) can allow the elimination of the sand. Lowering the height of a sand mound by eliminating the sand can have both cost and aesthetic benefits.



2.6 Level At-Grade Bed Cross-Section

A sloping at-grade, shown below, is a variation where the finished grade of the mound follows the existing grade.



2.7 Cross-Section of Sloping At-Grade

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III. ON-LOT DISPOSAL SEWAGE SYSTEM (OLDS) MAINTENANCE

Whatever type of OLDS serves your business or home, routine maintenance and proper operation is needed to avoid environmental and human health problems and to minimize costly repairs. Septic system maintenance is often compared to automobile maintenance because only a little effort on a regular basis can save a lot of money and significantly prolong the life of the system. Sound septic system operation and maintenance practices include conserving water, being careful that nothing harmful is disposed of through the system, and having the system pumped and inspected at prescribed intervals, as detailed below. The information below generally applies to all the on-lot systems previously described; however, some systems may have additional or unique components that require special care. For example, all sand mounds are dosed with a pump which would require additional maintenance; drip irrigation tubing is generally near the ground surface and is especially vulnerable to disturbance and compaction; and many alternate sewage system technologies require more detailed oversight by a qualified contractor. Please consult with the Sewage Enforcement Officer or your sewage system contractor for any unique operation and maintenance issues that may apply to your system.

Pump Your Tank Regularly

The single most effective maintenance activity that can and should be performed on all OLDS is the regular pumping of the treatment tank. This simple activity will remove the accumulated solids in the treatment tank, prevent solids from traveling out of the tank and damaging the drainfield, and allow the natural treatment processes in the tank to work as intended. Additional information regarding treatment tank pumping follows, to better explain why pumping your sewage system is usually a “win/win” situation for both the environment and your bank account.

How regular treatment tank pumping helps:

The treatment tank treats the wastewater naturally by holding it in the tank long enough for solids and liquids to separate. The wastewater forms three layers inside the tank. Solids lighter than water (such as fats, oils, and greases) float to the top forming a layer of scum. Solids heavier than water settle at the bottom of the tank, forming a layer of sludge. This leaves a middle layer of partially clarified wastewater. The layers of sludge and scum remain in the septic tank where bacteria found naturally in the wastewater continue to break the solids down. The sludge and scum that cannot be broken down are retained in the tank and build up until it is pumped.

It is very important to remove these solids as they will eventually build up to the point that the tank no longer has enough liquid area to allow for adequate microbial activity or the separation of solids and scum. Once this point is reached, suspended solids will pass through the tank to the drainfield, and the wastewater will not stay in the tank long enough for bacterial activity which helps break down some solids. Both consequences can result in greater risk for groundwater contamination and premature failure of the

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drainfield. Since repairing or replacing a failing drainfield will cost significantly more money than regular treatment tank pumping, having your tank pumped regularly will save you money in the long run, and at the same time help protect the environment.

How often you should have your tank pumped:

The rate at which solids accumulate varies significantly based upon such things as how many people live in the house, whether a garbage disposal is used, and the size of the tank. The general guideline for determining when a pump-out should be conducted is whenever the solids and scum layers accumulate to 1/3 of the liquid depth of the tank. In lieu of constant monitoring of the depth of the solids, a maximum four-year pumping interval has become the accepted standard in Pennsylvania and is also the basis for Marion Township's program. If you have a very large family, an undersized tank, or use a garbage disposal, you may need to increase your pumping frequency to avoid excessive solids build-up.

What else you should consider when having your system pumped:

You may use any PA-licensed septic waste Pumper/Hauler you wish that is either currently registered or can pursue timely registration with terra-tracker.com. Marion Township has selected the terra-tracker.com web-based application to record, submit, and track system pumping and observations records and proof of pumping throughout the Township.

There are several easy things a Pumper/Hauler can check while pumping your system which will help avoid problems in the future. When pumping and observation occurs, the Pumper/Hauler checks the following:

- ✓ Tank baffles should be inspected and, if necessary, repaired or replaced. Tank baffles are a simple but essential component of proper septic tank function, and when broken or missing can cause premature drainfield failure. A permit must be issued by the Primary Sewage Enforcement Officer (SEO) who will also inspect the baffle repair.
- ✓ The tank and tank lid should be checked for visible cracks or other structural defects and repaired if needed. Wastewater leaking out will create an environmental or health hazard, and any storm water getting in will cause your drainfield to be hydraulically overloaded. Safety is also a concern.
- ✓ The Pumper/Hauler should note whether there was flow back into the tank from the outlet pipe going to the drainfield. This can indicate a hydraulically overloaded drainfield and follow-up investigation may be needed.
- ✓ You should also ask your Pumper/Hauler to note the depth of your tank lid. Current regulations require that it be no more than twelve (12) inches deep so that it's easy to get to for regular pumping. If yours is deeper than this, you may want to consider adding a "riser", or manhole extension, to save extra digging every four (4) years.

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Use Water Wisely

Water conservation is very important for on-lot sewage systems because continual saturation of the soil in the drainfield can affect the quality of the soil and its ability to naturally remove toxins, bacteria, viruses, and other pollutants from the wastewater.

The most effective way to conserve water around the house is to first repair any leaking faucets or running toilets and use washing machines and dishwashers only when full.

In a typical household, most of the water used indoors is used in the bathroom, and there are a lot of little things that can be done to conserve water there. For example, try to avoid letting water run while washing hands and brushing teeth. Avoid taking long showers and install water saving features (aerators) on faucets and shower heads. These devices can reduce water use by up to 50 percent. Low-flush toilets use one to two gallons per flush compared to the three to five gallons used by conventional toilets. Even using a toilet dam or putting a container filled with rocks in the toilet tank can reduce water use by 25 percent.

It is also important to avoid overtaxing your system by using a lot of water in a short time period. Try to space out activities requiring heavy water use (like laundry) over several days.

Know What Not to Flush

What you put into your septic system greatly affects its ability to do its job. As a rule of thumb, do not dispose of anything in your septic system that can just as easily be put in the trash. Remember that your system is not designed to be a garbage disposal, and that solids build up in the septic tank and eventually need to be pumped out.

In the kitchen, avoid washing food scraps, coffee grinds, and other food items down the drain. Grease and cooking oils contribute to the layer of scum in the tank and should not be put down the drain. Garbage disposals generally increase the amount of solids in the tank, and as a result can require more frequent pump-outs.

The same common-sense approach used in the kitchen should be used in the bathroom. Don't use the toilet to dispose of plastics, paper towels, disposable diapers, non-biodegradable wipes, kitty litter, or any inorganic materials. The only things that should be flushed down the toilet are wastewater and toilet paper.

Avoid Hazardous Chemicals

To avoid disrupting or permanently damaging your septic system, do not use it to dispose of hazardous household chemicals. Even small amounts of paints, varnishes, thinners, waste oil, photographic solutions, pesticides, and other organic chemicals can destroy helpful bacteria and the biological digestion taking place within your system. These chemicals also pollute the groundwater. Some septic system additives that claim to help or clean your system also contain hazardous chemicals and should be avoided.

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Household cleaners, such as bleach, disinfectants, and drain and toilet bowl cleaners should be used in moderation and only in accordance with product labels. Overuse of these products can harm your system. It makes sense to try to keep all toxic and hazardous chemicals out of your septic tank system when possible.

To help prevent groundwater pollution, be sure to dispose of leftover hazardous chemicals by taking them to an approved hazardous waste collection center.

Consider Septic System Additives Carefully

There are many septic tank additive products on the market today, most of which claim to accelerate the natural processes in a treatment tank or even rejuvenate a clogged soil absorption system. Of these, there are generally two categories of additives: 1) chemical, which includes inorganic and organic compounds, and 2) biological, which includes yeast, bacteria, and enzymes. Over the past 40 years, there have been several studies conducted on septic tank additives; however, there is still some debate on their effectiveness. Part of the problem stems from the number of additives that are marketed and the lack of an established standard testing method for all additives.

It is important to understand that a homeowner does not need to add anything to a septic tank that is designed, operated, and properly maintained because naturally occurring bacteria are already present within the waste.

Chemical additives, such as caustic hydroxides and sulfuric acid, should never be added to a septic system. Adding these products will destroy the bacterial population in the septic tank, possibly affect the permeability of the drainfield, and may cause groundwater contamination. Often, manufacturers of biological additives market their use monthly to restore the bacterial balance in a septic tank, as part of a routine maintenance program. **No additive is needed to maintain the bacterial balance in a properly operated and maintained sewage system.**

Claims made on the effectiveness of additives to either eliminate pumping of a septic tank or restore permeability of the soil absorption system are unproven. ***No product can eliminate the need for regular sewage system pumping and prudent system maintenance.***

System Observations

Regular observation of your sewage system by a qualified contractor can help catch many small problems before they become big (and expensive) problems. This can also help alert you to different or additional maintenance activities which could help prolong the life of your sewage system.

Regular pumping and observation of all on-lot sewage systems is required within the Marion Township to determine accurate conditions and maintenance needs throughout the Township. Please see Section V of this guidance document for more discussion regarding pump-out and observation requirements.

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Protect Your System

Finally, it is important to protect your septic system from potential damage. Don't plant anything but grass near your sewage system. Roots from large shrubs and trees can cause damage. Grass is the most appropriate groundcover for the drainfield.

Don't allow anyone to drive or operate heavy machinery over any part of the system, and do not build or construct anything over the drainfield – these activities can crush piping, crack tanks, and compact the soil so it won't absorb wastewater as effectively.

One of the most important ways to protect your sewage system is to divert roof drains, surface water, and sump pumps away from the drainfield or treatment tank lid. Your drainfield area is already being asked to absorb more water than the rest of the yard – adding an extra load on top of this will cause it to function poorly or fail altogether. If water is directed over the tank lid, it can sometimes seep into a gap around the lid opening and will then get into the tank and flow to the drainfield, again causing system malfunction or failure.

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IV. GUIDANCE ON ADDRESSING SYSTEM MALFUNCTIONS

Previous sections described the various types of on-lot systems and appropriate operation and maintenance techniques needed to minimize problems and maximize longevity. However, despite an OLDS system owner's best effort, there may still arise various situations where an on-lot system is not functioning satisfactorily. There can be a myriad of reasons for a sewage system problem, and consultation with a qualified contractor and/or the Primary Sewage Enforcement Officer (SEO) will be needed in most cases.

Three general principles are important to keep in mind when addressing any malfunction:

1. A problem involving sewage ponding on the surface of the ground is a serious environmental and human health hazard, as well as an illegal condition. Anytime a malfunction like this occurs the sewage system must be pumped out by a PA-licensed Pumper/Hauler and evaluated by a qualified contractor or Primary SEO as soon as possible to protect the health of your family and your neighbors. Pumping and conserving water use should continue for as long as necessary to keep the problem under control.
2. Problems associated with the soil absorption area (aka drainfield) are typically the most difficult and expensive to correct, so try to be sure that simpler and less expensive things like a clogged or broken pipe, plumbing problem, tank problem, or unequal distribution from a distribution box (aka "d-box") are not causing the malfunction.
3. You or your contractor must contact the Primary SEO prior to conducting any repairs or exploratory excavation. In most cases, a simple repair permit and observation will be required.

Steps to help guide an OLDS system owner through the process of resolving a malfunction in more detail are presented below. Please note that these steps are just suggestions, and the process for addressing any particular problem will vary based on the nature of the problem, homeowner knowledge of the sewage system, and timely consultation with a qualified contractor or Primary SEO.

Step 1 – Identify the Problem

Most sewage system malfunctions can be described by one or more of several general symptoms. These symptoms, and some possible causes for each, are as follows:

Slow Drains or Wastewater Back-Up

- Plumbing problem inside house;
- Clogged or crushed pipe in sewage system;
- Clogged inlet baffle in treatment tank;
- Treatment tank clogged with solids/scum build-up; and/or
- System hydraulically saturated.

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Odors

- Problem with house plumbing vent;
- Tank or tank lid not structurally sound;
- Broken piping; and/or
- System hydraulically saturated.

Lush Green Grass Over Part of System

- Broken piping;
- Tank leak or overflow; and/or
- Drainfield saturated.

Wastewater Surfacing and/or Wet Spongy Area

- Broken piping;
- Tank leak or overflow; and/or
- Drainfield saturated.

Step 2 – Check Your Maintenance Records and Pump if Needed

If your sewage system has not been pumped regularly and recently, a simple call to a PA-Licensed sewage pumper to have your tank pumped out could help define the problem. When pumping a tank, most qualified contractors can easily check for poor flow into the tank (as may be caused by a clogged or damaged pipe or inlet baffle), excessive solids buildup which could be an indicator of possible drainfield problems, or even backflow into the tank in some extreme cases of drainfield saturation. Even if tank pumping and associated system checks fail to indicate the cause of a problem, in many cases pumping abates the immediate emergency by providing an empty tank as a storage reservoir for a few days until more investigation can be completed.

Step 3 – Locate the Problem

To determine what part of your sewage system may be causing the problem, it's often helpful to first confirm where the tank and drainfield are located on your property. In many cases, the permit that was issued for your sewage system can tell you where all the components are on your property, as well as the size and construction of each component. If you do not have this information in your records, permit copies for most newer systems (built in the last 20-30 years) can often be obtained directly from the Primary Sewage Enforcement Officer (SEO) for a fee. If no permit data is available for your property, you may need to contact a qualified sewage system contractor to help locate your sewage system components.

Once the location of your system components is known, you may be able to narrow down the possible causes of the problem. For example, if you have sewage ponding or surfacing, or an area of lush green grass over the drainfield or tank you will know that one of these components could be the problem. If sewage is surfacing between the tank and house, or between the tank and drainfield, you could have a broken pipe or damaged distribution box.

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Step 4 – Evaluate Recent Changes or Events

Have you recently added a sump pump, diverted a roof drain, or changed the surface water runoff on your yard in any way? These things could lead to a saturated drainfield if surface water has been allowed to get into the treatment tank or flow over the drainfield area. Any changes like this that could add to the hydraulic load on your sewage system should be corrected.

Have you recently moved into a house that previously had a smaller family, or added to the number of people living in your home? If so, the additional water usage could lead to failure of an older or poorly maintained sewage system. Your sewage system may also have not been designed to handle a particularly large family – a check of permit data can tell you the number of bedrooms (roughly equal to number of people) that your system was designed to accommodate. If your sewage system is undersized, you may want to discuss procedures for permitting a larger sewage system. Water conservation, fixing leaky fixtures, and installing low-flow fixtures (always wise on-lot sewage system practices) may be crucial in dealing with an undersized system.

Have you had any work done recently that involved heavy equipment on your yard, or allowed anyone to drive a vehicle across your yard? Vehicles and heavy construction equipment can crack tanks, crush pipes, and damage a drainfield in some cases. Addressing these problems will almost always require the input of a qualified contractor and the Primary Sewage Enforcement Officer (SEO).

Step 5 – Solve the Problem

Based on the investigations conducted in the steps above, you should be able to identify or at least narrow down the cause of the malfunction. In many cases, the experience of a qualified contractor may be needed to determine the precise cause, but in these cases, the information a homeowner has gathered by considering the steps above could be helpful in securing a timely diagnosis.

If you haven't already done so, always consult with the Primary Sewage Enforcement Officer (SEO) prior to repairing or replacing any part of your sewage system. If your tank or drainfield is the cause of the malfunction and needs to be replaced, a permit from the Primary SEO is always required. Simpler repairs may or may not require a permit – always verify permit requirements directly with the Primary SEO, or make sure that your contractor has done this, before beginning any type of repair work.

In the case of a drainfield replacement, a permit will usually involve the Primary SEO evaluating soils on your property to see if they are suitable for a new drainfield. This evaluation typically consists of back-hoe excavations and detailed percolation testing requirements.

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As previously noted, a drainfield replacement can be very costly, and there may also be cases where a property doesn't have enough suitable area to install a new drainfield. Depending upon the severity of the problem, increased pumping in conjunction with water conservation may be required in these cases.

For homeowners who find themselves with no feasible repair to a failing on-lot sewage system, frequent pumping and extreme water conservation may be the only solution. Homeowners in this condition may have to consider the installation of sewage holding tanks, which do not drain to a drainfield or absorption area but are instead designed to retain all sewage until it is pumped out. Holding tanks could provide longer intervals between pumping by providing larger storage capacity, mitigating costs and inconvenience in the long run, but this is generally the option of last resort in solving a sewage system malfunction.

Step 6 – Maintain Your Sewage System

After addressing a malfunction, and possibly incurring significant costs to do so, use and maintain your sewage system carefully so that the next malfunction can be avoided!

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V. OLDS SYSTEM OWNER RESPONSIBILITIES AND REQUIREMENTS

Pumping

Under the SMP as required by the DEP, each OLDS must be pumped at least every four (4) years, or more often if necessary, by a Pumper/Hauler licensed to do that work in the Commonwealth of Pennsylvania.

At the time your OLDS is pumped (once every four (4) years, or more frequently if needed given the condition of the OLDS), the Pumper/Hauler must prepare and submit a Pumping Observation Report through the terra-tracker.com mobile application and provide the service confirmation code to the homeowner. Upon completion of the pump, the Pumper/Hauler and Marion Township will electronically receive a unique code which confirms that the pumping and observation of the OLDS has occurred, and a PDF copy of the Pumping Observation Report. The Pumper/Hauler is thereafter required to provide you with the unique service confirmation code, in addition to the Pumping Observation Report, either electronically or via hard copy, that was submitted with Marion Township. To your benefit, the Pumping Observation Report may contain information on how you can maintain and repair the OLDS to increase its useful life.

Please note that the Pumping Observation Report only needs to be completed and submitted to Marion Township once every four (4) years, even if your OLDS must be pumped more often.

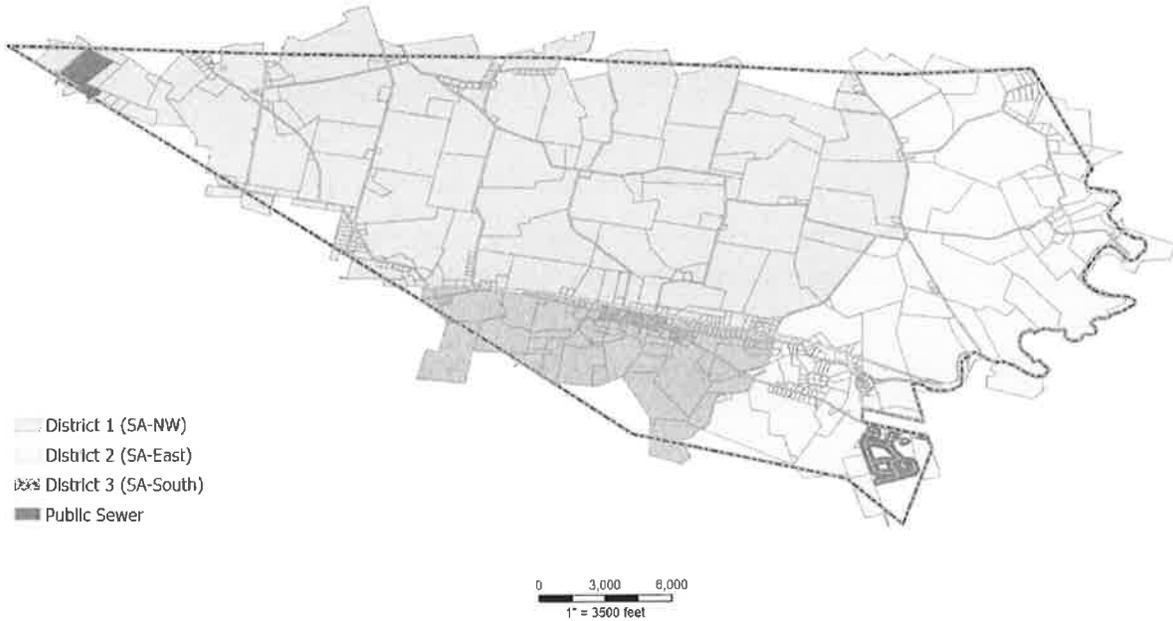
Observations

The Pumper/Hauler will observe all components of the OLDS, including all tanks and absorption areas, during a pump. In most cases, this observation can be done without earth disturbance apart from obtaining access to the tank's lid. The Pumper/Hauler's observations will then be reported on the Pumping Observation Report which is electronically submitted to Marion Township through its secondary sewage enforcement officer's web-based application, terra-tracker.com. Upon submission, terra-tracker.com will respond with an automated unique service confirmation code confirming receipt of the Pumping Observation Report. Thereafter, the Pumper/Hauler must provide you with the unique service confirmation code and a hard copy of the Pumping Observation Report in the event you cannot receive an electronic copy.

Timing of Pumping & Observation

Please refer to Figure 5.1 (the map may also be viewed online at <https://www.mariontwpberks.com/>) to determine when your OLDS must be observed and pumped. By way of explanation, Marion Township has been divided into three (3) Sewage Management Districts (SMD(s)). First, determine within which SMD your property is located. Second, please refer to Figure 5.2 which illustrates the first four-year cycle for each district.

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5.1 Marion Township Sewage Management District (SMD) Map

This map may also be viewed online at <https://www.mariontwpberks.com/>

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

Pumping and Observation Schedule

	Start Date	Days to Complete	End Date	2019	2020	2021	2022
Initial Pump/Observation Cycle							
(District 1) Northwest SMD	24-Dec-19	366	24-Dec-20				
(District 2) East SMD	24-Dec-19	731	24-Dec-21				
(District 3) South SMD	24-Dec-19	1096	24-Dec-22				
Second Pump/Observation Cycle: Four Years from Initial Pumping							

5.2 Pumping and Observation Schedule

The SMP requires each SMD to have an initial pumping and observation cycle consistent with Figure 5.2 above.

Notification and Compliance

Notification will be sent to all property owners within the year of their scheduled OLDS observation and pump-out by a Pumper/Hauler. The Township requires that initial pump-outs and observations occur within the first two (2) years of each cycle. If, by the end of your scheduled cycle, we have not received confirmation of pump-out and observation via Secondary SEO and terra-tracker.com, or a request to schedule an observation and pump-out, you will receive a notice requiring compliance within thirty (30) days. If after thirty (30) days we still have not received the required information, a second notice will be sent. Please refer to Section VI for information regarding enforcement.

Maintenance

Each OLDS system owner must maintain their system to avoid malfunctions. In addition to the pumping and observation requirement noted above, this includes completing any repairs as needed to keep the sewage system functioning properly, contracting with a qualified maintenance provider to oversee the more detailed maintenance required by certain advanced alternate system technologies, and other activities as may be needed to avoid or manage a malfunction. Please note that specific conditions for which the Township will require maintenance or repair activities include the following:

- Missing or damaged treatment tank baffles;
- Cracked or otherwise structurally unsound tanks or tank lids;
- Surface water directed over a tank or drainfield;
- Pumps, alarms, and electrical connections which are not working or otherwise deemed unsatisfactory by the Pumper/Hauler observing your system;

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- Unequal distribution box outlet levels;
- Greywater discharge to the ground surface;
- Direct piped sewage discharge;
- Evidence of sewage ponding or otherwise discharging to the ground surface;
- A sewage system design or component that requires more intensive maintenance than a conventional sewage system (e.g. advanced treatment or disposal technologies which are recommended by DEP for additional routine maintenance).

Operation

Putting substances down the drain that may damage your system and the environment is prohibited. Please read all labels carefully, and if in doubt do not put anything down your drain that may damage your sewage system or the groundwater.

VI. MARION TOWNSHIP ENFORCEMENT RESPONSIBILITIES

Marion Township must ensure that property owners within its jurisdiction adhere to the SMP by having their OLDS maintained, and observed and pumped as scheduled (i.e. once every four (4) years after the initial observation and pumping period is completed). This is because Marion Township can only comply with its Act 537 Plan, as mandated by the DEP, through the submission of reports on the OLDS in Marion Township. Marion Township, however, can only obtain the information necessary to submit those reports by receiving the Pumper Observation Reports completed during periodic pumps and observations of the OLDS.

As a result, Marion Township must ensure that OLDS system owners comply with the maintenance and periodic pumping and observation requirements of the SMP. In the event that an OLDS is not adequately maintained or pumped and observed as required by the SMP, Marion Township may be forced to issue you a notice of violation and/or take any and all other actions available to it at law or in equity to ensure compliance with the SMP, including but not limited to obtaining fines and costs before the local magisterial district justice or injunctive relief before the Berks County Court of Common Pleas. Marion Township prefers to work with OLDS system owners to the extent that an issue exists preventing a resident from having his or her OLDS adequately maintained or pumped and observed.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

VII. FREQUENTLY ASKED QUESTIONS

Q. Why does my OLDS need to be periodically pumped and observed?

A. The general intent of the SMP is to require OLDS system owners to adequately maintain that system.

Proper care of the OLDS will:

- Protect drinking water and groundwater resources from contamination.
- Reduce the incidence of malfunctions and prolong the life of your system, thereby preventing more costly repairs or replacement.
- Help to prevent the extension of public sewerage services which can be prohibitively expensive in rural areas.

Q. Is everyone receiving a pumping/observation notice at the same time?

A. No. To balance the anticipated workload on septic Pumpers and Haulers, approximately one-third (1/3) of property owners with on-lot septic systems will be notified to have their system pumped and observed each year.

Q. Do I have to schedule an observation during every pump if I have my septic system tank pumped more frequently?

A. No. You will only be required to schedule an observation once in each four (4) year cycle.

Q. If my septic system tank has been pumped in the last year, am I still required to participate in the Sewage Management Program (SMP)?

A. Yes. Documentation of the pumping must be provided to the Secondary Sewage Enforcement Officer (SEO) and you must schedule for pumping and observation to be in compliance.

Q. What happens if the Pumper/Hauler finds a problem during the observation?

A. The issue will be documented within the "Pumping Observation Report" with recommendations or requirements depending on the individual situation. Preventive maintenance is the key to avoiding more costly repairs down the line.

Q. Do I need to be present during pumping/observation?

A. It is recommended, but not required. It is helpful if OLDS system owner can locate system components or documents related to previous installation or maintenance and provide to Pumper/Hauler prior to scheduled pump-out/observation.

Q. What happens after pump-out and observation?

A. After the pumping and observation report has been submitted by the Pumper/Hauler on-

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

site, the Township and the Pumper/Hauler will receive an email with confirmation code and PDF attachment informing you of observations collected. If you do not have access to the internet or do not have an email account, a hard copy of the confirmation code and PDF attachment can be requested from Township at no charge.

Q. What if my tank doesn't need to be pumped as often as every four (4) years?

A. All tanks are required to be pumped by Marion Township Sewage Management Ordinance once every four (4) years after the initial pumping cycle is completed. Exemptions from the initial pumping cycle will not be considered. Future exemption(s) will be considered on a case-by-case basis. Please contact the Primary Sewage Enforcement Officer (SEO) should you want to request an exemption from future pumping cycles. If the exemption is granted, you will be required to have your septic system tank cleaned and observed during the next cycle. In no case will an OLDS system owner be exempt for more than one consecutive cycle.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

DOS AND DON'TS OF SEPTIC SYSTEM CARE

DO learn the location of your septic tank and other septic system components. Maintain access to the tank(s) and inspection ports for service visits.

DO conserve water to avoid overloading the system. Repair dripping faucets and leaking toilets, run washing machines and dishwashers only when full, avoid long showers, and use low-flow fixtures.

DO divert roof drains and the surface water flowing down driveways and hillsides away from the septic system.

DO have your tank pumped out every three years.

DO take leftover hazardous household chemicals to your approved hazardous waste collection center for disposal. Use commercial bathroom cleaners, bleach, disinfectants, and drain and toilet bowl cleaners sparingly and in accordance with product labels.

DON'T make any repairs or modifications to your septic system without obtaining the required permit from the municipal Sewage Enforcement Officer.

DON'T drive or park within 10 feet of a drainfield or septic tank. Do not put any structures on drainfields or on the septic tank. The area should be left undisturbed with only mowed grass cover. Roots from nearby trees or shrubs may clog and damage your drain lines.

DON'T use your sink or toilet as a trash can. Do not put disposable diapers, paper towels, tampons, or condoms down the drain or toilet. Do not use the septic system to dispose of fats or harmful chemicals.

DON'T use commercial septic tank additives, cleansers, yeast, or sugar. These products are not necessary, and some may hurt your system in the long run.

DON'T use caustic drain openers for a clogged drain. Instead, use boiling water or a drain snake to open clogs.

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

IMPORTANT CONTACTS

Terra Tracker:

Office: (484) 879-2270

Email: support@terra-tracker.com

Website: <https://terra-tracker.com>

Hydraterra Professionals (HtP):

Sewage Management Program Administrator, Secondary SEO

1691 Horseshoe Pike, Suite 2, Glenmoore, PA 19343

Office: (610) 942-3000

Email: info@hydraterrapro.com

Website: <https://hydraterrapro.com>

Systems Design Engineering, Inc.

Primary SEO

1032 James Dr., Leesport, PA 19533

Office: (610) 369-1319

Email: SEO@sdei.net

Website: <https://www.sdei.net>

Marion Township:

420 Water St., Stouchsburg, PA 19567

Email: mariontownship@comcast.net

Office: (610) 589-2860

Website: <https://www.mariontwpberks.com>

MARION TOWNSHIP SEWAGE MANAGEMENT PROGRAM (SMP)

Pennsylvania Department of Environmental Protection (DEP):

South-Central Regional Office

909 Elmerton Ave., Harrisburg, PA 17110

Office: (717) 705-4700

Website: <http://www.depweb.state.pa.us>

Pennsylvania Septage Management Association (PSMA):

PO Box 144, Bethlehem, PA 18016

Office: (717) 763-7762

Email: infocenter@psma.net

Website: <http://www.pasma.net>

Appendix C

EDU Evaluation

Marion Township EDU Evaluation

Prepared for:

*Marion Township
420 Water Street
Stouchsburg, PA 19567*

Prepared by:



1691 Horseshoe Pike, Suite 2
Glenmoore, PA 19343

Project Number: MART22201

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Attachment 2 – Marion Township Service Area EDU Evaluation

Attachment 3 – Southeast Sewer System Existing EDUs – Color Map

Attachment 4 – Southeast Sewer System Potential EDUs – Color Map

1. Executive Summary

In November 2022, an Equivalent Dwelling Unit (EDU) evaluation was performed for Marion Township (Township). The objective was to determine the number of lots in the approved Act 537 Plan Sewer Service Area (Service Area) and

- 1) Lots that currently have at least one dwelling unit and;
- 2) Lots that could be improved with more than the current number of dwelling units.

Each dwelling unit was assumed to be one (1) EDU regardless of building type and would create 225 gallons per day of sewage flow. Under the approved Act 537 Plan the sewage is to be sent to through a combination of gravity and lower pressure sewers with connection to the Womelsdorf Wastewater Treatment Plant (WWTP).

The EDU evaluation will assist in determining: the capacity required at the WWTP, the type of public sewer system best suited to convey the public sewer, and the associated cost for each connection.

A variety of electronic resources were used to collect lot information and a drive-through of the Service Area was completed to visually confirm the electronically collected information of the lots.

It was determined that the Service Area contains:

- 233 total lots;
- approximately 267 existing EDUs;
- approximately 300 potential future EDUs.

The following sections provide additional details of the Service Area and the process in which lot information was collected and evaluated.

2. Service Area

The Service Area is primarily located in the southern part of the Township and includes Stouchsburg Village, US 422 area with Edris Road, Upper Canal Road, Lower Canal Road, and Shady Cabins. Boundaries of the Service Area are shown in Attachment 1 (Map 11B - Proposed Public Sewer for Phase 1B and 2).

3. Collection of Lot Information

A number of resources were utilized to assess existing and potential EDUs for lots within the Service Area, and they are as follows:

- Google Earth & Google Maps: lots were observed from aerial and street views which allowed for identification of multiple front doors, mailboxes, electrical & gas services, and potential dwelling units on the lots.
- County of Berks Assessment Parcel Viewer: provided lot boundaries, as well as zoning classifications, lot acreage, number of structures from aerial imagery, and homeowner information. Zoning classifications were used to determine potential EDUs based on possible future usage.
- Zillow: Number of bedrooms & bathrooms were identified for a number of lots, aiding in the estimating of existing EDUs. Property lines, photos from inside and outside of the house, and homeowner notes also provided insight into any additions or detached improvements.
- Marion Twp. Act 537 Plan Sewage Needs Analysis (from 2005): Scanned pages provided additional information on several lots that were in question. Homeowners completed a survey with parcel information like EDUs.

Act 537 information provided the division of the Service Area into three (3) zones. ArcMap (GIS) was used to count and qualify the number of lots and EDUs in each of the three zones. An excel spreadsheet was used to collect the information and show the total data collection for each lot in the area (233 total). The spreadsheet, shown as Attachment 2, includes the number of structures, existing & potential EDUs, and additional lot information. This spreadsheet shows compiled data gathered from electronic and on-site observation.

4. Evaluation of Lot Information

Following the electronic assessment of service area, approximately 40 lots required a site visit to verify existing and potential future EDUs. On November 23, 2022, a driving site visit was conducted to observe conditions of the lots in question.

Of the 233 existing lots, it was determined that approximately:

- At least 14 were identified with no current dwelling units;
- 23 were identified as currently having 2 or more dwelling units;
- 7 were identified as currently having 3 or more dwelling units;
- 22 were zoned as commercial use lots;

- 4 were identified as farm use;
- Additionally, it was determined that 4050 Conrad Weiser Parkway has an existing EDU count of 13 with a potential for 15 or more EDUs and may require additional inquiry. This lot has a motel, restaurant, and single-family home.

Based on the findings from the driving site visit and lot information accumulated in Attachment 2, three (3) maps were developed in ArcGIS which are Attachments 3 and 4.

Attachment 3 shows the existing EDU count for every lot in the Service Area. All lots are shown with a different color representing the number of associated EDUS. EDU counts range from 0 to 13. Land Use designations and Zoning Classifications can also be show through visual representation.

Attachment 4 shows the future potential EDUs for the Service Area. By assessing each parcel, a determination was made about the potential for additional development which may increase the EDU count. This map shows EDU counts that range from 0 to 15.

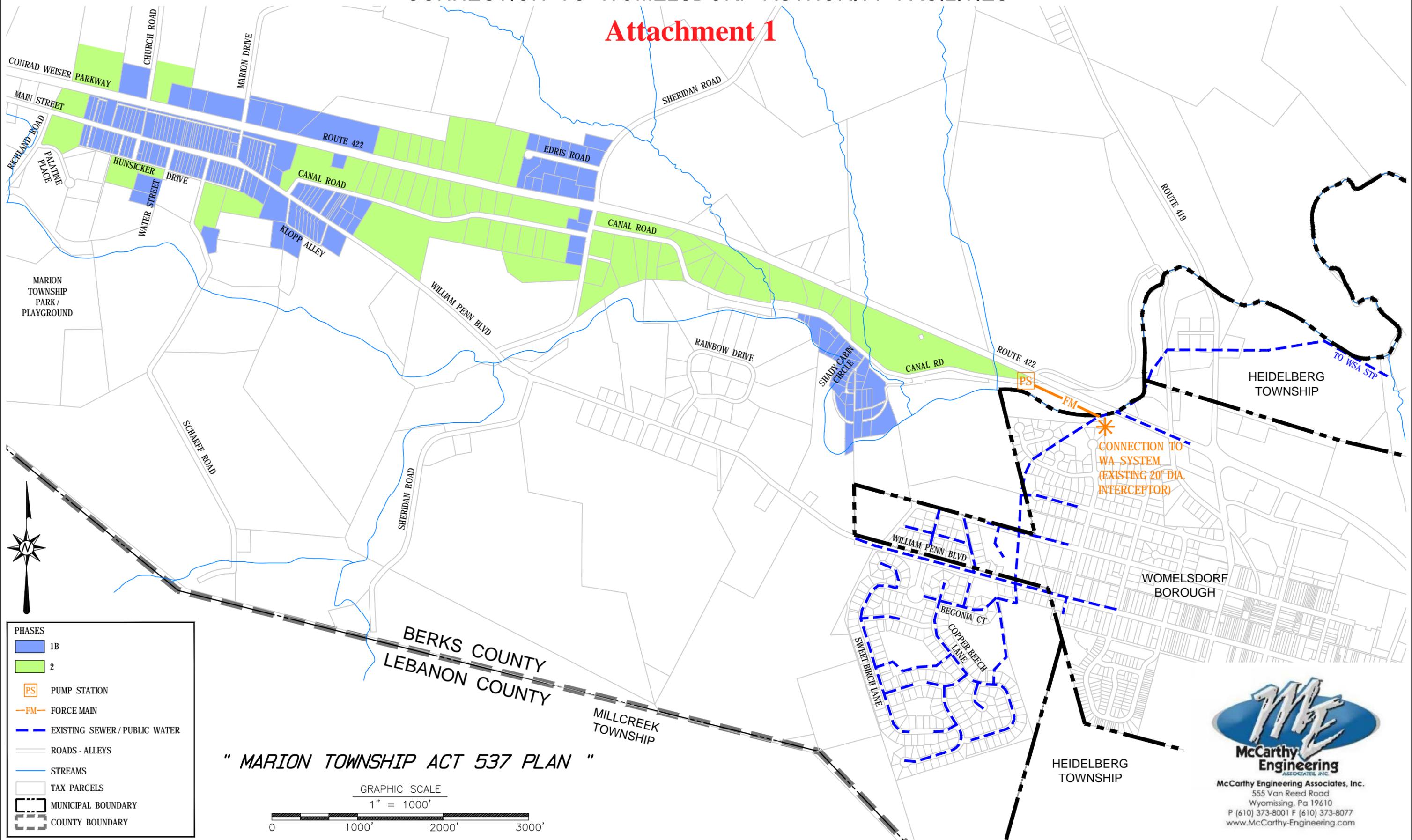
Attachment 1

MAP 11B – Proposed Public Sewer – Phase 1B & 2

MAP 11B - PROPOSED PUBLIC SEWER - PHASE 1B & 2

CONNECTION TO WOMELSDORF AUTHORITY FACILITIES

Attachment 1



PHASES

- 1B
- 2

PS PUMP STATION

—FM— FORCE MAIN

- - - EXISTING SEWER / PUBLIC WATER

— ROADS - ALLEYS

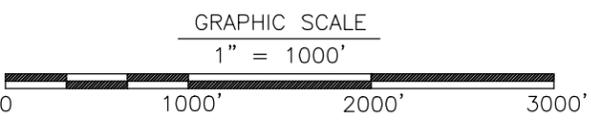
— STREAMS

 TAX PARCELS

MUNICIPAL BOUNDARY

COUNTY BOUNDARY

" MARION TOWNSHIP ACT 537 PLAN "



McCarthy Engineering
ASSOCIATES, INC.

McCarthy Engineering Associates, Inc.
555 Van Reed Road
Wyomissing, Pa 19610
P (610) 373-8001 F (610) 373-8077
www.McCarthy-Engineering.com

Attachment 2

Marion Township Service Area EDU Evaluation

Marion Township Service Area EDU Evaluation

Lot No.	Site Address	Existing EDUs	Potential EDUs	Zoning Classification (Berks Co. GIS)	Land Use Code (Berks Co. GIS)	Notes	Zillow	Type of Land Use (per Act 537 Plan)	Lot Acreage	Min Area Required by Zoning Class (acres)
1	157 MAIN ST	1	1	R	111	garage in back, not in-law suite	N/A	LDR	2.34	1.0
2	153 MAIN ST	1	1	R	112		5 bed / 1 bath	TC	0.42	0.09 to 0.46
3	151 MAIN ST	1	1	EXEMPT	191		4 bed / 2 bath	TC	0.29	0.09 to 0.46
4	149 MAIN ST	1	1	R	112		3 bed / 1.5 bath	TC	0.25	0.09 to 0.46
5	147 MAIN ST	1	1	R	111		4 bed / 2 bath	TC	0.31	0.09 to 0.46
6	143 MAIN ST	1	2	R	112	One definite house with large barn structure in back of lot	3 bed / 2 bath	TC	0.9	0.09 to 0.46
7	141 MAIN ST	1	1	R	111		5 bed / 1.5 bath	TC	0.51	0.09 to 0.46
8	135 MAIN ST	1	1	R	112	garage structure in back (multi level)- not in law suite	3 bed / 1 bath	TC	0.3	0.09 to 0.46
9	131/133 MAIN ST	1	2	C	3326	five structures, two mailing addresses on parcel	N/A	TC	0.3	0.09 to 0.46
10	129 MAIN ST	1	1	R	112	Large garage structure in back (multi level)	4 bed / 2 bath	TC	0.29	0.09 to 0.46
11	127 MAIN ST	1	1	R	112	Large garage/ barn structure in back (multi level)	3 bed / 1 bath	TC	0.27	0.09 to 0.46
12	121 / 123 MAIN ST	2	2	R	112	two clear front doors and two clear mailboxes	3 bed / 3 bath	TC	0.46	0.09 to 0.46
13	119 or 117 MAIN ST	1	2	R	112	Two distinct front doors- looked to be just one unit	5 bed / 1 bath	TC	0.8	0.09 to 0.46
14	113 MAIN ST	1	1	R	112	Large garage / barn structure in back (multi level)	4 bed / 2 bath	TC	0.21	0.09 to 0.46
15	111 MAIN ST	1	1	R	112	Large garage / barn structure in back (multi level)	4 bed / 2 bath	TC	0.3	0.09 to 0.46
16	109 MAIN ST	1	1	R	112		3 bed / 1 bath	TC	0.3	0.09 to 0.46
17	107 MAIN ST	1	1	R	112		5 bed / 1.5 bath	TC	0.32	0.09 to 0.46
18	105 MAIN ST	1	1	R	112		3 bed / 2bath	TC	0.32	0.09 to 0.46
19	103 MAIN ST	2	3	R	133	clear second unit livable	N/A	TC	0.45	0.09 to 0.46
20	101 MAIN ST	1	1	R	111	Large garage / barn structure in back (multi level)	4 bed / 1 bath	TC	0.39	0.09 to 0.46
21	99 MAIN ST	1	1	R	111R		2 bed / 1 bath	TC	0.15	0.09 to 0.46
22	97 MAIN ST	1	1	R	112R		2 bed / 1 bath	TC	0.16	0.09 to 0.46
23	95 MAIN ST	1	1	R	112R		4 bed / 1 bath	TC	0.3	0.09 to 0.46
24	93 MAIN ST	1	1	R	111		2 bed / 1 bath	TC	0.17	0.09 to 0.46
25	91 MAIN ST	1	1	R	111			TC	0.17	0.09 to 0.46
26	89 MAIN ST	1	1	R	111			TC	0.19	0.09 to 0.46
27	87 MAIN ST	1	2	R	116	Appears to be one large unit, rather than separate units	7 bed / 3 bath	TC	0.28	0.09 to 0.46
28	85 MAIN ST	1	1	C	5129	Marion Fire Co.	N/A	TC	0.31	0.09 to 0.46
29	83 / 81 MAIN ST	2	2	R	132	Two clear front doors labeled "81" and "83"		TC	0.29	0.09 to 0.46
30	MAIN ST (Easement)	0	0	C	2303			TC	0.3	0.09 to 0.46
31	4110 CONRAD WEISER PY / 75 MAIN ST	2	2	C & R	4101	1 SFR House AND" Twilight Acres Creamery & Bakery"	N/A	TC	0.5	0.09 to 0.46
32	73 MAIN ST	1	1	R	112			TC	0.43	0.09 to 0.46
33	71 MAIN ST	1	1	R	132			TC	0.36	0.09 to 0.46
34	69 MAIN ST	1	1	R	111		3 bed / 1 bath	TC	0.18	0.09 to 0.46
35	67 MAIN ST	1	1	R	111			TC	0.18	0.09 to 0.46
36	414 MARION DR	2	3	R	111	Multi family home (414 & 416 Marion Dr.)	6 bed / 3 bath	TC	0.34	0.09 to 0.46
37	65 MAIN ST	1	1	R	132			TC	0.16	0.09 to 0.46
38	63 MAIN ST / 61 MAIN ST	2	3	R	132	Appears to be two separate units, no information online	N/A	TC	0.22	0.09 to 0.46
39	CONRAD WEISER PY (not developed)	0	0	R	100A			TC	0.14	0.09 to 0.46
40	CONRAD WEISER PY (not developed)	0	0	R	100A			TC	0.25	0.09 to 0.46
41	4225 / 4221 CONRAD WEISER PY	2	2	C	4280	Weiler's Produce Building, plus additional house possibly?	N/A	HC	18.37	0.46 to 1
42	4201 CONRAD WEISER PY	1	1	C	4280	Weiler's Garage- one structure	N/A	HC	2.69	0.46 to 1
43	CHURCH RD	0	0	FARM	800			HC	22.62	0.46 to 1
44	4127 CONRAD WEISER PY	1	1	E	9940	Fire Co. - structure	N/A	HC	1.41	0.46 to 1

Lot No.	Site Address	Existing EDUs	Potential EDUs	Zoning Classification (Berks Co. GIS)	Land Use Code (Berks Co. GIS)	Notes	Zillow	Type of Land Use (per Act 537 Plan)	Lot Acreage	Min Area Required by Zoning Class (acres)
45	4119 CONRAD WEISER PY	2	2	C	4104	Appears to be two businesses, no additional information online	N/A	HC	1.06	0.46 to 1
46	4113 CONRAD WEISER PY	1	3	C	4271	Mangat Family Dentistry - structure	N/A	HC	2.69	0.46 to 1
47	160 MAIN ST	1	1	R	111		5 bed / 6 bath	HC	3.33	0.46 to 1
48	148 MAIN ST	1	1	R	132		3 bed / 2 bath	TC	0.23	0.09 to 0.46
49	146 MAIN ST	1	1	R	111		3 bed / 1 bath	TC	0.26	0.09 to 0.46
50	144 MAIN ST	1	1	R	111			TC	0.26	0.09 to 0.46
51	138 MAIN ST	1	1	R	133	large, multi story barn in back of property- could be livable	5 bed / 3 bath	TC	0.55	0.09 to 0.46
52	136 MAIN ST	1	1	R	111	large, multi story barn in back of property- could be livable	4 bed / 1.5 bath	TC	0.31	0.09 to 0.46
53	134 MAIN ST	1	1	R	111	large, multi story barn in back of property- could be livable	3 bed / 1 bath	TC	0.39	0.09 to 0.46
54	130 MAIN ST	1	1	R	111	large, multi story barn in back of property- could be livable	2 bed / 1 bath	TC	0.18	0.09 to 0.46
55	126 MAIN ST / 128 MAIN ST	1	2	R	133	two units	N/A	TC	0.33	0.09 to 0.46
56	122 MAIN ST	1	1	R	112		4 bed / 1.5 bath	TC	0.26	0.09 to 0.46
57	120 MAIN ST	1	1	R	111		3 bed / 1 bath	TC	0.27	0.09 to 0.46
58	118 MAIN ST	1	1	R	113		3 bed / 1 bath	TC	0.28	0.09 to 0.46
59	116 R MAIN ST	1	1	C	4241	Restaurant - could be closed, but unclear	4 bed / 1 bath	TC	0.11	0.09 to 0.46
60	116 MAIN ST	1	1	C	4241		N/A	TC	0.19	0.09 to 0.46
61	112 MAIN ST / 114 MAIN ST	2	2	R	144	two clear units 112 and 114	5 bed / 2 bath	TC	0.22	0.09 to 0.46
62	110 MAIN ST	1	1	R	112		3 bed / 1 bath	TC	0.27	0.09 to 0.46
63	106 / 106R / 104 / 102 / 100 MAIN ST	5	5	R	162	106 & 106 R is one building. 100, 102, 104 is second building (5 units)	N/A	TC	0.53	0.09 to 0.46
64	96 MAIN ST	1	1	R	161	two front doors, but appears to just be one unit	4 bed / 2 bath	TC	0.33	0.09 to 0.46
65	94 MAIN ST	1	1	R	111		6 bed / 1.5 bath	TC	0.3	0.09 to 0.46
66	86 MAIN ST	3	3	C	4220	appears to be 2-3 units, no additional information online	N/A	TC	0.39	0.09 to 0.46
67	82 MAIN ST	1	1	R	115			TC	0.22	0.09 to 0.46
68	80 MAIN ST	1	1	R	144			TC	0.19	0.09 to 0.46
69	78 MAIN ST	1	1	R	144	large, multi story barn in back of property- could be livable	4 bed / 2 bath	TC	0.31	0.09 to 0.46
70	76 MAIN ST	1	1	R	111			TC	0.27	0.09 to 0.46
71	74 MAIN ST	1	1	R	111			TC	0.15	0.09 to 0.46
72	72 MAIN ST	1	1	R	111			TC	0.15	0.09 to 0.46
73	70 MAIN ST	1	1	R	144		3 bed / 1 bath	TC	0.32	0.09 to 0.46
74	68 MAIN ST	1	1	R	114		4 bed / 3 bath	TC	0.3	0.09 to 0.46
75	426 WATER ST	1	1	R	101			?	6.02	-
76	412 WATER ST	1	1	R	111			TC	0.83	0.09 to 0.46
77	420 S WATER ST	1	1	E	9940			TC	5.89	0.09 to 0.46
78	4061 CONRAD WEISER PY	1	1	C	4260	Keppley's Tire Center	N/A	HC	1.27	0.46 to 1
79	4055 CONRAD WEISER PY	1	1	C	4282	Restaurant	N/A	HC	1.31	0.46 to 1
80	4045 / 4049 CONRAD WEISER PY	2	2	C	3325	Auction place, plus one possible house	N/A	HC	2.86	0.46 to 1
81	4009, 4017, 4019, 4021, 4023 CONRAD WEISER PY	6	6	C	4280	Business Center (with 6 separate businesses)	N/A	HC	6.07	0.46 to 1
82	4005 CONRAD WEISER PY	1	1	R	101			HC	1.78	0.46 to 1
83	3995 CONRAD WEISER PY	1	1	R	101			HC	1.18	0.46 to 1
84	3989 CONRAD WEISER PY	1	1	R	101			HC	0.97	0.46 to 1
85	3983 CONRAD WEISER PY	1	1	R	105A			HC	0.96	0.46 to 1
86	3977 CONRAD WEISER PY	1	1	R	105			HC	1.18	0.46 to 1
87	3965 CONRAD WEISER PY	1	1	R	112		4 bed / 2 bath	HC	2.98	0.46 to 1
88	3945 CONRAD WEISER PY	1	1	R	801		3 bed / 2 bath	HC	7.75	0.46 to 1
89	CONRAD WEISER PY	0	1	R	100A			HC	3.25	0.46 to 1
90	23 EDRIS RD	1	1	R	105B			HC	0.57	0.46 to 1
91	19 EDRIS RD	1	1	R	105B			HC	0.59	0.46 to 1
92	15 EDRIS RD	1	1	R	102			HC	0.59	0.46 to 1
93	11 EDRIS RD	1	1	R	105B			HC	0.46	0.46 to 1

Lot No.	Site Address	Existing EDUs	Potential EDUs	Zoning Classification (Berks Co. GIS)	Land Use Code (Berks Co. GIS)	Notes	Zillow	Type of Land Use (per Act 537 Plan)	Lot Acreage	Min Area Required by Zoning Class (acres)
94	7 EDRIS RD	1	1	R	102			HC	0.89	0.46 to 1
95	520 SHERIDAN RD	1	1	R	102		2 bed / 1 bath	HC	1	0.46 to 1
96	3 EDRIS RD	1	1	R	102			HC	0.86	0.46 to 1
97	20 EDRIS RD	1	1	R	101	large, multi story garage in front of property- could be livable	3 bed / 2 bath	HC	1.13	0.46 to 1
98	16 EDRIS RD	1	1	R	101			HC	1.07	0.46 to 1
99	8 EDRIS RD	1	1	R	105A			HC	1.01	0.46 to 1
100	4 EDRIS RD	1	1	R	102			HC	1.07	0.46 to 1
101	3919 CONRAD WEISER PY	1	1	R	102			HC	0.33	0.46 to 1
102	3917 CONRAD WEISER PY	1	1	R	101			HC	0.37	0.46 to 1
103	3913 CONRAD WEISER PY	1	1	R	105A		3 bed / 3 bath	HC	1.03	0.46 to 1
104	3907 CONRAD WEISER PY	1	1	R	105A			HC	1.05	0.46 to 1
105	3901 CONRAD WEISER PY	1	1	R	102		3 bed / 2.5 bath	HC	0.69	0.46 to 1
106	59 MAIN ST	1	1	R	111	large garage structure next to house	3 bed / 1 bath	TC	0.71	0.09 to 0.46
107	57 MAIN ST	1	1	R	111P		2 bed / 1 bath	TC	0.28	0.09 to 0.46
108	55 MAIN ST	1	1	R	111		3 bed / 1 bath	TC	0.35	0.09 to 0.46
109	53 MAIN ST / 51 MAIN ST	2	2	R	132	two clear mail boxes and front doors	N/A	TC	0.39	0.09 to 0.46
110	49 MAIN ST	1	1	R	111	two clear mail boxes and front doors- no additional info	5 bed / 1 bath	TC	0.41	0.09 to 0.46
111	45 MAIN ST	1	1	R	111		3 bed / 1.5 bath	TC	0.41	0.09 to 0.46
112	43 MAIN ST	1	1	R	113		3 bed / 1 bath	TC	0.43	0.09 to 0.46
113	4050 /4056 Conrad Weiser PY	13	15	C	4223	Motel (0.5 EDU/ room x 13 units) 1 edu for restaurant, 1 edu for house, 1 edu auto repair bldg, 6 unit motel on other side	N/A	HC	2.29	0.46 to 1
114	41 MAIN ST	1	1	R	101		2 bed / 1 bath	TC	0.62	0.09 to 0.46
115	37 MAIN ST / 35 MAIN ST	4	4	R	132	Large farm land, not zoned as F. Multi units in building 1, possible additional house	N/A	TC / HC (parcel split)	7.79	0.09 to 1
116	4030 CONRAD WEISER PY	1	1	C	4101	Hi-Way Meat Market	N/A	HC	0.57	0.46 to 1
117	901 CANAL RD	1	1	R	102			HC	1.35	0.46 to 1
118	895 CANAL RD	1	1	R	101		3 bed / 2.5 bath	HC	1.33	0.46 to 1
119	889 CANAL RD	1	1	R	105A		3 bed / 2 bath	HC	1.36	0.46 to 1
120	883 CANAL RD	1	1	R	105A			HC	1.41	0.46 to 1
121	877 CANAL RD	1	1	R	105A			HC	1.5	0.46 to 1
122	871 CANAL RD	1	1	R	101			HC	1.32	0.46 to 1
123	861 CANAL RD	1	1	R	111			HC	1.76	0.46 to 1
124	855 CANAL RD	1	1	R	106			HC	1.61	0.46 to 1
125	851 CANAL RD	0	1	R	101	open field- but google aerial shows house being built- no additional info		HC	1.3	0.46 to 1
126	847 CANAL RD	1	1	R	111			HC	1.1	0.46 to 1
127	CANAL RD	0	1	R	100B	field		HC	1.08	0.46 to 1
128	CONRAD WEISER PY	0	1	R	153	field		HC	4.6	0.46 to 1
129	490 SHERIDAN RD	1	1	R	111			HC	0.56	0.46 to 1
130	805 CANAL RD	1	1	R	102			HC	0.63	0.46 to 1
131	33 MAIN ST	1	1	R	111		2 bed / 1 bath	TC	0.26	0.09 to 0.46
132	31 MAIN ST	1	1	R	101		3 bed / 1 bath	TC	0.25	0.09 to 0.46
133	29 MAIN ST	1	1	R	101			TC	0.27	0.09 to 0.46
134	27 MAIN ST	1	1	R	102			TC	0.31	0.09 to 0.46
135	23 MAIN ST	1	1	R	150			TC	0.75	0.09 to 0.46

Lot No.	Site Address	Existing EDUs	Potential EDUs	Zoning Classification (Berks Co. GIS)	Land Use Code (Berks Co. GIS)	Notes	Zillow	Type of Land Use (per Act 537 Plan)	Lot Acreage	Min Area Required by Zoning Class (acres)
136	21 MAIN ST	1	1	R	111	includes large multi level garage with loft- not in law suite	3 bed / 3 bath	TC	0.52	0.09 to 0.46
137	19 MAIN ST	1	1	R	121C			TC	0.16	0.09 to 0.46
138	17 MAIN ST	1	1	R	121C			TC	0.17	0.09 to 0.46
139	15 MAIN ST	1	1	R	113			TC	0.3	0.09 to 0.46
140	STOUCHSBURG RD	0	0	R	100A			TC	0.42	0.09 to 0.46
141	11 MAIN ST	1	1	R	111			TC	0.46	0.09 to 0.46
142	7 MAIN ST	1	1	R	107			TC	0.46	0.09 to 0.46
143	904 CANAL RD	1	1	R	101			TC	0.51	0.09 to 0.46
144	900 CANAL RD	1	1	R	105A			TC	0.85	0.09 to 0.46
145	1355 WILLIAM PENN BL	2	3	FARM	801P	3 large structures, all possibly livable	4 bed / 1 bath	LDR	13.03	1
146	844 CANAL RD	1	1	R	124			LDR	1.99	1
147	836 CANAL RD	1	1	R	102			LDR	1.44	1
148	830 CANAL RD	1	1	R	102			LDR	1.34	1
149	824 CANAL RD	1	1	R	102			LDR	1.41	1
150	818 CANAL RD	1	1	R	105B			LDR	0.89	1
151	808 CANAL RD	1	1	R	105A			LDR	2.18	1
152	802 CANAL RD	1	1	R	106		2 bed / 1 bath	LDR	0.86	1
153	468 SHERIDAN RD	1	1	R	111			LDR	0.61	1
154	464 SHERIDAN RD	1	1	R	101			LDR	5.1	1
155	66 MAIN ST	2	2	R	133		N/A	TC	0.31	0.09 to 0.46
156	64 MAIN ST	1	1	R	111			TC	0.15	0.09 to 0.46
157	62 MAIN ST	1	2	C	5180	Commercial- could be a bar	N/A	TC	0.21	0.09 to 0.46
158	60 MAIN ST	1	1	R	112			TC	0.25	0.09 to 0.46
159	58 MAIN ST	1	1	R	111			TC	0.27	0.09 to 0.46
160	56 MAIN ST	1	1	R	111			TC	0.27	0.09 to 0.46
161	54 MAIN ST	1	1	R	144			TC	0.27	0.09 to 0.46
162	52 MAIN ST	1	1	R	111	large, multi story barn in back of property- could be livable	3 bed / 1.5 bath	TC	0.27	0.09 to 0.46
163	48 MAIN ST	1	1	R	111		3 bed / 2 bath	TC	0.29	0.09 to 0.46
164	46 MAIN ST	1	1	R	144		3 bed / 1 bath	TC	0.28	0.09 to 0.46
165	44 MAIN ST / 42 MAIN ST	2	2	R	132	two clear front doors with 42 & 44 on them, with mailboxes	N/A	TC	0.31	0.09 to 0.46
166	40 MAIN ST	1	1	R	111			TC	0.41	0.09 to 0.46
167	38 MAIN ST	1	1	C	5101	Church		TC	0.79	0.09 to 0.46
168	34 MAIN ST	8	8	C	4200	Apartment Complex - appears to be 6 individual units	2 bed / 1 bath (per unit)	TC	2.18	0.09 to 0.46
169	349 SCHARFF RD	1	1	R	145			TC	3.12	0.09 to 0.46
170	341/ 343 SCHARFF RD	1	1	C	4280	two structures, but hard to see if both are livable from google	N/A	TC	2.57	0.09 to 0.46
171	303 SCHARFF RD	1	1	C	5129	Appears to be a scrap yard with one building	N/A	TC	1.1	0.09 to 0.46
172	4 KLOPP AL	1	1	R	101			TC	1.09	0.09 to 0.46
173	6 KLOPP AL	1	1	R	101			TC	1.37	0.09 to 0.46
174	32 MAIN ST / 30 MAIN ST / 28 MAIN ST	4	4	R	132	parcel has three structures and units (28, 30, & 32)	N/A	TC	0.57	0.09 to 0.46
175	26 MAIN ST	1	1	R	111		3 bed / 1 bath	TC	0.3	0.09 to 0.46
176	24 MAIN ST / 22 MAIN ST	2	2	R	112	two clear front doors / mailboxes	N/A	TC	0.29	0.09 to 0.46
177	20 MAIN ST	1	1	R	144	large, multi story barn/ garage in back of property- could be livable	2 bed / 2 bath	TC	0.31	0.09 to 0.46
178	18 MAIN ST	1	1	R	144	large, multi story barn/ garage in back of property- could be livable	2 bed / 1 bath	TC	0.29	0.09 to 0.46
179	16 MAIN ST	1	1	R	111		2 bed / 1 bath	TC	0.28	0.09 to 0.46

Lot No.	Site Address	Existing EDUs	Potential EDUs	Zoning Classification (Berks Co. GIS)	Land Use Code (Berks Co. GIS)	Notes	Zillow	Type of Land Use (per Act 537 Plan)	Lot Acreage	Min Area Required by Zoning Class (acres)
180	14 MAIN ST	1	1	R	112	large, multi story barn/ garage in back of property- likely not livable	3 bed / 1 bath	TC	0.29	0.09 to 0.46
181	12 MAIN ST	1	1	R	133	appears to be potentially two units, One in front, one in rear according to google	4 bed / 4 bath	TC	0.44	0.09 to 0.46
182	10 MAIN ST	1	1	R	102			TC	1.42	0.09 to 0.46
183	553 SHERIDAN RD	1	1	FARM	801			LDR	86.11	1
184	709 CANAL RD	1	1	R	105A			LDR	1.38	1
185	CANAL RD	0	1	R	100A			LDR	1.09	1
186	663 CANAL RD	1	1	R	101			LDR	1.28	1
187	657 CANAL RD	1	1	R	105A			LDR	1.47	1
188	651 CANAL RD	1	1	R	101			LDR	1.96	1
189	645 CANAL RD	1	1	R	111		N/A	LDR	7.34	1
190	637 CANAL RD	1	1	R	101		3 bed / 2 bath	LDR	3.97	1
191	3716 CONRAD WEISER PY	1	1	R	100A			LDR	1.31	1
192	623 CANAL RD	2	2	R	145			LDR	1.19	1
193	619 CANAL RD	1	1	R	145			LDR	1.37	1
194	565 CANAL RD	1	1	FARM	801	Multiple potentially livable structures- no additional information	N/A	LDR	96.33	1
195	N/A (field)	0	0	N/A	N/A	cemetery		LDR	0	1
196	477 SHERIDAN RD	1	1	R	101			LDR	1.8	1
197	SHERIDAN RD	0	0	EXEMPT	600	open parcel - dirt road		LDR	0.25	1
198	SHERIDAN RD	0	0	EXEMPT	5920	cemetery		LDR	1.59	1
199	449 SHERIDAN RD	1	1	R	111			LDR	2.65	1
200	730 CANAL RD	1	1	R	111	large, multi story barn/ garage in front of property- potentially	3 bed / 2 bath	LDR	3.46	1
201	722 CANAL RD	1	1	R	105A			LDR	1.44	1
202	716 CANAL RD	1	1	R	105A			LDR	1.34	1
203	710 CANAL RD	1	1	R	105A			LDR	1.07	1
204	664 CANAL RD	1	1	R	105A			LDR	1.29	1
205	630 A CANAL RD	1	1	R	150			LDR	0.14	1
206	630 CANAL RD	1	1	R	146			LDR	0.13	1
207	624 CANAL RD	1	1	R	104	large, multi story barn/ garage in front of property- potentially	2 bed / 1.5 bath	LDR	1.14	1
208	616 CANAL RD	1	1	R	146			LDR	0.17	1
209	618 CANAL RD	0	1	R	100A			LDR	0.83	1
210	614 CANAL RD	1	1	R	111			LDR	0.7	1
211	610 CANAL RD	1	1	R	101			LDR	0.51	1
212	1520 CANAL RD	1	1	R	104			LDR	0.12	1
213	602 CANAL RD	1	1	R	104			LDR	0.08	1
214	527 CANAL RD	1	1	R	104			LDR	0.32	1
215	7 SHADY CABIN CR	1	1	R	101			LDR	0.46	1
216	9 SHADY CABIN CR	1	1	R	101			LDR	0.23	1
217	11 SHADY CABIN CR	1	1	R	101			LDR	0.22	1
218	13 SHADY CABIN CR	1	1	R	101			LDR	0.23	1
219	15 SHADY CABIN CR	1	1	R	101			LDR	0.3	1
220	17 SHADY CABIN CR	1	1	R	101			LDR	0.56	1
221	SHADY CABIN CR	1	1	R	153			LDR	0.18	1
222	19 SHADY CABIN CR	1	1	R	101	"the shady cabin"- homemade jellies and jam store		LDR	0.26	1
223	WILLIAM PENN BL	0	0	R	100A			LDR	0.42	1
224	SHADY CABIN CR	0	0	R	153			LDR	1.22	1
225	27 SHADY CABIN CR	1	1	R	145			LDR	0.71	1
226	31 SHADY CABIN CR	1	1	R	101			LDR	0.72	1
227	35 SHADY CABIN CR	1	1	R	101			LDR	1.91	1
228	SHADY CABIN CR	0	0	R	100A			LDR	1.58	1
229	4 SHADY CABIN CR	1	1	R	104			LDR	0.5	1
230	16 SHADY CABIN CR	1	1	R	146			LDR	0.39	1

Lot No.	Site Address	Existing EDUs	Potential EDUs	Zoning Classification (Berks Co. GIS)	Land Use Code (Berks Co. GIS)	Notes	Zillow	Type of Land Use (per Act 537 Plan)	Lot Acreage	Min Area Required by Zoning Class (acres)
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231	22 SHADY CABIN CR	1	1	R	102			LDR	0.4	1
232	28 SHADY CABIN CR	1	1	R	146			LDR	0.29	1
233	SHADY CABIN CR	0	0	R	100A			LDR	0.3	1

233 **Total** **267** **287**

0 EDUs	18	12	22	C
1 EDUs	192	191	4	FARM
2 EDUs	16	18		
3 EDUs	1	6		
4 EDUs	2	2		
5 EDUs	1	1		
6 EDUs	1	1		
7 EDUs	0	0		
8 EDUs	1	1		
9 EDUs	0	0		
10 EDUs +	1	1		
2 or more	23	30		
3 or more	7	12		

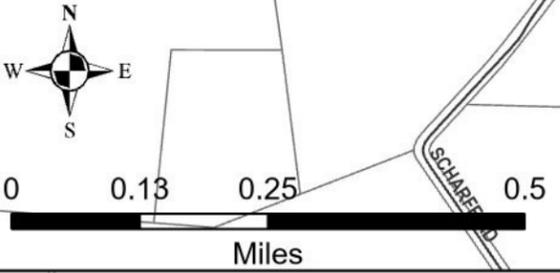
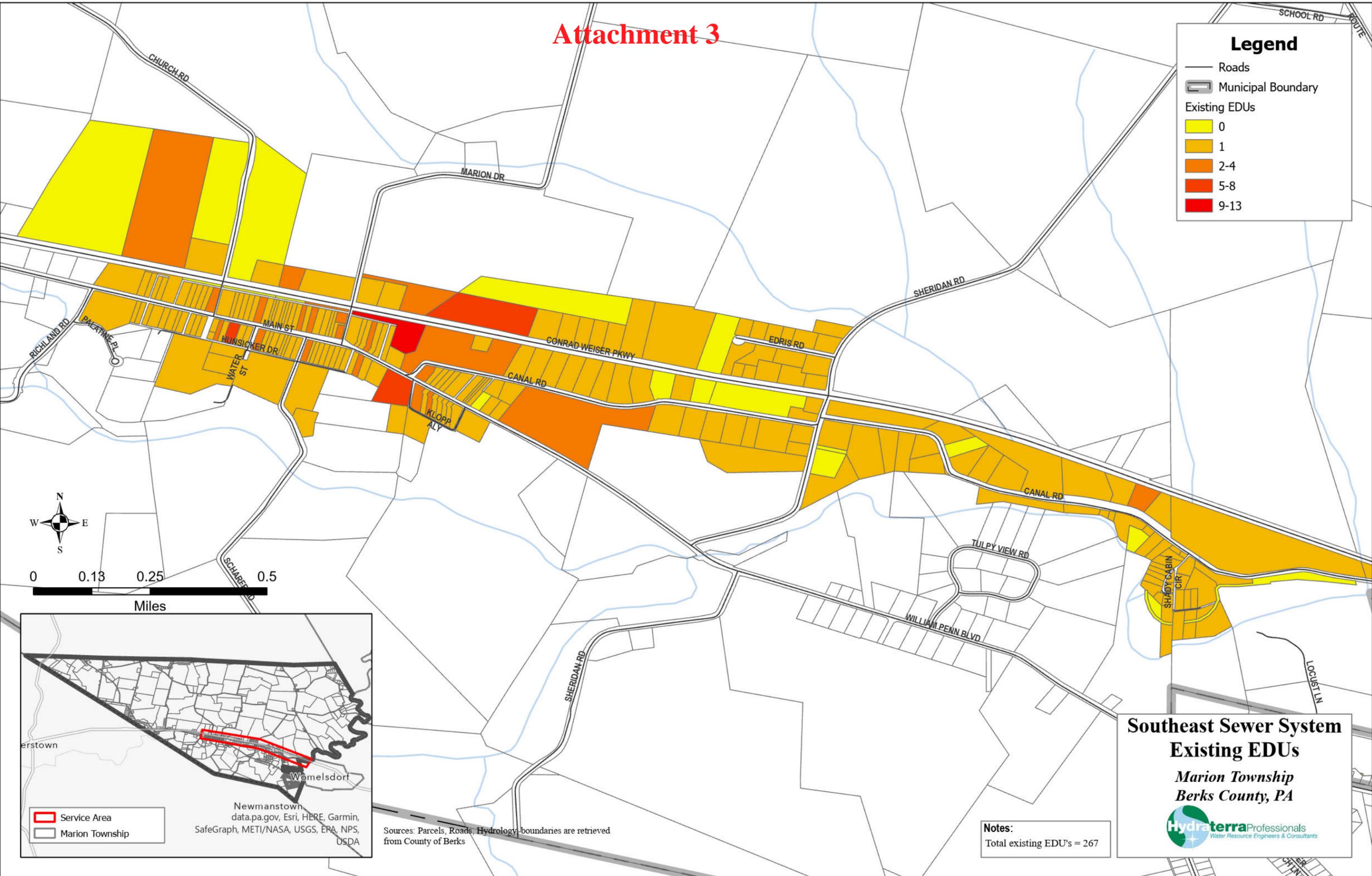
Attachment 3

Southeast Sewer System Existing EDUs – Color Map

Attachment 3

Legend

- Roads
- Municipal Boundary
- Existing EDUs
 - 0
 - 1
 - 2-4
 - 5-8
 - 9-13



Service Area

Marion Township

Newmanstown
data.pa.gov, Esri, HERE, Garmin,
SafeGraph, METI/NASA, USGS, EPA, NPS,
USDA

Sources: Parcels, Roads, Hydrology boundaries are retrieved
from County of Berks

**Southeast Sewer System
Existing EDUs**

*Marion Township
Berks County, PA*

Notes:
Total existing EDU's = 267

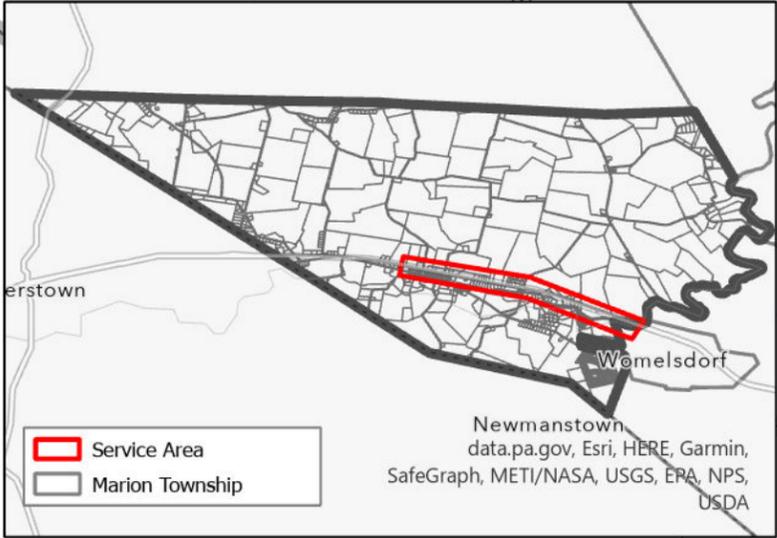
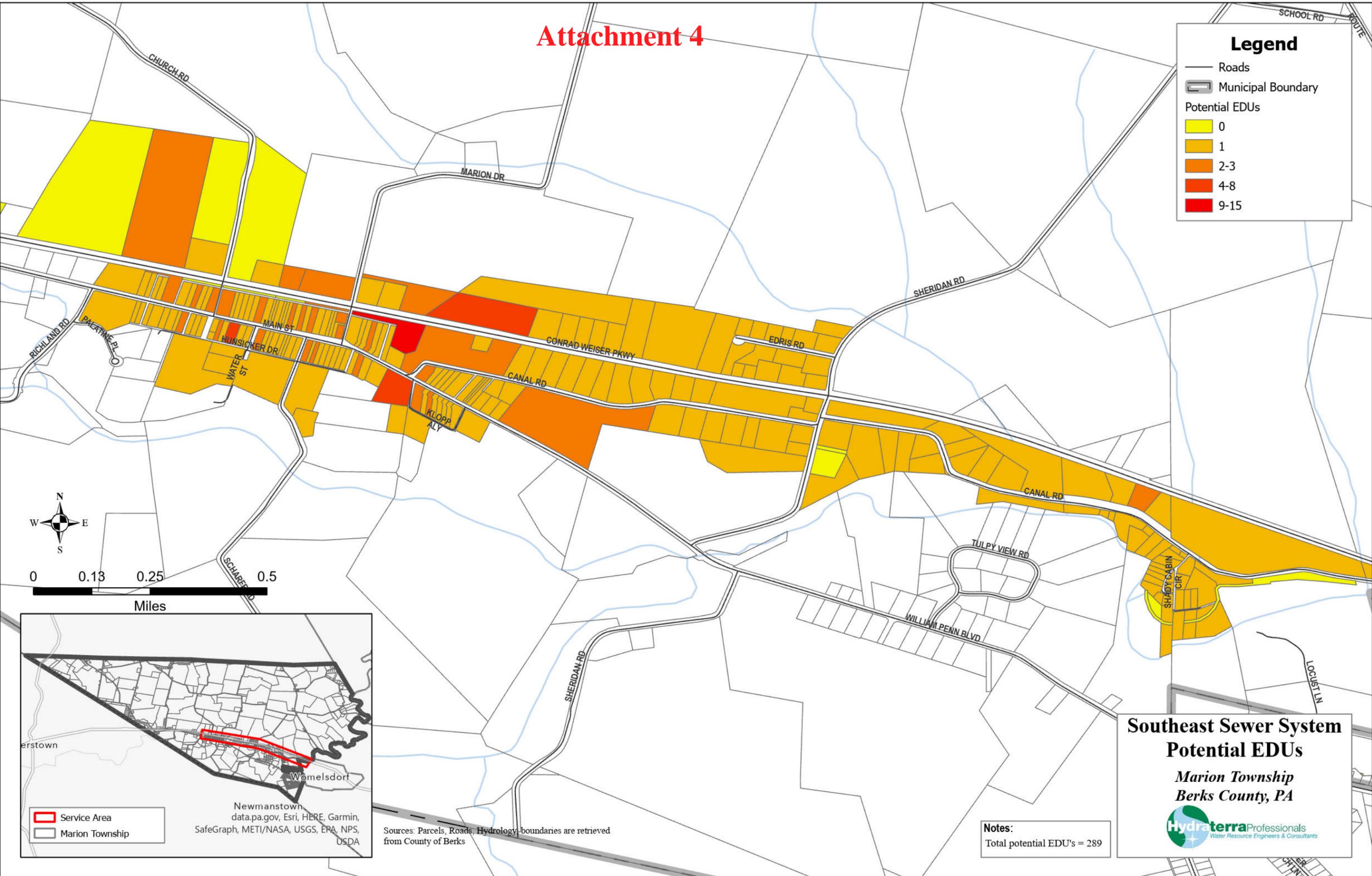
Attachment 4

Southeast Sewer System Potential EDUs – Color Map

Attachment 4

Legend

- Roads
- Municipal Boundary
- Potential EDUs
 - 0
 - 1
 - 2-3
 - 4-8
 - 9-15



**Southeast Sewer System
Potential EDUs**

*Marion Township
Berks County, PA*

Notes:
Total potential EDU's = 289

Sources: Parcels, Roads, Hydrology boundaries are retrieved from County of Berks

Newmanstown, data.pa.gov, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

Service Area
Marion Township

Appendix D

Sewer Design Comparison

Marion Township Sewer Design Comparison

Prepared for:

*Marion Township
420 Water Street
Stouchsburg, PA 19567*

Prepared by:



1691 Horseshoe Pike, Suite 2
Glenmoore, PA 19343

January 17, 2023

Project Number: MART22201

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Attachment 2 – Approved Act 537 Concept Plan Engineer’s Estimate

Attachment 3 – Public Sewer Concept Plan

Attachment 4 – Public Sewer Concept Plan Engineer’s Estimate

Attachment 5 – Public Low-Pressure Sewer Concept Plan

Attachment 6 – Low-Pressure Sewer System Conceptual Cost

1. Executive Summary

In late 2022, Marion Township requested Hydraterra Professionals (HtP) conduct a sewer design comparison between a combination gravity/low-pressure sewer system (Approved System) as approved in the 2019 Act 537 Plan and a new, conceptual alternative sewer system constructed entirely of low-pressure components (Alternative System).

The design comparison detailed below develops and considers conceptual costs for the Approved System and Alternative System in the sewer service area defined by the approved Act 537 Plan (Service Area). It further sizes the two different systems using the number of existing and potential equivalent dwelling units within the Service Area, 267 and 300 EDUs respectively, as determined by HtP's 2022 EDU Evaluation.

A variety of sources were used to prepare the comparison, including:

- Approved 2019 Act 537 Plan;
- HtP 2022 EDU Evaluation;
- Bidding information and quotes from local pipeline contractors; and
- Design recommendations and quote from low-pressure grinder pump manufacturer.

As both gravity and low-pressure sewer systems are commonly used throughout the region, the Approved and Alternative Systems are viable for the Service Area. Therefore, the design comparison clarifies the primary differentiating factors of the Alternative System:

- Reduces total cost of construction from \$10.4M to \$6.5M;
- Requires additional Act 537 planning, public comment, and approval;
- Requires individually-owned mechanical equipment to operate; and
- Increases long-term individual operational and maintenance costs.

2. Conceptual Gravity Sanitary Sewer Design

Gravity sewers, when constructed using the latest approved materials and methods, rarely have problems and require little maintenance well into their life expectancy. As a result, gravity sewers have traditionally been the preferred sanitary sewer design method where the topography and surface features allow.

Gravity sewers require a series of pipes with various negative slopes to move wastewater toward the system's low point. To ensure that this continuous negative pipe slope is maintained between manholes, open trench excavation is necessary. Pump Stations with adequately sized wet wells are also required in order to collect and convey wastewater to a treatment plant or receiving waste stream.

A conceptual combination gravity/low-pressure sewer layout was provided in the approved Act 537 Plan. HtP considered this original concept. See the Approved Act 537 Concept Plan (Map 11B) and Engineer's Estimate in Attachment #1 and Attachment #2.

HtP reviewed the Approved Act 537 Concept Plan with the aim to reduce the overall construction cost and created a revised concept plan for the Service Area based on the existing EDU count of 267. See Attachment #3 – Public Sewer Concept Plan and Attachment #4 – Public Sewer Concept Plan Engineer's Estimate.

A. Concept Changes

A key difference between the Approved Act 537 Concept Plan and HtP's Public Sewer Concept Plan¹ is the reduction in the length of deep sewers, achieved by relocating the proposed public pump station. The Approved Act 537 Concept Plan proposed a pump station located at Roy and Virginia Zartman's property along Canal Rd. The Public Sewer Concept Plan relocates this pump station closer to Stouchsburg to the lot owned by John and Anna Spotts at 645 Canal Road.

Another difference is using individual low-pressure grinder pumps to serve lots on the north side of Conrad Weiser Blvd and some individual lots on the south side of Conrad Weiser Boulevard (Public Sewer Concept Plan).

By changing the pump station location and using low-pressure grinders in suggested areas, the depth of gravity sewers and the number of highway crossings can be reduced. This may ultimately result in construction cost savings.

B. Pump Station

A public pump station will be required to collect and convey raw wastewater from the service area under Tulpehocken Creek and into the Womelsdorf public sewer system.

Pump stations are designed to certain standards. The deep wet wells associated with pump stations are easily impacted by the geology under and around the pump station. Construction for removal of bedrock or construction in areas of high groundwater or areas prone to flooding will significantly increase costs and must be considered.

PADEP requires a licensed operator to oversee the pump station operation. Proper operation of pump stations requires regular preventive maintenance of the site; structure; pumping; grinding and control equipment. Pump station mechanical, control, and communication components will need to be replaced as they reach the end of their

¹ Developed using available GIS information; no land or geotechnical survey was completed. Actual locations, pipe depths, and lengths are subject to change.

useful life. Therefore, the Township's budget should consider operating and capital improvement costs. With the correct operation, maintenance, and capital improvements, a pump station is capable of providing years of dependable service.

3. Low-Pressure Sanitary Sewer Design

Low-pressure sewer systems are typically considered and used where gravity sewers are not practical. Cases typical for low-pressure use include when a relatively small number of connections are needed a long distance from the discharge point and/or where shallow bedrock exists and prevents cost-effective construction.

Property owners are required to purchase and maintain the individual grinder pumps, controls, wet wells, and pressure lateral for their lot. The private lateral from each grinder pump collects a lot's raw wastewater and extends to the right of way into a publicly owned low-pressure force main. The low-pressure force main conveys macerated sewage from each grinder pump to the point of discharge.

Depending on each specific project, significant construction cost savings may be realized when compared to a gravity sewer design. As low-pressure sewers are not subject to inflow or infiltration from extraneous water, the potential for reduced treatment costs also exists.

Unlike gravity sewer, low-pressure sewer:

- Can be laid parallel with the existing grade;
- Macerates the sewage allowing it to be pumped in smaller diameter pipes; and
- Can be installed using subsurface drilling methods.

Low-pressure sewer systems consume electricity and require more maintenance than gravity sewers:

- Small pipe diameters and air release valves are subject to plugging and may require jetting, specifically when a small portion of lots in the system's design are connected;
- Property owners are required to maintain their individual pumps and replace pumps as they reach the end of their useful life;
- Grinder pump wet wells have limited storage capacity. Mechanical equipment breakdowns and power outages can impact service and increase overflow problems.

A public low-pressure sewer concept plan¹ was developed and costs were estimated using individual grinder pumps for each EDU in the Service Area. See Attachment #5-Public Low-Pressure Sewer Concept Plan and Attachment #6 –Low-Pressure Sewer System Conceptual Cost.

Table 1 below provides a comparison of the two systems.

4. Table 1 – Approved System vs. Alternative System		
Item	Approved System (Combination gravity sewer, pump station, low-pressure sewer)	Alternative System (Complete low-pressure sewer)
Design, Engineering, and Legal Cost ¹	\$524,666	\$524,666
Public Sewer Construction Costs ¹	\$9,906,862	\$1,511,939
Private Sewer Construction Costs ¹	\$0	\$4,448,220
Total Project Costs ¹	\$10,431,528	\$6,484,825
Total Project Costs per EDU¹	\$39,069	\$24,288
Additional PADEP Sewer Planning/advertisement/approval	No	Yes
Responsible for pump repair, replacement, and maintenance	Township ²	Property Owner ³
Impact from Inflow/Infiltration	yes	no
Required sewer depth	Varies depending on grade	Follows contour, +/- 4' deep
Future sewer connection methods	Gravity or low pressure	Low pressure only
Method of pipe installation	Open trench ⁴	Open trench or directional drilling

¹All costs are estimated.

²Requires twice weekly maintenance visits under supervision of licensed operator, pump replacement every 5-15 years.

³Requires annual maintenance and pump replacement every 5-15 years.

⁴Directional drilling applies to public pump station force main.

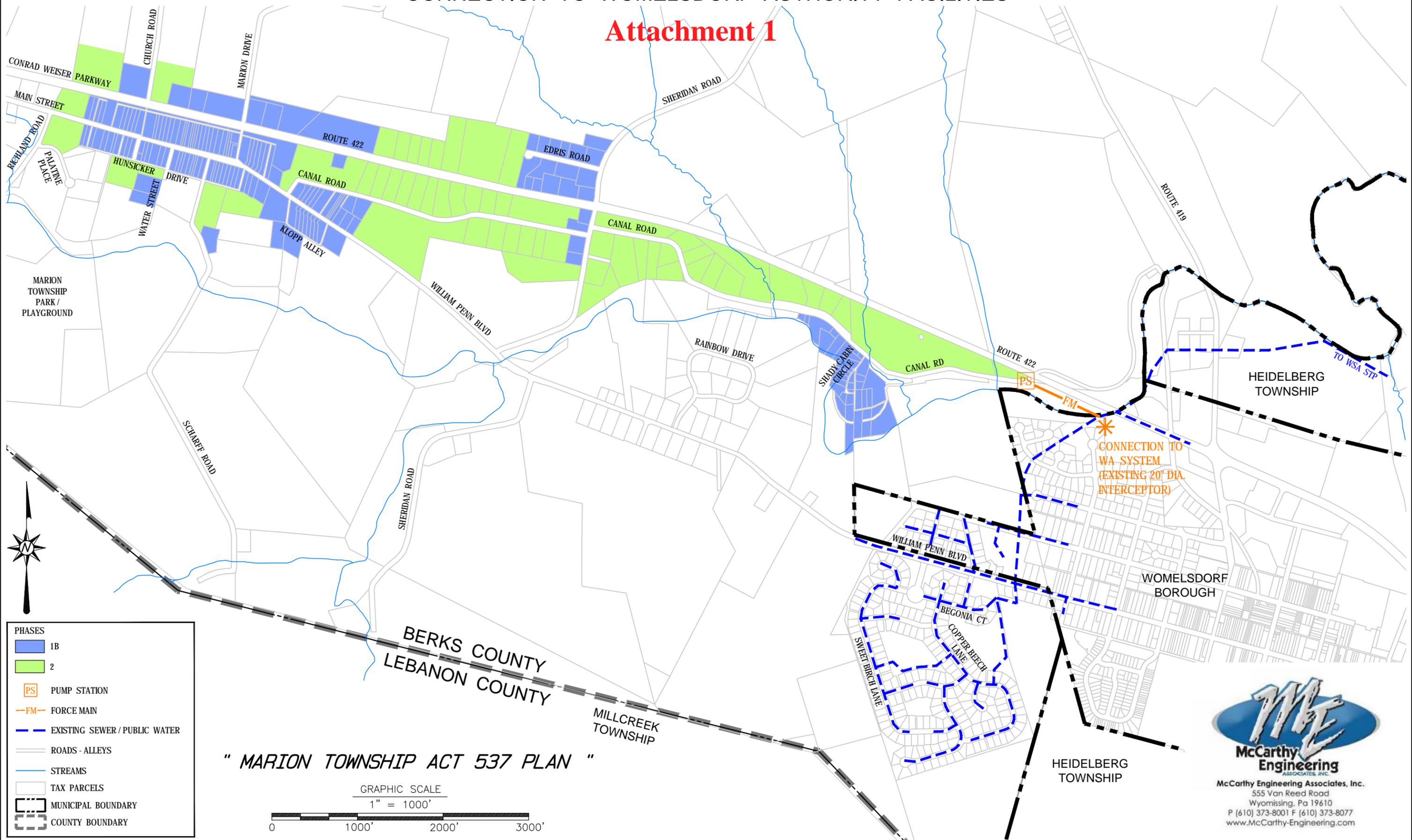
Attachment 1

Approved Act 537 Concept Plan (Map 11B)

MAP 11B - PROPOSED PUBLIC SEWER - PHASE 1B & 2

CONNECTION TO WOMELSDORF AUTHORITY FACILITIES

Attachment 1



PHASES

- 1B
- 2

PS PUMP STATION

—FM— FORCE MAIN

- - - EXISTING SEWER / PUBLIC WATER

ROADS - ALLEYS

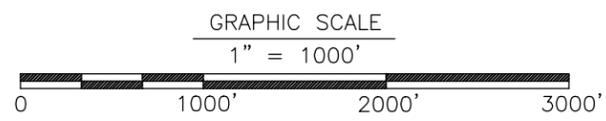
— STREAMS

TAX PARCELS

MUNICIPAL BOUNDARY

COUNTY BOUNDARY

" MARION TOWNSHIP ACT 537 PLAN "



McCarthy Engineering
ASSOCIATES, INC.

McCarthy Engineering Associates, Inc.
555 Van Reed Road
Wyomissing, Pa 19610
P (610) 373-8001 F (610) 373-8077
www.McCarthy-Engineering.com

Attachment 2

Approved Act 537 Concept Plan Engineer's Estimate



**ENGINEER'S ESTIMATE
FOR PROBABLE COST
PENNSYLVANIA**

PROJECT NO.	220007	COUNTY	Berks
PROJECT NAME	Act 537 Plan	DATE	7/29/2021 - AED/DKR
MUNICIPALITY	Marion Township	REVISED	6/15/2022 - SCE
DESCRIPTION	Updated Cost Estimate	CLIENT TYPE	PUBLIC

#	ITEM	QTY	UNIT	UNIT PRICE	ITEM COST
---	------	-----	------	------------	-----------

CONSTRUCTION COSTS

101	8" PVC (<10' Depth)	19125	LF	\$ 130.00	\$ 2,486,250.00
102	8" PVC (10-15' Depth)	5100	LF	\$ 180.00	\$ 918,000.00
103	8" PVC (>15' Depth)	1275	LF	\$ 250.00	\$ 318,750.00
104	Precast Manhole (<12' Depth)	58	EA	\$ 6,500.00	\$ 377,000.00
105	Precast Manhole (>12' Depth)	15	EA	\$ 10,000.00	\$ 150,000.00
106	Stone Backfill	4750	CY	\$ 60.00	\$ 285,000.00
107	Permanent Roadway Restoration (Trench)	8500	SY	\$ 115.00	\$ 977,500.00
108	6" PVC Laterals	18500	LF	\$ 50.00	\$ 925,000.00
109	Flushing & Televising Lines	25500	LF	\$ 2.50	\$ 63,750.00
110	Testing	25500	LF	\$ 2.50	\$ 63,750.00
111	Canal Road Pump Station	1	LS	\$ 750,000.00	\$ 750,000.00
112	Womesldorf STP Upgrades	1	LS	\$ 550,000.00	\$ 550,000.00
CONSTRUCTION COSTS - SUBTOTAL					\$ 7,865,000.00

DESIGN/ADMINISTRATION/PERMITTING

201	Right-of-Way Acquisition	1.00	LS	N/A	\$ 200,000.00
202	Legal	1.00	LS	N/A	\$ 200,000.00
203	Design	1.00	LS	N/A	\$ 400,000.00
204	Permitting	1.00	LS	N/A	\$ 100,000.00
205	Construction Observation	1.00	LS	N/A	\$ 400,000.00
206	Contingency	10.00	%	N/A	\$ 786,500.00
DESIGN/ADMINISTRATION/PERMITTING - SUBTOTAL					\$ 2,086,500.00

PROJECT TOTAL **\$ 9,951,500.00**

NOTE: THE UNIT PRICES SHOWN ARE BASED ON DATA AVAILABLE FROM VARIOUS SOURCES AND MAY NEED TO BE ADJUSTED TO REFLECT CURRENT MARKET CONDITIONS, MATERIAL AVAILABILITY, PROJECT LOCATION, TIME OF YEAR AND OTHER FACTORS. TO ESTABLISH MORE ACCURATE CONSTRUCTION COSTS, IT IS RECOMMENDED THAT ACTUAL CONTRACTOR BIDS BE SOLICITED.

Attachment 3

Public Sewer Concept Plan

Legend

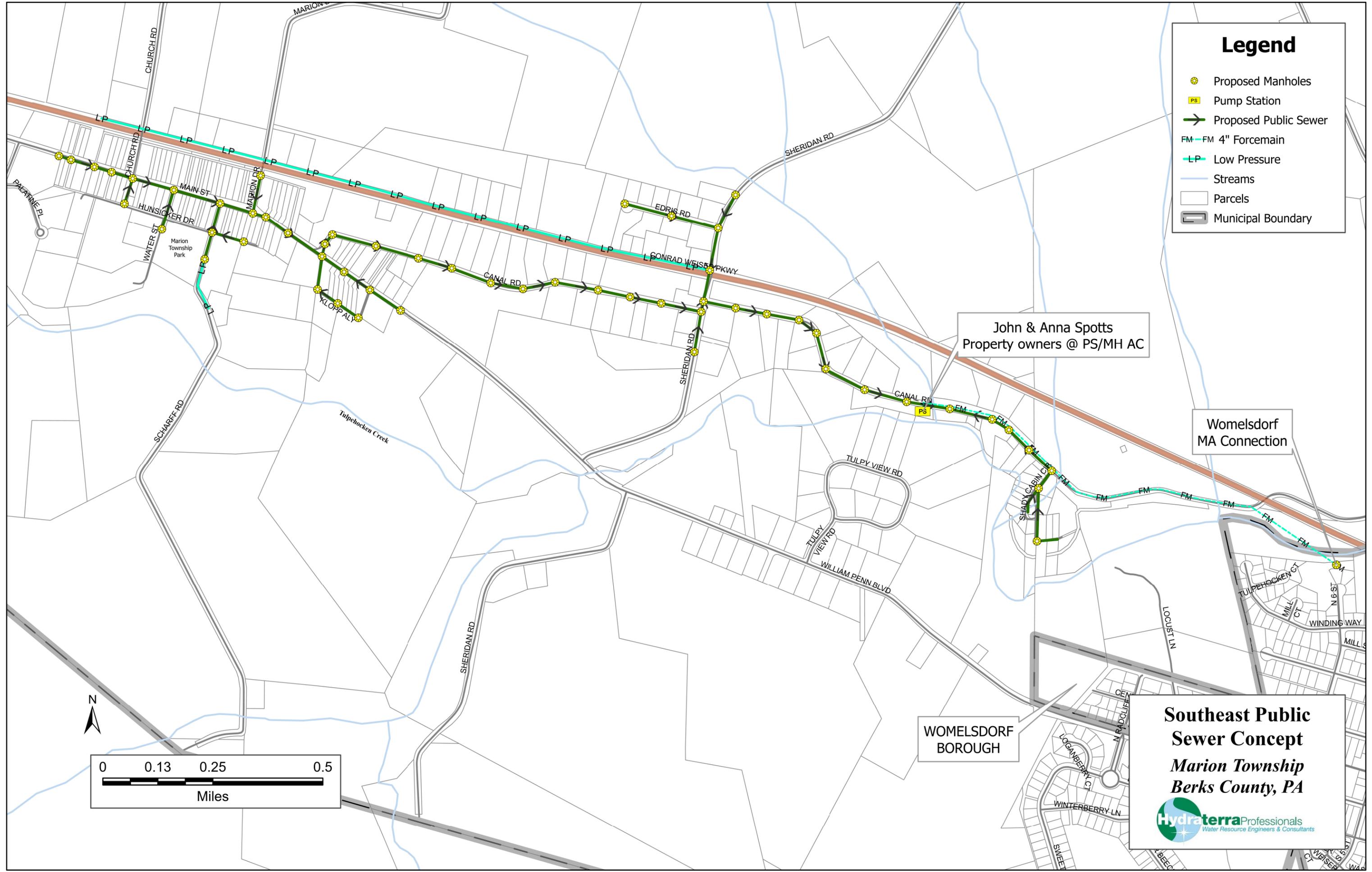
- Proposed Manholes
- PS Pump Station
- Proposed Public Sewer
- FM 4" Forcemain
- LP Low Pressure
- Streams
- Parcels
- Municipal Boundary

John & Anna Spotts
Property owners @ PS/MH AC

Womelsdorf
MA Connection

WOMELSDORF
BOROUGH

Southeast Public Sewer Concept Marion Township Berks County, PA



Attachment 4

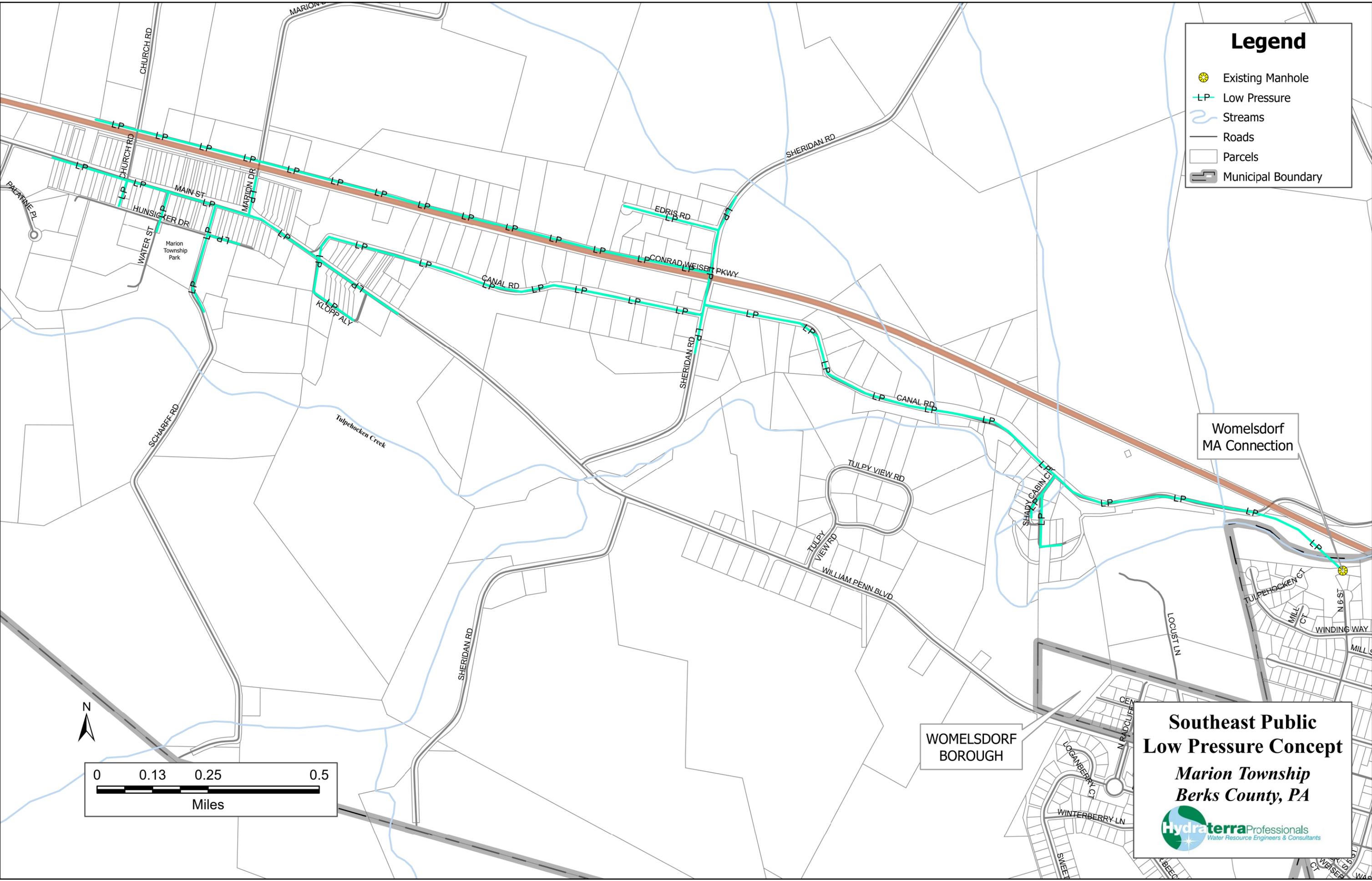
Public Sewer Concept Plan Engineer's Estimate

Attachment 5

Public Low-Pressure Sewer Concept Plan

Legend

- Existing Manhole
- Low Pressure
- Streams
- Roads
- Parcels
- Municipal Boundary



Womelsdorf
MA Connection

WOMELSDORF
BOROUGH

**Southeast Public
Low Pressure Concept**
*Marion Township
Berks County, PA*

Hydraterra Professionals
Water Resource Engineers & Consultants



Attachment 6

Low-Pressure Sewer System Conceptual Cost

Appendix E

Geotechnical Exploration and Evaluation Report

September 28, 2023

Mr. Joe Boldaz
Hydraterra Professionals, LLC
1691 Horseshoe Pike
Glenmoore, Pennsylvania 19343

3110 Pike Street
Harrisburg, PA 17111
Phone (717) 561-1623
Fax (717) 754-0084
www.hcea.com

Re: Geotechnical Report
Southeast Public Sewer Concept Study
Main Street and Canal Road
Marion Township, Berks County, Pennsylvania
HCEA Project No. R23059

Dear Mr. Boldaz:

Hillis-Carnes Engineering Associates, Inc. (HCEA) is pleased to submit this report concerning the subsurface exploration and subsequent geotechnical evaluation for the proposed Public Sewer Project in Marion Township, Berks County, Pennsylvania. This report summarizes the subsurface soil and bedrock conditions encountered at the boring locations along select sections of the proposed sewer main. It is anticipated that this report will be utilized to aid in selection of the most economical sewer design concept, i.e. gravity system or low pressure system and will be provided to the Contractors during the bidding process. These services were provided in general accordance with our proposal dated June 13, 2023 and subsequent proposal addendum dated July 31, 2023.

We wish to advise you that the boring samples will be stored at our Harrisburg, Pennsylvania office for a period of 30 days from the date of this letter. Should you wish the samples to be stored for a longer period, or to be delivered to you or another party, please advise us in writing prior to the end of the 30-day period. Otherwise, the samples will be discarded at the end of the 30-day storage period.

HCEA appreciates having had the opportunity to provide the geotechnical consultation for this project, and we will remain available for further consultation during the various design stages. Should you have any questions concerning the contents of this report, or require additional consultation, design, inspection, or testing services, please contact our office.

Very truly yours,
HILLIS-CARNES ENGINEERING ASSOCIATES, INC.



Stephen M. Simonette, P.E.
Principal Engineer
ssimonette@hcea.com



Nathaniel J. Lauer, P.E.
Senior Project Engineer
nlauer@hcea.com

HILLIS-CARNES
ENGINEERING ASSOCIATES, INC.

Geotechnical Report
Southeast Public Sewer Concept Study
Main Street and Canal Road
Marion Township, Berks County, PA
HCEA Project No. R23059

Prepared For:

Mr. Joe Boldaz
Hydraterra Professionals, LLC
1691 Horseshoe Pike
Glenmoore, PA 19343

Prepared By:

Hillis-Carnes Engineering Associates, Inc.
3110 Pike Street
Harrisburg, Pennsylvania 17111

Date:

September 28, 2023

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1.0 PROJECT DESCRIPTION

This report summarizes the subsurface soil and bedrock conditions encountered at the boring locations along select sections of the proposed sewer main. It is anticipated that this report will be utilized to aid in selection of the most economical sewer design concept, i.e. gravity system or low pressure system and will be provided to the Contractors during the bidding process.

It is our understanding that this project consists of installation of approximately 13,000 linear feet of sewer main generally located along Main Street and Canal Road in Marion Township, Berks County, Pennsylvania. The proposed sewer main will generally traverse west to east along Main Street from just west of the Main Street/Church Road intersection to the Canal Road/Conrad Weiser Parkway (S.R. 0422) intersection near the Marion Township/Womelsdorf Borough municipal boundary. The proposed project area is shown on Figure 1 – Project Location Plan included in the Appendix. The boundaries of this geotechnical study focus on the deepest excavations required for conceptual gravity design which will occur along Canal Road between Main Street and Shady Cabins Lane.

Should any of the project characteristics, construction type, or structural loading conditions differ from those outlined above, then this office should be contacted so revisions of these recommendations can be made.

2.0 FIELD EXPLORATION

2.1 Standard Penetration Test Borings and Auger Probes

To determine the general on-site soil types and depth to bedrock along the proposed sewer alignment, a subsurface exploration program was performed consisting of a total of eighteen (18) Standard Penetration Test (SPT) borings designated as Borings B-2 through B-19 and twenty-one (21) auger probes designated as Boring B-1 and Borings B-21 through B-37. Boring B-20, originally to be drilled along Sheridan Road, was eliminated due to its close proximity to the Sheridan Road/S.R. 0422 intersection. Except for Borings B-23 and B-32, all borings were extended to auger refusal indicating that the apparent top of bedrock was encountered. Borings B-23 and B-32 were advanced to depths of 20 feet and 10 feet, respectively, and did not encounter auger refusal. Upon encountering auger refusal, bedrock was cored in select borings. As-drilled boring locations, as well as ground elevations are shown on Figure 2 – Boring Location Sketch included in the Appendix.

The as-drilled test boring locations were field located by C2C Design Group using survey instrumentation. A brief overall summary of the boring/auger probe results is presented in tabular form below.

Summary of Boring Data				
Boring No.	Drilled Depth (Feet)	Depth to Bedrock (Feet)	Existing Ground Surface Elevation (Feet)	Top of Bedrock Elevation (Feet)
Canal Road East from Sheridan Road Intersection to Shady Cabin Circle Intersection				
B-1	10.5	Auger Refusal Obtained On Apparent Top of Rock at 10.5 feet	379.1	368.6
B-2	15.5	LIMESTONE Bedrock Cored from 10.5 feet to 15.5	378.1	367.6
B-3	10.5	Auger Refusal Obtained On Apparent Top of Rock at 10.5 feet	380.8	370.3
B-4	11.0	Auger Refusal Obtained On Apparent Top of Rock at 11.0	387.4	376.4
B-5	5.5	Auger Refusal Obtained On Apparent Top of Rock at 5.5 feet	389.8	384.3
B-6	14.5	LIMESTONE Bedrock Cored from 4.5 feet to 14.5 feet	385.8	381.3
B-7	7.0	Auger Refusal Obtained On Apparent Top of Rock at 7.0 feet	374.4	367.4
B-8	10.0	LIMESTONE Bedrock Cored from 4.7 feet to 10.0 feet	370.9	366.2
B-9	9.5	Auger Refusal Obtained On Apparent Top of Rock 9.5 feet	371.2	361.7
B-10	10.0	Auger Refusal Obtained On Apparent Top of Rock 10.0 feet	372.1	362.1
B-11	10.0	Auger Refusal Obtained On Apparent Top of Rock at 10.0 feet	371.4	361.4
B-12	10.0	Auger Refusal Obtained On Apparent Top of Rock at 10.0	366.3	356.3
B-13	20.0	LIMESTONE Bedrock Cored from 9.2 feet to 20.0 feet	364.6	355.4
B-14	11.0	Auger Refusal Obtained On Apparent Top of Rock at 11.0 feet	364.6	353.6
B-15	16.0	LIMESTONE Bedrock Cored from 11.0 feet to 16.0 feet	366.3	355.3
B-16	11.7	Auger Refusal Obtained On Apparent Top of Rock at 11.7 feet	366.1	354.4
B-17	15.0	LIMESTONE Bedrock Cored from 8.2 feet to 15.0 feet	367.0	358.8
B-18	4.2	Auger Refusal Obtained On Apparent Top of Rock at 4.2 feet	367.1	362.9
B-19	11.0	Auger Refusal Obtained On Apparent Top of Rock at 11.0 feet	366.0	355.0

Summary of Boring Data				
Boring No.	Drilled Depth (Feet)	Depth to Bedrock (Feet)	Existing Ground Surface Elevation (Feet)	Top of Bedrock Elevation (Feet)
Sheridan Road from Sheridan Road/S.R. 0422 Intersection				
B-21	10.5	Auger Refusal Obtained On Apparent Top of Rock at 10.5	382.0	371.5
B-22	5.5	Auger Refusal Obtained On Apparent Top of Rock at 5.5	406.0	400.5
B-23	20.0	Borehole Advanced to 20 feet – No Bedrock Encountered	391.0	Not Encountered
Canal Road West from Sheridan Road Intersection to Main Street Intersection				
B-24	4.0	Auger Refusal Obtained On Apparent Top of Rock at 4.0	379.0	375
B-25	4.0	Auger Refusal Obtained On Apparent Top of Rock at 4.0	382.3	378.3
B-26	7.2	Auger Refusal Obtained On Apparent Top of Rock at 7.2	386.8	379.6
B-27	3.2	Auger Refusal Obtained On Apparent Top of Rock at 3.2	397.4	394.2
B-28	5.5	Auger Refusal Obtained On Apparent Top of Rock at 5.5	400.7	395.2
B-29	2.9	Auger Refusal Obtained On Apparent Top of Rock at 2.9	401.1	398.2
B-30	4.0	Auger Refusal Obtained On Apparent Top of Rock at 4.0 - Auger Kicking Off Pinnacle at 1.0'	400.3	396.3
B-31	3.5	Auger Refusal Obtained On Apparent Top of Rock at 3.5	397.7	394.2
B-32	10.0	Borehole Advanced to 10 feet – No Bedrock Encountered	396.2	Not Encountered
B-33	7.5	Auger Refusal Obtained On Apparent Top of Rock at 7.5 - Auger Kicking Off Pinnacle at 5.5'	396.7	389.2
B-34	2.6	Auger Refusal Obtained On Apparent Top of Rock at 2.6	400.7	398.1
B-35	4.5	Auger Refusal Obtained On Apparent Top of Rock at 4.5	404.9	400.4
B-36	5.0	Auger Refusal Obtained On Apparent Top of Rock at 5.0	408.6	403.6
B-37	4.5	Auger Refusal Obtained On Apparent Top of Rock at 4.5	410.1	405.6

HCEA's drilling personnel performed the test borings located along Canal Road east of the Canal Road/Sheridan Road intersection and along Sheridan Road north of the Sheridan Road/S.R. 0422 intersection between July 18 and 21, 2023. HCEA's drilling

personnel performed the test borings located along Canal Road west of the Canal Road/Sheridan Road intersection on August 8, 2023. Borings were drilled with an Acker Soil Scout track-mounted rig equipped with an automatic hammer under the supervision of HCEA geotechnical personnel. The SPT borings were advanced with hollow-stem augers and the subsurface soils were sampled continuously to a depth of 10 feet and at 5-foot sample intervals thereafter until the depths at which the boreholes were terminated upon obtaining auger refusal or rock coring was conducted. Samples were taken by driving a 1-3/8 inch I.D. (2-inch O.D.) split-spoon sampler in accordance with ASTM D1586 specifications. The sampler was first seated 6 inches to penetrate any loose cuttings and then was driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the middle 12 inches of the 2-foot spoon is designated as the "Penetration Resistance" or "N" value. The penetration resistance is an index to the soil strength and compression characteristics. Auger probes were advanced "unsampled" until auger refusal was obtained on the apparent top of bedrock.

Bedrock was obtained by diamond core drilling in general accordance with the procedures in ASTM D2113 "Standard Method for Diamond Core Drilling for Site Investigation". In-situ quality of bedrock was determined by physical observation of the core retrieved (hardness, degree of weathering, fracture spacing, etc.) as well as calculation of the Rock Quality Designation (RQD) of the recovered core. RQD is a qualitative index used to identify the relative quality of the rock mass. It is a percentage calculated by summing the lengths of intact pieces of rock core which exceed 4 inches in length and dividing that length by the total length of the core run.

At completion of the drilling, the boreholes were backfilled with auger cuttings. Upon backfilling of the boreholes, no additional compaction effort or site restoration was performed. Additional settlement and/or softening of the soil replaced in the boreholes may occur, resulting in a depression or hole in the ground surface. Consequently, future maintenance or restoration of the site may be required by others.

During drilling operations, HCEA prepared field logs for each of the borings. Portions of each SPT soil sample were placed in air-tight glass jars and rock cores were placed in wooden core storage boxes. After completion of the drilling, the samples were transported to HCEA's laboratory for future examination. In the laboratory, the samples were visually reviewed by the Geotechnical Engineer to review the inspector's field classifications. The samples were classified in accordance with the Unified Soil Classification System (USCS) and the field classifications were revised where necessary. The USCS classifications appear on the typed Test Boring Logs.

The Test Boring Logs, included in the Appendix, show subsurface sample depths and recoveries, SPT results, RQD values, and water level measurement data. The logs also show the approximate thickness, location, and visual classification of each material encountered. The stratigraphic lines separating each material type represent the approximate location of the boundary between them. The transition between materials may be far more or less gradual than indicated on the logs.

3.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered at the site are shown on the Test Boring Logs and included in the Appendix. A summary of the test boring results and brief description of the subsurface conditions and pertinent engineering characteristics of the soils are given below.

Strata divisions shown on the Test Boring Logs have been estimated based on visual examinations of the recovered boring samples. In the field, strata changes could occur gradually and/or at slightly different levels than indicated. Groundwater conditions indicated on the Test Boring Logs are those observed during the period of the subsurface exploration. Fluctuations in groundwater levels could occur seasonally and might also be influenced by changes in grading, runoff and infiltration rates, and other influencing factors.

Generalized subsurface conditions based on the results of the test borings are discussed below.

3.1 General Site Geology

Available geologic maps indicate that the western approximately half of the project site is located in an area where the parent bedrock materials belong to the Ordovician-aged Annville Formation (Oan), while the eastern half of the project is located in an area where the parent bedrock materials belong to the Ordovician-aged Hershey and Myerstown Formations (Ohm). The approximate contact between the Annville Formation and undivided Hershey and Myerstown Formations is mapped near the Canal Road/Sheridan Road intersection. The Hershey and Myerstown Formations are "undivided" in the area of the project because similarity of the rock types within each makes developing geological boundaries between them difficult. A generalized description of the bedrock of each of the formations is given below as presented in the Pennsylvania Department of Environmental Resources (DER) Environmental Geological Report 1, "Engineering Characteristics of the Rocks of Pennsylvania".

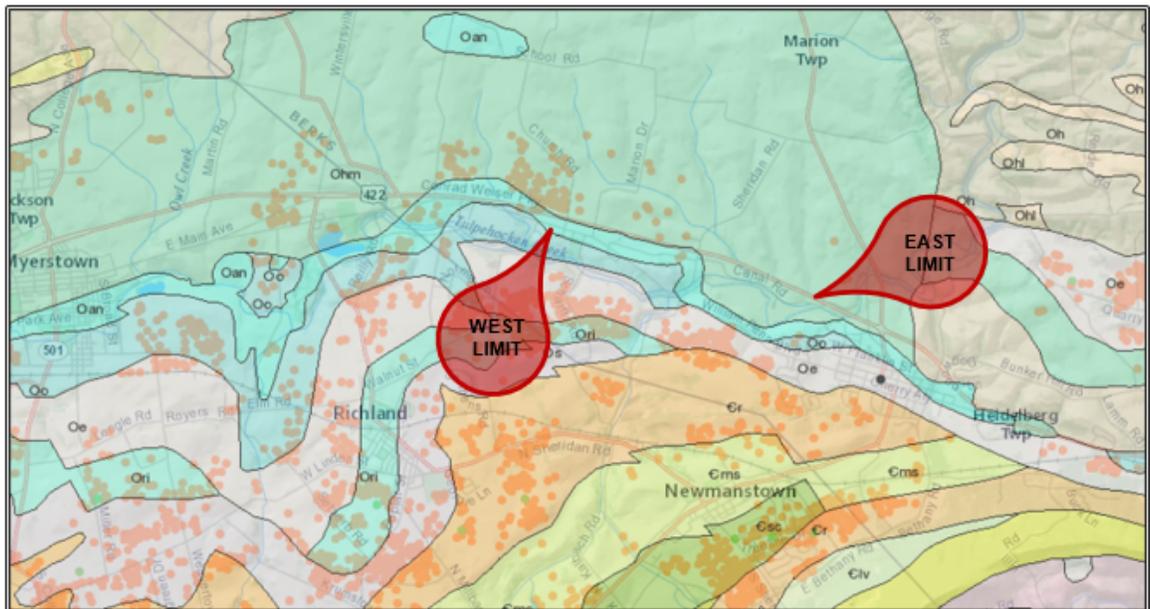
The bedrock of the Annville Formation is described as light gray, high calcium limestone. The bedrock is generally well bedded with most bedding spacing described as thick to massive. Joints display a blocky pattern. Fracturing is moderately well developed, moderately to highly abundant, regularly spaced, and steeply dipping to vertical. Most fractures are open, but some are filled with calcite. The bedrock of the formation is moderately resistant to weathering and usually only slightly weathered to a shallow depth. Medium-sized, irregular shaped blocks typically result from the weathering process. The soil/bedrock interface is commonly pinnacled. Ease of excavation is typically difficult with bedrock pinnacles being a special problem. Foundation stability is good provided foundations are excavated to sound material and a thorough investigation for solution opening is undertaken.

The bedrock of the Hershey Formation is described as dark gray to black argillaceous limestone. The bedrock is generally well bedded with most bedding described as thin to flaggy. Joints display a platy pattern. Fracturing is moderately well developed, highly abundant, moderately spaced, steeply dipping, and open. The bedrock of the formation is moderately to highly weathered to a moderate depth. Pencil-like, jagged fragments, elongated plate, and blocks typically result from the weathering process. Ease of excavation is typically ranges from moderately easy in weathered zones to difficult where the bedrock is less weathered. Foundation stability is good provided foundations are excavated to sound material and a thorough investigation for solution opening is undertaken.

The bedrock of the Myerstown Formation is described as medium to dark gray limestone with dark gray to black carbonaceous limestone at its base. The bedrock is generally well bedded with most bedding described as thin to flaggy. Joints display a platy pattern. Fracturing is well developed, highly abundant, moderately spaced, steeply dipping, and open. The bedrock of the formation is moderately to highly weathered to a moderate depth. Pencil-like, jagged fragments, elongated plate, and blocks typically result from the weathering process. Ease of excavation is typically ranges from moderately easy in weathered zones to difficult where the bedrock is less weathered. Foundation stability is good provided foundations are excavated to sound material and a thorough investigation for solution opening is undertaken.

The Pennsylvania Department of Conservation and Natural Resources (DCNR) web-mapping application “Pennsylvania Geologic Data Exploration (PaGEODE)” shows numerous closed depressions (orange dots on below Figure) and a number of closed depressions (green dots of below Figure) mapped in close proximity of the site. The above-mentioned Karst features are mapped in the Annville Formation as well as the Mverstown and Hershev Formations which underlies the project site.

Figure 1 - “Pennsylvania Geologic Data Exploration (PaGEODE)” Web Mapping – Bedrock Geology



3.2 Surface Materials

Approximately 3 to 4 inches of ASPHALTIC CONCRETE pavement underlain by a thin layer of gravel SUBBASE was encountered at all boring locations performed within the existing roadway. Borings drilled just off of the roadway encountered approximately 3 to 5 inches of surficial TOPSOIL. Please be aware that surficial material types and thicknesses may vary between widely spaced boring positions.

3.3 Natural Soils

At the boring locations, the surficial materials were underlain by natural Residual soils derived from the weathering process of the underlying LIMESTONE bedrock. The Residual soils generally consisted of fine-grained soils including Silty CLAY (CL-ML), Clayey SILT (ML-CL), Silty CLAY with Gravel (CL-ML), Gravelly CLAY (CL), and Sandy

CLAY (CL). As depth increased, the gravel component of the Residual soils increased as more limestone fragments became present. The granular Residual soils generally included Silty GRAVEL (GM) and Silty SAND and GRAVEL (SM-GM).

The Standard Penetration Test (SPT) N-values in the fine-grained soils generally ranged from approximately 4 to 12 blows per foot (bpf), indicating medium stiff to stiff consistency. The SPT N-values in the coarse-grained gravelly soils near the top of bedrock interface were generally greater than 50 blows per foot indicating very dense relative densities.

3.4 Bedrock

All borings, with the exception of Boring B-23, were extended to auger refusal, indicating that the top of bedrock was encountered. Boring B-23 was extended to a depth of 20 feet without encountering bedrock. Depths to bedrock ranged from approximately 2.9 feet in Boring B-29 to approximately 11.7 feet in Boring B-16. Depths the bedrock generally ranged from approximately 4 to 10 feet in the majority of the borings. Depths and corresponding elevations of the top of bedrock and apparent bedrock encountered within each of the borings is presented in the “Summary of Boring Data” table in Section 2.1. Photographs of the boxes containing the rock cores recovered are included in the Appendix.

All borings that were cored encountered limestone bedrock that was generally described as dark gray to gray, hard, and slightly weathered to fresh with closely to medium spaced fractures. Low recovery was observed in the initial core run within Boring B-8 due to the weathered and broken conditions just below the overburden/bedrock interface. Results of the coring operations are presented below.

Test Boring No.	Bedrock Depth (feet)	Rock Quality Designation (RQD)	Recovery (%)
B-2	10.5	Rock Core 10.5 to 15.5 feet (RQD = 24%)	80%
B-6	4.5	Rock Core 4.5 to 9.5 feet (RQD = 30%) Rock Core 9.5 to 14.5 feet (RQD = 20%)	56% 100%
B-8	4.7	Rock Core 4.7 to 5.0 feet (RQD = 0%) Rock Core 5.0 to 10.0 feet (RQD = 28%)	100% 92%
B-13	9.2	Rock Core 9.2 to 10.0 feet (RQD = 0%) Rock Core 10.0 to 15.0 feet (RQD = 50%) Rock Core 15.0 to 20.0 feet (RQD = 94%)	100% 94% 100%
B-15	11.0	Rock Core 11.0 to 15.0 feet (RQD = 20%)	100%
B-17	8.2	Rock Core 8.2 to 10.0 feet (RQD = 0%) Rock Core 10.0 to 15.0 feet (RQD = 60%)	89% 96%

3.5 Groundwater

Infiltrating groundwater was not encountered within the majority of our borings during drilling and sampling operations. However, groundwater was encountered while sampling and measured immediately upon completion in five of the borings. The borings and depths at which groundwater was encountered are as follows: 6 feet in Boring B-3, 10 feet in Borings B-4, 8 feet in Boring B-12, 6 feet in Boring B-13, and 10 feet in Boring B-10. It is believed that these groundwater depths reflect a localized “perched” water level just above the top of bedrock at these locations and that the

static groundwater table is likely at or below the top of bedrock for the majority of the project site.

It should be noted that all borings were backfilled immediately upon completion for safety concerns. A more accurate determination of the hydrostatic water table would require the installation of perforated pipes or piezometers which could be monitored over an extended period. The actual level of the hydrostatic water table and the amount and level of perched water should be anticipated to fluctuate throughout the year, depending on variations in precipitation, surface run-off, infiltration, site topography, and drainage. The Contractor should determine the actual groundwater levels at the time of construction to evaluate groundwater impact on the proposed construction procedures.

4.0 EVALUATIONS AND RECOMMENDATIONS

Rock Excavation Considerations

Auger probes performed along the southern side of Canal Road between Main Street and Sheridan Road encountered auger refusal on the apparent top of bedrock at depths ranging from approximately 2.6 to 7.5 feet below existing site grades, indicating a shallow top of bedrock surface. The majority of the auger probes in this section of Canal Road encountered auger refusal at depths ranging from 4 to 6 feet in depth. Auger probes and test borings performed along the southern side of Canal Road between Sheridan Road and Shady Cabin Lane encountered auger refusal at depths ranging from 4.2 to 11.0 feet in depth below existing site grades, indicating a relatively shallow and variable top of bedrock surface. The majority of the auger probes and borings in this section of Canal Road encountered auger refusal at depths ranging from approximately 10 to 11 feet. Depths and corresponding elevations of the top of bedrock and apparent bedrock encountered within each of the borings is presented in the "Summary of Boring Data" table in Section 2.1.

It should be noted that based on the results of the boring program and review of published geological data, the project site is underlain by Karst geology likely resulting in a pinnacled bedrock surface. The irregularity of the rock surface means that the elevation of the rock surface can vary significantly over even a short lateral distance. Therefore, the potential exists for bedrock to be encountered at elevations that vary significantly from the elevation in which bedrock was encountered in the boring program.

Based on our borings, the uppermost overburden soils and some of the immediately underlying weathered rock (generally classified as Silty GRAVEL (GM)) should generally be excavatable using conventional excavation equipment. However, our borings also indicate the weathered zone is relatively thin and competent limestone bedrock is generally encountered at shallow depths below the soil/weathered bedrock transition. Excavation difficulties in rock are anticipated to increase with increased depth, and over-sized equipment and special excavation techniques may be necessary. Some of the weathered rock above the auger refusal depths may be of limited thickness, and very dense conditions (high SPT N-values) should be anticipated. SPT N-values in excess of 50 BPF may require pre-splitting or pre-loosening with specialized rock excavation equipment to achieve excavation. Bulldozer and/or track-hoe equipment equipped with ripper teeth should generally be sufficient for excavation of the uppermost weathered rock; however, top-down excavation through these materials may be difficult. The rippability of the very dense weathered rock and underlying limestone bedrock at and below auger refusal depths is expected to be limited and may require impact hammers or limited blasting depending on design finished grades of the sewer main.

For the purposes of this report, we recommend the contract documents define rock as those materials in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material $\frac{3}{4}$ cubic yard or more in volume that exceed a standard penetration resistance of 50 blows for 3 inches of penetration or less according to ASTM D1586. If the project specifications indicated the excavated materials as “unclassified”, we recommend this geotechnical report and the Test Boring Logs be included in the contract documents. For “classified” excavated materials, the contract documents should include unit prices for rock excavation and disposal or on-site crushing for re-use.

5.0 REMARKS

This study has been prepared to aid in the evaluation of the site for the proposed construction. It is considered that adequate recommendations have been provided to serve as a basis for design and preparation of plans and specifications. Additional recommendations can be provided as needed.

These analyses and recommendations are, of necessity, based on the information made available to us at the time of the actual writing of the report and the on-site surface and subsurface conditions, that existed at the time the exploratory borings were drilled. Further assumptions have been made that the limited exploratory borings, in relation both to the areal extent of the site and to depth, are representative of conditions across the site.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties either implied or expressed. Hillis-Carnes Engineering Associates, Inc. assumes no responsibility for interpretations made by others based on work or recommendations made by HCEA.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



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APPENDIX

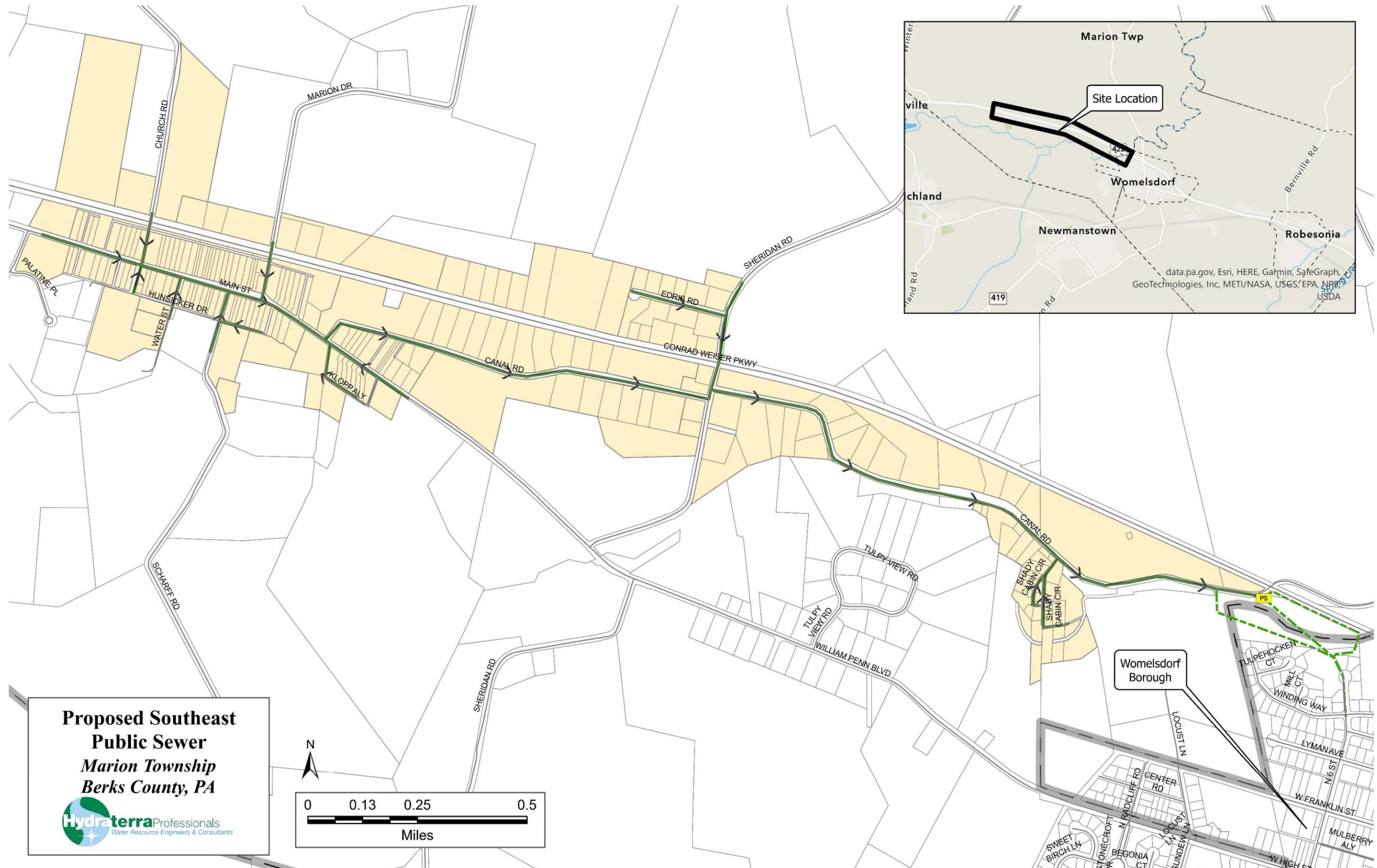
Figure 1 - Project Location Map

Figure 2 – Boring Location Sketch

Test Boring Logs

Core Box Photographs

Field Classification Sheet



HILLIS-CARNES
ENGINEERING ASSOCIATES
 3110 Pike Street, Harrisburg, PA 17111
 Phone: (717) 561-1623 Fax: (717) 754-0084

FIGURE 1 – PROJECT LOCATION MAP
 Southeast Public Sewer Concept Study
 Marion Township, Berks County, Pennsylvania

JOB NO: R23059
DATE: 9/1/2023
SCALE: AS SHOWN
PAGE: 1

DRAWN BY: JJH
CHECKED BY: NJL

Legend

 As-Drilled Test Boring Location

Point #	Northing	Easting	Elevation	Row Description
5281	384971.5090	2396302.3900	405.969	B-22
5298	384984.0300	2396289.7400	390.798	B-23
1517	384028.2230	2396087.1840	379.053	BORE B-1
1518	384043.9170	2396475.2010	379.059	BORE B-2
1519	384013.9710	2396677.9280	380.791	BORE B-3
1520	383971.3300	2396927.7480	387.415	BORE B-4
1577	383930.7750	2397125.7460	389.781	BORE B-5
1742	383727.1170	2397229.8000	385.784	BORE B-6
1891	383540.8070	2397506.3960	374.253	BORE B-7
2177	383419.0870	2397462.5980	370.885	BORE B-8
2272	383318.2740	2397667.8710	371.180	BORE B-8
5744	383284.8190	2397885.7730	372.105	BORE B-10
2410	383218.9810	2398062.3360	371.449	BORE B-11
1850	383188.4930	2398280.7140	368.300	BORE B-12
5957	383178.8290	2398334.0960	364.557	BORE B-13
1850	383098.8810	2398332.9240	348.239	BORE B-18
1471	383031.6470	2398932.8920	368.081	BORE B-18



This sketch was adapted from the pdf titled "BO-1 – Boring Locations" dated 8/24/2023 and prepared by C2C Design Group. Boring symbols and labels were added by HCEA at the surveyed boring location points.

HILLIS-CARNES
ENGINEERING ASSOCIATES
 3110 Pike Street, Harrisburg, PA 17111
 Phone: (717) 561-1623 Fax: (717) 754-0084

FIGURE 2 – AERIAL MAP/BORING LOCATION SKETCH

Southeast Public Sewer Concept Study
 Marion Township, Berks County, Pennsylvania

JOB NO:	R23059
DATE:	9/1/2023
SCALE:	AS SHOWN
PAGE:	1

DRAWN BY:	JJH
CHECKED BY:	NJL

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-1
 Location Northing: 384078.22 ; Easting: 2396287.18 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 379.1 Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve							
							N	10	30	50				
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.											
		0.3' - 0.6': SUBBASE												
378		0.6' - 10.5': Silty CLAY (ml-cl), brown and light brown, moist												
2			Borehole advanced "unsampled" to auger refusal due to limited site distance. Material descriptions based on auger cutting return.											
376														
4														
374														
6														
372														
8														
370														
10														
368		Bottom of Boring at 10.5 feet		Auger Refusal at 10.5' on Apparent Top of Bedrock.										
12			No groundwater encountered during boring advancement.											

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION	<u>Dry</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

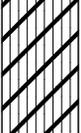
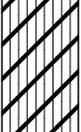
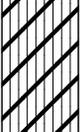
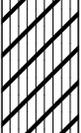
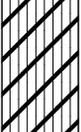
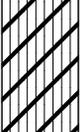
ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-2
 Location Northing: 384043.92 ; Easting: 2396475.20 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 378.1 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
378 - 0		0.0' - 0.3': TOPSOIL	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.2'		1-4-2-2	6	10
376 - 2		0.3' - 10.5': Clayey SILT (ml-cl), brown and light brown, moist S-2: with fine sand		1.7'		2-2-2-2	4	
374 - 4				1.6'		4-7-5-4	12	
372 - 6				2.0'		6-5-5-5	10	
370 - 8			2.0'		5-3-3-2	6		
368 - 10			Auger Refusal at 10.5'					
366 - 12		10.5' - 15.5': LIMESTONE, light gray and medium gray, hard, moderately to slightly weathered, very closely to medium spaced fractures, moderate dipping fractures	R-1: 10.5-15.5' Rec=80%, RQD=24%	4.0'				

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

Dry ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

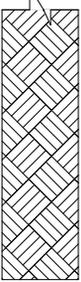
ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-2
 Location Northing: 384043.92 ; Easting: 2396475.20 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 378.1 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve		
							N	10	30
364		11.5'-12.0': very broken							
362		Bottom of Boring at 15.5 feet	No groundwater encountered while sampling.						
360									
358									
356									
354									

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-3
 Location Northing: 384013.97 ; Easting: 2396677.93 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 380.8 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.4': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5		25-21-16-8	37	
380		0.4' - 0.7': SUBBASE						
2		0.7' - 4.0': Silty CLAY gravel (ml-cl), brown vel is siltstone fragments	Sample wet at 6.0'	1.3'		4-3-2-3	5	
378								
4		4.0' - 8.5': Gravelly CLAY (cl), brown, moist to wet (Highly Decomposed LIMESTONE)		1.5'		2-4-3-2	7	
376			- more rock fabric remaining with depth	1.8'		2-4-3-5	7	
6								
374			Auger Refusal at '10.5' on Apparent Top of Bedrock.	0.9'		4-50/4	100	
8		8.5' - 10.5': Silty GRAVEL (gm), gray and grayish-brown, moist to wet (Weathered LIMESTONE)						
372			Groundwater encountered at 6 feet during sampling.					
10		Bottom of Boring at 10.5 feet						
370								
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

6.0 ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-4
 Location Northing: 383971.33 ; Easting: 2396927.75 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 387.4 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5'		23-16-5-3	21	10 30 50
		0.3' - 0.6': SUBBASE						
386		0.6' - 4.0': Silty CLAY (ml-cl), brown and light brown, moist		1.8'		6-5-7-6	12	
384								
4		4.0' - 10.0': Clayey SILT (ml-cl), brown and light brown, moist		2.0'		4-3-6-6	9	
382								
6			Sample wet at 6.0'	1.5'		9-5-4-4	9	
380								
8			S-5: weathered limestone in end of spoon, wet	0.9'		5-3-3-20	100	100
378		10.0' - 11.0': Silty GRAVEL (gm), gray and grayish-brown, wet (Weathered LIMESTONE)						
10			Groundwater encountered at 10' during sampling.					
376		Bottom of Boring at 11.0 feet	Auger Refusal at 11.0' on Apparent Top of Bedrock.					
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

10.0 ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-5
 Location Northing: 383930.77 ; Easting: 2397125.75 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 389.8 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.8'		19-5-6-3	11	10
		0.3' - 0.6': SUBBASE						
		0.6' - 4.0': Silty CLAY (ml-cl), brown and light brown, moist						
388				1.6'		5-4-5-8	9	
386		4.0' - 5.5': Silty GRAVEL (gm), gray and dark gray, moist (Weathered LIMESTONE)		0.9'		29-50/.4	100	100
384		Bottom of Boring at 5.5 feet	Auger Refusal at 5.5' on Apparent Top of Bedrock.					
			No groundwater encountered during sampling.					
382								
380								
378								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-6
 Location Northing: 383737.12 ; Easting: 2397259.60 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 385.8 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.8'		15-9-6-5	15	10
		0.3' - 0.5': SUBBASE						
		0.5' - 4.5': Silty CLAY (cl ml-), brown, moist						
384 2				1.7'		4-4-3-3	7	
382 4			Auger Refusal at 4.5'	0.6'		1-50/0	100	100
380 6		4.5' - 14.5': LIMESTONE, light gray and medium gray, hard, slightly weathered, closely to medium spaced fractures, moderate dipping fractures	R-1: 4.5' - 9.5' Rec=56%, RQD=30%	2.8'				
378 8								
376 10			R-2: 9.5' - 14.5' Rec=100%, RQD=20%	5.0'				
374 12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-6
 Location Northing: 383737.12 ; Easting: 2397259.60 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 385.8 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve		
							N	10	30
372 14		Bottom of Boring at 14.5 feet	No groundwater encountered while sampling.						
370 16									
368 18									
366 20									
364 22									
362 24									

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	<u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-7
 Location Northing: 383540.81 ; Easting: 2397308.94 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 374.4 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	2.0'		26-11-11-11	22	10 30 50
374		0.3' - 0.6': SUBBASE		2.0'		7-3-3-4	6	
2		0.6' - 2.5': Silty SAND with gravel (sm), brown and grayish-brown, moist		0.5'		2-3-5-8	8	
372		2.5' - 6.0': Silty CLAY (cl-ml), brown, moist	Auger Refusal at 7.0' on Apparent Top of Bedrock. No groundwater encountered during sampling.	0.4'		19-50/.2	9	
4		6.0' - 7.0': Silty GRAVEL (gm), grayish-brown and light gray, wet (Weathered LIMESTONE)						
370		Bottom of Boring at 7.0 feet						
6								
368								
8								
366								
10								
364								
12								
362								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry

CAVE IN DEPTH

N/A

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-8
 Location Northing: 383419.09 ; Easting: 2397462.59 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 370.9 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5'		27-12-25-26	37	
	0.3' - 0.5': SUBBASE							
370		0.5' - 4.0': Silty CLAY with gravel (cl-m), brown and light brown, moist						
2				1.8'		12-32-13-10	45	
368				0.6'		46-50/.2	100	
4		4.0' - 4.7': Silty GRAVEL (gm), grayish-brown to gray, dry (Weathered LIMESTONE)	Auger Refusal at 4.7'	2.8'				
366		4.7' - 10.0': LIMESTONE, light gray, hard, moderately to slightly weathered, closely to medium spaced fractures, moderately dipping fractures	R-1: 4.7' - 5.0' Rec=100%, RQD=0%	4.6'				
6			R-2: 5.0' - 10.0' Rec=92%, RQD=28%					
364								
8								
362								
10		Bottom of Boring at 10.0 feet	No groundwater encountered while sampling.					
360								
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-9
 Location Northing: 383318.27 ; Easting: 2397687.87 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 371.2 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/20/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/20/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.2'		32-8-16-14	24	10 30 50
		0.3' - 0.5': SUBBASE						
370		0.5' - 2.0': Clayey SAND with gravel (sc), brown and reddish-brown, moist	2.0' - 4.0': Clayey SILT (ml-cl), brown, moist	1.5'		7-5-7-7	12	
2								
368								
4		4.0' - 9.5': Silty SAND and GRAVEL (sm-gm), brownish-gray to light gray, moist to dry (Weathered LIMESTONE)	- gravel is limestone fragments - more rock fabric remaining with depth	1.7' 1.2'		8-7-11-11	18	
366								
6			Hard, slow augering past 8 feet.	1.8'		18-19-27-26	46	
364								
8			Bottom of Boring at 9.5 feet	0.7'		28-50/.2	100	100
362								
10			Auger Refusal at 9.5' on Apparent Top of Bedrock.					
360			No groundwater encountered during sampling.					
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry

CAVE IN DEPTH

N/A

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-10
 Location Northing: 383264.92 ; Easting: 2397885.77 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 372.1 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
372	0	0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.0'		17-7-5-4	12	10
		0.3' - 0.5': SUBBASE						
		0.5' - 4.0': Silty CLAY (cl-ml), brown, moist						
370	2			1.5'		5-4-6-5	10	
368	4	4.0' - 6.0: Clayey SILT (ml-cl), brown, moist S-3: weathered rock in end of spoon, faint rock fabric visible		2.0'		4-5-6-11	11	
366	6	6.0' - 10.0': Silty GRAVEL (gm), brownish-gray to light gray, dry (Weathered LIMESTONE) - gravel is limestone fragments - more rock fabric remaining with depth	Slow, hard augering past 6'	1.3' 1.2'		23-26-50/.3	100	100
364	8							
362	10	Bottom of Boring at 10.0 feet	Auger Refusal at 10.0' on Apparent Top of Bedrock.					
360	12		No groundwater encountered during sampling.					

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

Dry ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-11
 Location Northing: 383218.98 ; Easting: 2398082.34 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 371.4 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.6'		27-11-6-21	17	10 30 50
		0.3' - 0.7': SUBBASE						
370		0.7' - 2.0': Sandy CLAY (cl), brown, moist						
2		2.0' - 4.0': Well-graded GRAVEL with sand (gw), gray, dry		1.0'		12-13-8-5	21	
368								
4		4.0' - 9.5': Clayey SILT (ml- cl), brown, moist S-3: weathered rock in end of spoon, faint rock fabric visible		2.0'		3-4-3-3	7	
366								
6		9.5' - 10.0': Silty GRAVEL (gm), grayish-brown, dry (Weathered LIMESTONE) S-4: faint rock fabric visible	Slow, hard augering past 9'	1.2'		4-5-5-4	10	
364				1.3'				
8				1.1'		3-1-2-50/.1	3	
362								
10		Bottom of Boring at 10.0 feet	Auger Refusal at 10.0' on Apparent Top of Bedrock.					
360			No groundwater encountered during sampling.					
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-12
 Location Northing: 383188.49 ; Easting: 2398280.71 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 366.3 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5'		19-9-6-3	15	10
366		0.3' - 0.6': SUBBASE						
		0.6' - 5.0': Silty SAND with gravel (sm), brown, dark brown, and reddish-brown, moist (Apparent FILL)						
2				0.2'		5-6-4-3	10	
364								
4		S-3: weathered rock in end of spoon, faint rock fabric visible		0.5'		5-7-16-5	23	
362								
6		5.0' - 7.5': Silty CLAY (cl- ml), brown, moist		1.5'		4-4-6-9	10	
360		S-4: faint rock fabric visible						
8		7.5' - 10.0': Silty GRAVEL (gm), brown to light grayish-brown, moist (Weathered LIMESTONE)	Spoon wet at 8.0'	1.2'		26-50/.4	100	100
358			Hard, slow augering past 9'	0.6'				
10		Bottom of Boring at 10.0 feet	Auger Refusal at 10.0' on Apparent Top of Bedrock.					
356			Groundwater encountered at 8' during sampling.					
12								
354								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

8.0 ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-13
 Location Northing: 383178.82 ; Easting: 2398334.10 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 364.6 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	0.5'		4-6-4-4	10	10
364		0.3' - 0.6': SUBBASE						
		0.6' - 4.0': Silty CLAY (cl- ml), brown, moist						
2			Samples wet at 6'	1.0'		4-4-3-3	7	7
362								
		4.0' - 8.0': Clayey SILT (ml- cl), brown and grayish-brown, moist to wet						
4			Auger Refusal at 9.2' R-1: 9.2' - 10.0' Rec=100%, RQD=0% R-2: 10.0' - 15.0' Rec=94%, RQD=50%	0.6'		1-3-3-4	6	6
360								
		8.0' - 9.2': Silty GRAVEL (gm) , grayish-brown to gray, dry (Weathered LIMESTONE)						
6				1.5'		1-5-4-2	9	9
358								
		9.2' - 20.0': LIMESTONE, dark gray, hard, slightly weathered to fresh, medium spaced fractures, moderate dipping fractures						
8				1.1'		6-34-50/1	100	100
356								
10				0.8'				
354								
12				4.7'				
352								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST
 AT COMPLETION
 AFTER 24 HRS.
 AFTER ___ HRS.

GROUND WATER
6.0 ft.

CAVE IN DEPTH
N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-13
 Location Northing: 383178.82 ; Easting: 2398334.10 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 364.6 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve					
							N	10	30	50		
350		Bottom of Boring at 20.0 feet	R-3: 15.0' - 20.0' Rec=100%, RQD= 94% Groundwater encountered at 6' while sampling.									
348												
346												
344												
342												
340												

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION <u>6.0</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

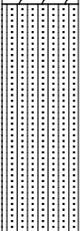
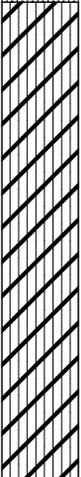
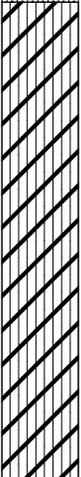
ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-14
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/18/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/18/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': TOPSOIL	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.6'		1-4-2-3	6	10
2		0.3' - 3.0': Silty SAND with gravel (sm), brown and dark brown, moist		1.2'		2-2-2-2	4	30
4		3.0' - 8.0': Silty CLAY (cl- ml), brown, moist		1.9'		5-5-6-6	21	30
6				1.6'		5-3-7-8	10	30
8		8.0' - 11.0': Silty GRAVEL (gm), brown to light grayish-brown, moist (Weathered LIMESTONE) - rock fabric visible past 8.0 feet	Hard, slow augering past 9' Auger Refusal at 11.0' on Apparent Top of Bedrock. No groundwater encountered during sampling.	2.0'		17-18-30-35	48	50
10		Bottom of Boring at 11.0 feet						
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-15
 Location Northing: 383096.88 ; Easting: 2398733.52 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 366.3 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/18/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/18/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': TOPSOIL	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.6'		5-2-2-3	6	10
366		0.3' - 5.0': Silty SAND with gravel (sm), brown and dark brown, moist		0.6'		2-2-1-3	3	
2		5.0' - 8.0': Silty CLAY (cl- ml), brown, moist		2.0'		3-5-4-4	9	
364				2.0'		6-4-2-2	6	
4			Hard, slow augering past 9'	1.4'		12-14-40-50/3	54	
362		8.0' - 11.0': Silty GRAVEL (gm), brown to light grayish-brown, moist (Weathered LIMESTONE) - rock fabric visible past 8.0 feet		4.7'				
6		11.0' - 14.0': Shaley LIMESTONE, dark gray, medium hard, moderately weathered, closely spaced fractures, moderately dipping fractures	R-1: 11.0'-16.0' Rec=94%, RQD=20%					
360								
8								
358								
10								
356								
12								
354								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry

CAVE IN DEPTH

N/A

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-15
 Location Northing: 383096.88 ; Easting: 2398733.52 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 366.3 Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/18/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/18/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve						
							N	10	30	50			
14 352		Bottom of Boring at 16.0 feet	No groundwater encountered during sampling.										
16 350													
18 348													
20 346													
22 344													
24 342													

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION <u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-16
 Location Northing: 383031.65 ; Easting: 2398932.88 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 366.1 Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
366	0	0.0' - 0.2': ASPHALT 0.2' - 0.5': SUBBASE 0.5' - 4.0': Sandy SILT (ml), brown and reddish-brown, moist (Apparent FILL)	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5'		15-8-15-13	23	10 30 50
364	2			1.2'		13-6-5-5	11	
362	4	4.0' - 8.0': Silty CLAY (cl- ml), brown, moist		1.9'		5-2-2-2	4	
360	6			1.8'		3-3-3-3	6	
358	8	8.0' - 10.5': Organic SILT/PEAT (ol/pt), black, moist to wet, with organics	Hard, slow augering past 10.5'	1.2'		3-4-2-3	48	
356	10		Groundwater encountered at 10' during sampling.					
354	12	10.5' - 11.7': Silty GRAVEL (gm), brown to light grayish-brown, moist (Weathered LIMESTONE) Bottom of Boring at 11.7 feet	Auger Refusal at 11.7' on Apparent Top of Bedrock.					

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

10.0 ft.

CAVE IN DEPTH

N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-17
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve	
							N	Curve
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	0.8'		8-3-2-2	5	10
		0.3' - 0.7': SUBBASE		1.5'		25-7-11-10	18	
2		0.7' - 4.0': Gravelly SILT (ml), brown and dark brown, moist - gravel is shale fragments						
4		4.0' - 7.0': Silty CLAY (cl- ml), brown and dark orangish-brown, moist		1.0'		2-3-3-3	6	
6				1.5'		4-4-12-34	16	
8		7.0' - 8.2': Silty GRAVEL (gm), brownish-gray to gray, dry (Weathered LIMESTONE)		0.2'		50/.2	100	100
		8.2' - 15.0': LIMESTONE, dark gray, hard, slightly weathered weathered to fresh, closely to medium spaced fractures, moderately dipping fractures	R-1: 8.2' - 10.0' Rec=89%, RQD=0% Auger Refusal at 8.2'	1.6'				
10			R-2: 10.0' - 15.0' Rec=96%, RQD=60%	4.8'				
12								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry

CAVE IN DEPTH

N/A

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-17
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop 30 in. Rock Core Diameter NQ2 - 2" Classified By N. Lauver / HCEA
 Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve		
							N	10	30
14		12.5' - 13.5: vertical fracture							
16		Bottom of Boring at 15.0 feet	No groundwater encountered while sampling.						
18									
20									
22									
24									

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION <u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-18
Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
Surf. Elev. _____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
Date Started 7/19/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/19/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot	
							N	Curve
0		0.0' - 0.3': TOPSOIL	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5'		4-15-26-35	41	
2		0.3' - 4.0': Silty GRAVEL (gm), brownish-gray to gray, moist to dry (Weathered SILTSTONE) - gravel is siltstone fragments	Hard, slow augering past 3.0'	0.6'		47-50/.3	100	
4		Bottom of Boring at 4.0 feet	Auger Refusal at 4.0' on Apparent Top of Bedrock. No groundwater encountered during sampling.	0.0'		50/.0	100	
6								
8								
10								
12								

SAMPLER TYPE
DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

AT COMPLETION
AFTER 24 HRS.
AFTER ___ HRS.

GROUND WATER
Dry ft.
ft.
ft.

CAVE IN DEPTH
N/A ft.
ft.
ft.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-19
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. 140 lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop 30 in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/18/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/18/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve			
							N	10	30	50
0		0.0' - 0.3': TOPSOIL	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.	1.5'		3-3-3-3	6			
0.3		0.3' - 5.0': Sandy SILT (ml), brown and light brown, moist		1.0'		6-2-1-2	3			
4		5.0' - 9.5': Silty CLAY (cl- ml), brown, moist	No groundwater encountered during sampling.	2.0'		2-3-4-7	5			
6				1.7'		5-8-8-7	16			
8				1.3'		10-12-16-40	28			
10		9.5' - 11.0': Silty GRAVEL (gm), brown to light grayish-brown, moist (Weathered LIMESTONE)	Auger Refusal at 11.0' on Apparent Top of Bedrock.							
12		Bottom of Boring at 11.0 feet								

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-21
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve			
							N	10	30	50
0		0.0' - 0.4': TOPSOIL	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.							
2		0.4' - 9.5': Gravelly CLAY (cl), dark brown, moist								
4			Borehole advanced "unsampled" until auger refusal obtained due to limited site distance. Material descriptions based on auger cutting return.							
6										
8			Auger Refusal at 10.5' on Apparent Top of Bedrock.							
10		9.5' - 10.5': Silty GRAVEL (gm), brownish-gray, moist (Weathered LIMESTONE) Bottom of Boring at 10.5 feet								
12			No groundwater encountered during boring advancement.							

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED AT COMPLETION
 I - INTACT AFTER 24 HRS.
 U - UNDISTURBED AFTER ___ HRS.
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-22
 Location Northing: 384971.51 ; Easting: 2396392.39 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 406.0 Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve							
							N	10	30	50				
406 0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.											
		0.3' - 0.6': SUBBASE												
		0.6' - 3.0': Clayey SILT (ml-cl), brown, moist												
404 2		3.0' - 5.5': Silty GRAVEL (gm), brownish-gray, moist (Weathered LIMESTONE)	Borehole advanced "unsampled" until auger refusal obtained due to limited site distance. Material descriptions based on auger cutting return.											
402 4		Bottom of Boring at 5.5 feet	Auger Refusal at 5.5' on Apparent Top of Bedrock.											
400 6			No groundwater encountered during boring advancement.											
398 8														
396 10														
394 12														

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. ft.	ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. ft.	ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-23
 Location Northing: 384684.04 ; Easting: 2396289.74 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 391.0 Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve							
							N	10	30	50				
0		0.0' - 0.3': ASPHALT	Soil classifications based on Visual-Manual procedure (ASTM D2488) unless laboratory classified.											
		0.3' - 0.6': SUBBASE												
390		0.6' - 20.0': Silty CLAY (cl-m), brown and dark brown, moist												
2			Borehole advanced "unsampled" until auger refusal obtained due to limited site distance. Material descriptions based on auger cutting return.											
388														
4														
386														
6														
384														
8														
382														
10														
380														
12														

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER _____ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

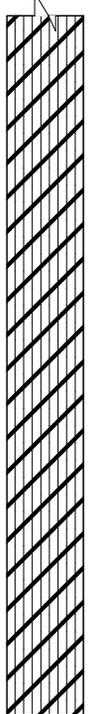
ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-23
 Location Northing: 384684.04 ; Easting: 2396289.74 Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. 391.0 Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 7/21/2023 Pipe Size N/A in. Boring Method HSA Date Completed 7/21/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve									
							N	10	30	50						
378		Bottom of Boring at 20.0 feet	No Auger Refusal - Easy Augering to 20'													
376																
374																
372																
370																
368																
366																

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ____ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-24
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 4.0': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4		Bottom of Boring at 4.0 feet	Auger Refusal at 4.0' on Apparent Top of Bedrock.								
6			No groundwater encountered during boring advancement.								
8											
10											
12											

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION	<u>Dry</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-25
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 4.0': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4		Bottom of Boring at 4.0 feet	Auger Refusal at 4.0' on Apparent Top of Bedrock.								
6			No groundwater encountered during boring advancement.								
8											
10											
12											

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION <u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-26
Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve																															
							N	10	30	50																												
0		0.0' - 7.2': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.																																				
2																																						
4																																						
6																																						
8																																						
10																																						
12																																						
																				Bottom of Boring at 7.2 feet	Auger Refusal at 7.2' on Apparent Top of Bedrock.	No groundwater encountered during boring advancement.																

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION	<u>Dry</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ____ HRS.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-27
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 3.2': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4		Bottom of Boring at 3.2 feet	Auger Refusal at 3.2' on Apparent Top of Bedrock.								
6			No groundwater encountered during boring advancement.								
8											
10											
12											

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	<u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER _____ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-28
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 5.5': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth. Bottom of Boring at 5.5 feet	Auger Refusal at 5.5' on Apparent Top of Bedrock. No groundwater encountered during boring advancement.								
2											
4											
6											
8											
10											
12											

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION <u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-29
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 2.9': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4		Bottom of Boring at 2.9 feet	Auger Refusal at 2.9' on Apparent Top of Bedrock.								
6			No groundwater encountered during boring advancement.								
8											
10											
12											

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-30
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 4.0': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.	Augers started kicking off apparent bedrock pinnacle at 1.0'								
2											
4		Bottom of Boring at 4.0 feet	Auger Refusal at 4.0' on Apparent Top of Bedrock.								
6			No groundwater encountered during boring advancement.								
8											
10											
12											

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

AT COMPLETION
 AFTER 24 HRS.
 AFTER ___ HRS.

GROUND
WATER
Dry ft.

CAVE IN
DEPTH
N/A ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-31
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 3.5': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4		Bottom of Boring at 3.5 feet	Auger Refusal at 3.5' on Apparent Top of Bedrock.								
6			No groundwater encountered during boring advancement.								
8											
10											
12											

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION	<u>Dry</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-32
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve			
							N	10	30	50
0		0.0' - 10.0': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.								
2										
4										
6										
8										
10										
12										
		Bottom of Boring at 10.0 feet	Borehole advanced to 10' - No Auger Refusal obtained.							
			No groundwater encountered during boring advancement.							

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER _____ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

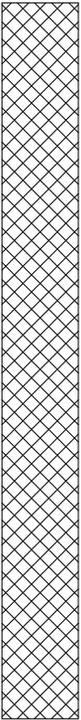
ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-33
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve			
							N	10	30	50
0		0.0' - 7.5': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.								
2										
4										
6									Augers started kicking off apparent bedrock pinnacle at 5.5'	
8								Bottom of Boring at 7.5 feet	Auger Refusal at 7.5' on Apparent Top of Bedrock.	
10									No groundwater encountered during boring advancement.	
12										

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-34
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve							
							N	10	30	50				
0		0.0' - 2.6': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.												
2		Bottom of Boring at 2.6 feet	Auger Refusal at 2.6' on Apparent Top of Bedrock.											
4			No groundwater encountered during boring advancement.											
6														
8														
10														
12														

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	AT COMPLETION <u>Dry</u> ft.	<u>N/A</u> ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER 24 HRS. _____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ____ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-35
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 4.5': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4											
Bottom of Boring at 4.5 feet			Auger Refusal at 4.5' on Apparent Top of Bedrock.								
6				No groundwater encountered during boring advancement.							
8											
10											
12											

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

AT COMPLETION Dry ft.
 AFTER 24 HRS. _____ ft.
 AFTER ___ HRS. _____ ft.

CAVE IN DEPTH

ft. N/A ft.
 ft. _____ ft.
 ft. _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-36
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve									
							N	10	30	50						
0		0.0' - 5.0': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.														
2																
4																
6																
8																
10																
12																
								Bottom of Boring at 5.0 feet	Auger Refusal at 5.0' on Apparent Top of Bedrock.							
									No groundwater encountered during boring advancement.							

SAMPLER TYPE	SAMPLE CONDITIONS	GROUND WATER	CAVE IN DEPTH	BORING METHOD
DRIVEN SPLIT SPOON UNLESS OTHERWISE	D - DISINTEGRATED	Dry ft.	N/A ft.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	_____ ft.	_____ ft.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER ___ HRS. _____ ft.	_____ ft.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST			MD - MUD DRILLING

STANDARD PENETRATION TEST-DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS.

HILLIS - CARNES

ENGINEERING ASSOCIATES, INC.

TEST BORING LOG

Project Name Marion Township Public Sewer Project Boring No. B-37
 Location _____ Job # R23059

SAMPLER

Datum Surveyed Hammer Wt. N/A lbs. Hole Diameter 3.25" ID Foreman M. Williams / HCEA
 Surf. Elev. _____ Ft. Hammer Drop N/A in. Rock Core Diameter N/A Classified By N. Lauver / HCEA
 Date Started 8/14/2023 Pipe Size N/A in. Boring Method HSA Date Completed 8/14/2023

Elevation/ Depth	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Rec.	NM %	SPT Blows	SPT Blows/Foot Curve				
							N	10	30	50	
0		0.0' - 4.5': UNSAMPLED - Borehole advanced "unsampled" to auger refusal to determine the top of bedrock depth.									
2											
4											
Bottom of Boring at 4.5 feet			Auger Refusal at 4.5' on Apparent Top of Bedrock.								
6				No groundwater encountered during boring advancement.							
8											
10											
12											

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUND WATER

Dry ft.
 _____ ft.
 _____ ft.

CAVE IN DEPTH

N/A ft.
 _____ ft.
 _____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING



- BORING B-15: RUN #1 – 11.0' – 16.0'
- BORING B-17: RUN #1 – 8.2' – 10.0'
RUN #2 – 10.0' – 15.0'
- BORING B-13: RUN #1 – 9.2' – 10.0'
RUN #2 – 10.0' – 15.0'
RUN #3 – 15.0' – 20.0' (CONT.)



- BORING B-13: RUN #3 – 15.0' – 20.0' (CONT.)
- BORING B-8: RUN #1 – 4.7' – 5.0'
RUN #2 – 5.0' – 10.0'
- BORING B-6: RUN #1 – 4.5' – 9.5' (CONT.)

HILLIS-CARNES
ENGINEERING ASSOCIATES

3110 Pike Street
Harrisburg, PA 17111

Phone: (717) 561-1623 Fax: (717) 754-0084

CORE BOX PHOTOGRAPHS
Southeast Public Sewer Concept Study
Marion Township, Berks County, Pennsylvania

JOB NO:	R23059	DRAWN BY:	NJL
DATE:	9/1/2023	CHECKED BY:	JJH
SCALE:	NTS		
PAGE:	1		



- BORING B-6: RUN #1 – 4.5’ – 9.5’ (CONT.)
- BORING B-2: RUN #2 – 10.5’ – 15.0’

HILLIS-CARNES
ENGINEERING ASSOCIATES

3110 Pike Street
Harrisburg, PA 17111

Phone: (717) 561-1623 Fax: (717) 754-0084

CORE BOX PHOTOGRAPHS
Southeast Public Sewer Concept Study
Marion Township, Berks County, Pennsylvania

JOB NO: R23059 DRAWN BY: NJL

DATE: 9/1/2023 CHECKED BY: JJH

SCALE: NTS

PAGE: 2

HILLIS-CARNES ENGINEERING ASSOCIATES, INC.

3110 Pike Street • Harrisburg, PA 17111

PHONE: (717) 561-1623 • FAX: (717) 754-0084

Description of Soils – per ASTM D2487

Major Component	Component Type	Component Description	Symbol	Group Name
Coarse-Grained Soils , More than 50% is retained on the No. 200 sieve	Gravels – More than 50% of the coarse fraction is retained on the No. 4 sieve. Coarse = 1" to 3" Medium = ½" to 1" Fine = ¼" to ½"	Clean Gravels <5% Passing No. 200 sieve	GW	Well Graded Gravel
		Gravels with fines, >12% Passing the No. 200 sieve	GP	Poorly Graded Gravel
			GM	Silty Gravel
		GC	Clayey Gravel	
	Sands – More than 50% of the coarse fraction passes the No. 4 sieve. Coarse = No.10 to No.4 Medium = No. 10 to No. 40 Fine = No. 40 to No. 200	Clean Sands <5% Passing No. 200 sieve	SW	Well Graded Sand
		Sands with fines, >12% Passing the No. 200 sieve	SP	Poorly Graded Sand
			SM	Silty Sand
		SC	Clayey Sand	
Fine Grained Soils , More than 50% passes the No. 200 sieve	Sils and Clays Liquid Limit is less than 50 Low to medium plasticity	Inorganic	ML	Silt
			CL	Lean Clay
		Organic	OL	Organic silt
			OH	Organic Clay
	Sils and Clays Liquid Limit of 50 or greater Medium to high plasticity	Inorganic	MH	Elastic Silt
			CH	Fat Clay
		Organic	OH	Organic Silt
			OC	Organic Clay
Highly Organic Soils	Primarily Organic matter, dark color, organic odor		PT	Peat

Proportions of Soil Components

Component Form	Description	Approximate percent by weight
Noun	Sand, Gravel, Silt, Clay, etc.	50% or more
Adjective	Sandy, silty, clayey, etc.	35% to 49%
Some	Some sand, some silt, etc.	12% to 34%
Trace	Trace sand, trace mica, etc.	1% to 11%
With	With sand, with mica, etc.	Presence only

Particle Size Identification

Particle Size	Particle dimension
Boulder	12" diameter or more
Cobble	3" to 12" diameter
Gravel	¼" to 3" diameter
Sand	0.005" to ¼" diameter
Silt/Clay (fines)	Cannot see particle

Cohesive Soils

Field Description	No. of SPT Blows/ft	Consistency
Easily Molded in Hands	0 – 3	Very Soft
Easily penetrated several inches by thumb	4 – 5	Soft
Penetrated by thumb with moderate effort	6 – 10	Medium Stiff
Penetrated by thumb with great effort	11 – 30	Stiff
Indented by thumb only with great effort	Greater than 30	Hard

Granular Soils

No. of SPT Blows/ft	Relative Density
0 – 4	Very Loose
5 – 10	Loose
11 – 30	Medium Dense
31 – 50	Dense
Greater than 50	Very Dense

Other Definitions:

- **Fill:** Encountered soils that were placed by man. Fill soils may be controlled (engineered structural fill) or uncontrolled fills that may contain rubble and/or debris.
- **Saprolite:** Soil material derived from the in-place chemical and physical weathering of the parent rock material. May contain relic structure. Also called residual soils. Occurs in Piedmont soils, found west of the fall line.
- **Disintegrated Rock:** Residual soil material with rock-like properties, very dense, N = 60 to 51/0".
- **Karst:** Descriptive term which denotes the potential for solutioning of the limestone rock and the development of sinkholes.
- **Alluvium:** Recently deposited soils placed by water action, typically stream or river floodplain soils.
- **Groundwater Level:** Depth within borehole where water is encountered either during drilling, or after a set period of time to allow groundwater conditions to reach equilibrium.
- **Caved Depth:** Depth at which borehole collapsed after removal of augers/casing. Indicative of loose soils and/or groundwater conditions.

Appendix F

2011 Womelsdorf Sewer Authority
(WSA) Draft Agreement

INTERMUNICIPAL AGREEMENT

This Intermunicipal Agreement (hereinafter the "Agreement") is made and entered into this 19th day of January, 2010, by and between

WOMELSDORF SEWER AUTHORITY, a municipal authority operating under the laws of the Commonwealth of Pennsylvania, with a mailing address of 101 High Street, Womelsdorf, Berks County, Pennsylvania 19567, and

TOWNSHIP OF MARION, a political subdivision of the Commonwealth of Pennsylvania, with a mailing address of 420 Water Street, Stouchsburg, Berks County, Pennsylvania 19567.

BACKGROUND

WHEREAS, the Womelsdorf Sewer Authority (hereinafter "Authority") is the owner and operator of a sanitary sewer treatment plant with associated collection lines and facilities which provide public sewer service to the Borough of Womelsdorf;

WHEREAS, the Borough of Womelsdorf and the Township of Marion (hereinafter "Township") are adjoining municipalities;

WHEREAS, the Township's study and report for the update of the 537 Plan have determined that sewer systems within the sewage needs area of Township are insufficient and proposes the revision of its Act 537 Plan providing public service to its residences;

WHEREAS, Township desires to connect to the Authority sanitary sewer system in order to provide sanitary sewer service to its residents and to comply with the mandates of DEP;

WHEREAS, the General Assembly of the Commonwealth of Pennsylvania has provided for intermunicipal cooperation in the performance of governmental functions, powers and

responsibilities by the Act of December 19, 1996, P.L. 1158, No. 177 § 1, 53 Pa. C.S. 2301, et seq., as amended;

WHEREAS, as a result of the anticipated connections from the Township to the Authority, the Authority is making improvements and modifications to the sanitary sewer treatment plant;

WHEREAS, subject to the Township's receipt of adequate financing for the project, Township will construct the necessary facilities including sewer line extensions to convey sewage to the Authority's sanitary sewage treatment plant;

WHEREAS, in order for its residents to connect to the sanitary sewer system of Authority, Township will pay to Authority the agreed upon portion of costs of the connection to the Authority's sanitary sewer system, including tapping fees, as agreed to by the parties and their proportional share of the costs of the current improvements and upgrades to the sanitary sewer treatment plant; and

WHEREAS, since the costs of the construction of the collection system by the Township have not been finalized nor has the proportional share of the costs of the current improvements and upgrades to the sanitary sewer treatment plant been determined;

NOW, THEREFORE, in consideration of the mutual covenants and promises set forth herein, the Parties hereto, intending to be legally bound, hereby agree as follows:

1. The recitals set forth in the BACKGROUND section of this Agreement are hereby incorporated in the body of this Agreement as if more fully set forth herein at length.
2. Term. The term of this Agreement shall be for a period of twenty (20) years commencing on the date hereof (hereinafter the "Initial Term"). At the expiration of the Initial Term, this Agreement shall renew for successive five (5) year terms unless either party provides

notice of non-renewal at least one hundred and eighty (180) days before the expiration of the then-current term.

3. Sewage Capacity. The Authority agrees to accept and process up to a maximum of 60,000 gallons per day of sewage flow from Township (hereinafter the "Maximum Daily Flow"). Township sewage flow shall be measured by the Township and will be calculated on a monthly basis averaging the daily sewage flow measurement for that month. The Authority may, in its sole and complete discretion, accept and process flows in the excess of the Maximum Daily Flow; in the event that Authority elects to accept and process excess flows, it may charge Township an excess flow fee as set forth in Article 4 of this Agreement.

4. Fees.

A. Authority agrees to accept, treat and dispose of sanitary sewage generated in Township in accordance with the terms and conditions of this Agreement. The Township agrees to accept and be bound by all of the rules and regulations of the Authority, including but not limited to the pretreatment, if necessary, of any industrial wastewater.

B. Township agrees that it will pay to Authority the agreed portion of the connection fee for each equivalent dwelling upon collection of the connection fee unit (hereinafter "EDU") of sanitary sewer service as set forth in the Authority fee schedule as adopted by the Township.

C. Discharges by Township in excess of the Maximum Daily Flow shall be assessed an excess flow fee in the amount of \$8.97 per 1,000 for each gallons of excess flow.

D. Authority is hereby authorized to bill the Township for all residential, commercial and industrial users of the Authority sanitary sewer servicing the Township in

accordance with the then current Authority fee schedule, and take all legal action permitted by Pennsylvania law with respect to nonpayment.

E. The Township agrees that it will pay a mutually agreed upon sum of money for their proportional share of the costs of the 2010 and 2011 Sewer Plant Treatment Project for the ongoing and recent upgrades to the Authority's sanitary sewer treatment plant subject to the Township acquiring adequate financing for the project.

5. Connection to Authority Sewer System.

A. The parties acknowledge that Authority is providing sanitary sewage treatment to Township and that Township is responsible for all necessary conveyance lines and facilities in order to connect to the Authority sanitary sewage system.

B. The service area covered for sanitary sewage treatment service provided by Authority under this Agreement shall be as shown on the Act 537 Plan update adopted by the Township. The parties agree that the Authority and the Township shall have the ability to form sewer districts in the Township or extend the boundaries of existing sewer districts in the Township from time to time as permitted by adopted updates to the Township's Act 537 Plan.

C. Township may make additional connections to the Authority sewer system from time to time pursuant to the terms of this Agreement. The Township shall bear the cost of any such additional connections. The Township agrees to provide the Authority with an easement in form and description satisfactory to the Authority over any streets or properties as necessary for the construction of any additional connections.

D. Where the Township seeks to make an additional connection to the Authority sewer system, the Township Engineer or, in the event a developer proposes to construct the interconnection, such developer's consulting engineer, shall prepare plans and

specifications for the construction of the additional connection and submit same to the Authority Engineer for review and Approval in accordance with all Authority Ordinances and regulations. Any changes to the plans and specifications shall also require review and approval by the Authority Engineer. The Township shall administer the construction or inspection of the additional connection in such a manner as to make certain that all work is performed according to plans drawn by the Township or developer's engineers and approved by the Authority.

E. The Township shall construct or cause to be constructed, operate and maintain a metering device as approved by the Authority at any additional connection that is made to the Authority wastewater system.

F. Any additional connection to the Authority wastewater system shall require payment to the Authority the agreed proportionate share of the costs of connection, including tapping fees.

6. Construction.

A. Township shall design and construct all conveyance lines and facilities necessary to transport wastewater from Township to the Authority wastewater plant sewer line as shown on the adopted Act 537 Plan update (hereinafter the "Connection Facilities"). Township shall pay all costs associated with the design and construction of the Connection Facilities including but not limited to all materials, labor and any necessary appurtenances, and shall restore all structures and road surfaces disturbed during the construction of the Connection Facilities. Township shall obtain at its expense the necessary permits, environmental or otherwise, required for the design and construction of the Connection Facilities. These construction and design documents, including the plans and specifications, shall be submitted to the Authority and the Pennsylvania Department of Environmental Protection (hereinafter "DEP")

for review prior to bidding. The design shall be approved by Authority and DEP prior to bidding the Connection Facilities project.

B. Authority reserves the right to inspect at will the Connection Facilities both during and after construction without notice to Township.

C. Township agrees to indemnify and hold harmless Authority from any and all actions for damages arising out of the installation and construction of the Connection Facilities within both the Township and the Borough of Womelsdorf including any actions brought by designers, engineers, contractors or subcontractors.

7. Equipment.

A. All equipment installed by Township shall be approved by the Authority prior to its installation and/or use.

B. Township shall install and/or utilize any equipment or appurtenances required by the Authority, including but not limited to manholes, lines, stubs and meters.

8. Maintenance and Inspections.

A. The Authority and Township shall ensure that all sewer lines and equipment located in their respective municipalities are maintained in good operating order and shall further ensure that said lines and equipment are not negatively impacting, or otherwise impeding, the operation of the sanitary sewer system and the Authority treatment facility in accordance with DEP requirements.

B. The Authority shall have the right to inspect and test all sewer lines and equipment located in the Township, including such inspections and tests as may be necessary to verify the number and types of properties connected to the sanitary sewer system in the Township. If upon inspection Authority discovers conditions or equipment that are negatively

impacting or otherwise impeding the sanitary sewer system, the Authority may demand, in writing, that the Township satisfactorily rectify such conditions or equipment. If Township fails to replace or repair such equipment within the reasonable time prescribed in the written notice by the Authority, Authority may enter upon the property and make the necessary repair or replacement, and shall be entitled to reimbursement from Township of the cost of labor and equipment utilized.

9. Exchange of Information and Reports.

A. The Township shall records pertinent to the operation and maintenance of the sanitary sewer system to the Authority on a quarterly basis. Such records shall include, but shall not be limited to: (1) the average daily flow (in gallons) carried by the sewer lines for each town for the past year; and (2) the average daily amount (in gallons) treated at the Facility for the past year.

B. The Township shall issue a report to the Authority setting forth the Equivalent Dwelling Units generating wastewater to be accepted, treated and disposed of by the Authority for the upcoming year. This report shall also include an estimate of the daily amount of wastewater (in gallons) to be generated by such Equivalent Dwelling Units for the upcoming year.

C. The Authority and Township agree to keep and maintain adequate records relative to the sanitary sewer system of each town. The Authority shall, within five business days after written notice to Township, have the right to inspect all records of Township relating to the construction, expansion, operation and maintenance of the sanitary sewer system.

10. Indemnification. Except for any claim resulting from the negligent or intentional action, inaction or omission of Authority, its agents, servants and/or employees, Township shall, at its sole cost and expense, indemnify and save harmless Authority for any losses, claims, damages, awards, penalties or injuries, including reasonable attorneys' fees, incurred by any

third party arising from the connection to the sewage treatment system of Authority by Township and its agents, servants, employees and/or any other party acting at the direction of or with the permission of Township.

11. Insurance.

A. The Township agrees to maintain at all times during the term of this Agreement comprehensive general public liability insurance in which the Authority shall be named as an additional insured with minimum limits of liability of One Million Dollars (\$1,000,000.00) single limit coverage. All insurance policies required by this provision shall be obtained by the Township at the sole expense of Township and shall be placed with companies qualified to do business within the Commonwealth of Pennsylvania and shall include a waiver of subrogation by the insurance carrier.

B. Township shall maintain worker's compensation coverage and any other insurance policies required for its employees, agents, contractors and/or subcontractors who perform any obligations of Township under this Agreement.

C. Said insurance policies shall provide for a least sixty (60) days notice to the Authority before cancellation. Copies of certificates of policies of insurance shall be delivered to the Authority prior to the execution of this Agreement.

12. Compliance with Ordinances and other Regulations. Township and residential, commercial and industrial users located within Township connected to the Authority sanitary sewer system shall comply with all Ordinances, rules and regulations of Authority as adopted from time to time.

13. Termination. In the event that the Authority terminates this Agreement for any reason other than a threat of imminent harm to the Authority sanitary sewer system, the Authority

shall be obligated to continue to accept and treat wastewater from Township until such time as Township is able to implement an alternative wastewater treatment disposal plan.

14. Miscellaneous.

A. Modification. This Agreement may be modified only by written agreement signed by the Authority and the Township.

B. Descriptive Headings. The descriptive headings of this Agreement are included for convenience in reference only and do not in any way limit or amplify the terms and provisions of this Agreement.

C. No Joint Venture. The relationship between the Authority and the Township shall not be deemed a partnership or joint venture.

D. Notices. All notices, demands, consents, requests and other communications hereunder which may be or are required to be given by either Party, shall be in writing and shall be deemed to have been properly given when sent by United States registered or certified mail, postage prepaid, addressed to the Parties hereto, at the following addresses or at such other address as either Party may, from time to time, designate in a notice to the other:

To Authority:

Womelsdorf Sewer Authority
101 High Street
Womelsdorf, PA 19567

With a copy to:

John E. Muir, Esquire
Roland & Schlegel, LLC
627 North Fourth Street, P.O. Box 902
Reading, PA 19603

To Township:

Township of Marion
420 Water Street
Stouchsburg, PA 19567

With a copy to:

Andrew S. George, Esquire
Mogel, Speidel, Bobb and Kershner
520 Walnut Street, P.O. Box 8581
Reading, PA 19603

Each Party hereto shall have the right, by giving not less than five (5) days prior written notice to the other parties hereto, to change any address of such Party for the purpose of notices under this Section

E. No Assignment; Binding Effect. Neither this Agreement, nor any right, interest nor obligation hereunder, may be assigned by any party hereto without the prior written consent of the other party hereto, and any attempt to do so will be void, except for assignments and transfers by operation of law. Subject to the preceding sentence, this Agreement is binding upon, insures to the benefit of and is enforceable by the party's hereto and there respective successors and assignees.

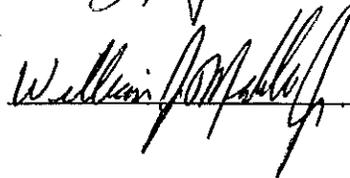
F. Governing Law. This Agreement shall be governed by, construed and enforced in accordance with the laws of the Commonwealth of Pennsylvania.

G. Severability. The invalidity or unenforceability of any particular provision or part of any provision of this Agreement shall not affect the other provisions or parts hereof. If any provision is determined to be invalid or unenforceable by a court of competent jurisdiction, the balance of the Agreement will remain in effect.

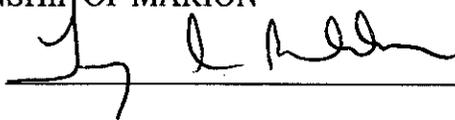
IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed
as of the day and year first above written.

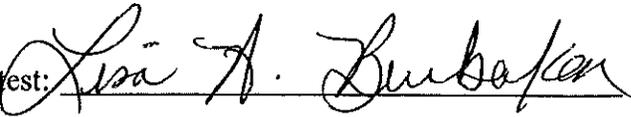
WOMELSDORF SEWER AUTHORITY

By: 

Attest: 

TOWNSHIP OF MARION

By: 

Attest: 

#211444

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Appendix G

2023 Womelsdorf Sewer Authority (WSA) Fee Schedule

SEWAGE COSTS
NEW QUARTERLY RATES EFFECTIVE 11/01/13

RESIDENTIAL

\$58.75

Minimum Use
6,000 Gallons

Over 6,000 Gallons
\$6.34 per 1,000

NON-TRADITIONAL RESIDENTIAL RATES

(More than one home per meter)

\$78.90

Minimum Use
6,000 Gallons

Over 6,000 Gallons
\$11.55 per 1,000

A LATE FEE OF 10% IS ADDED IF PAYMENT IS NOT MADE BY THE DUE DATE.

SEWER BILLING PERIODS

PERIOD 1 – JAN. FEB. MARCH	BILLED IN JUNE	DUE JULY 5
PERIOD 2 – APR. MAY JUNE	BILLED IN SEPT.	DUE OCT. 5
PERIOD 3 – JULY AUG. SEPT.	BILLED IN DEC.	DUE JAN. 5
PERIOD 4 – OCT. NOV. DEC.	BILLED IN MARCH	DUE APRIL 5

Appendix H

PNDI & PHMC Comments

1. PROJECT INFORMATION

Project Name: **Marion Township SE Sewer System Special Study**

Date of Review: **11/16/2023 09:57:57 AM**

Project Category: **Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Sewer line (new - construction in new location)**

Project Area: **41.82 acres**

County(s): **Berks**

Township/Municipality(s): **MARION TOWNSHIP; WOMELSDORF**

ZIP Code:

Quadrangle Name(s): **STRAUSSTOWN; WOMELSDORF**

Watersheds HUC 8: **Schuylkill**

Watersheds HUC 12: **Headwaters Tulpehocken Creek; Upper Tulpehocken Creek**

Decimal Degrees: **40.378080, -76.226160**

Degrees Minutes Seconds: **40° 22' 41.865" N, 76° 13' 34.1777" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

Marion Township SE Sewer System Special Study

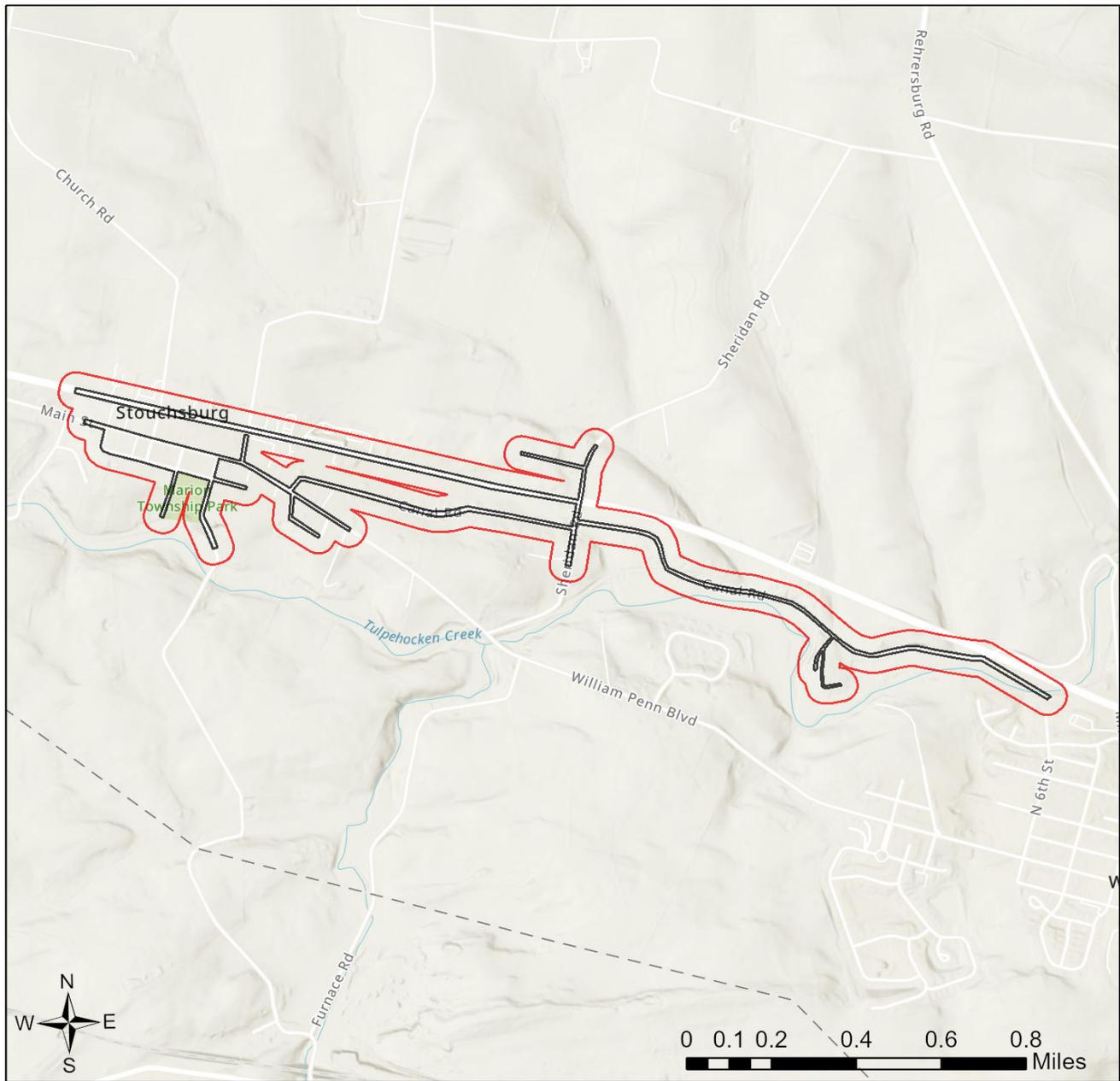


-  Buffered Project Boundary
-  Project Boundary



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Marion Township SE Sewer System Special Study



-  Buffered Project Boundary
-  Project Boundary



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

RESPONSE TO QUESTION(S) ASKED

Q1: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.

Your answer is: Someone qualified to identify and delineate wetlands (holding a natural resource degree or equivalent work experience) has investigated the site, and determined that NO wetlands are located in or within 300 feet of the project area. (A written report from the wetland specialist, and detailed project maps should document this.)

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <https://conservationexplorer.dcnr.pa.gov/content/resources>.



5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

PA Fish and Boat Commission

Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

U.S. Fish and Wildlife Service

Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Game Commission

Bureau of Wildlife Management
Division of Environmental Review
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: _____
Company/Business Name: _____
Address: _____
City, State, Zip: _____
Phone:(_____) _____ Fax:(_____) _____
Email: _____

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

date



Pennsylvania State Historic Preservation Office

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

August 24, 2023

Joseph Borgioni
Hydraterra Professionals
1691 Horseshoe Pike
Suite 2
Glenmoore PA 19343

RE: ER Project # 2023PR03818.003, Marion Township Southeast Sewer System,
Department of Environmental Protection, Womelsdorf Borough, Berks County

Dear Joseph Borgioni:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Above Ground Resources

No Above Ground Concerns - Environmental Review - No Effect - Historic Properties Present - Above Ground

The following historic properties, listed in or eligible for the National Register of Historic Places, are located in the project area of potential effect: Tulpehocken Creek Historic District (Resource # 1984RE00263). Based on the information received and available in our files, in our opinion, the proposed project will have No Effect on these historic properties. Should the scope of the project change and/or should you be made aware of historic property concerns, you will need to reinitiate consultation with our office using PA-SHARE.

For questions concerning above ground resources, please contact Barbara Frederick at bafrederic@pa.gov.

Archaeological Resources

No Archaeological Concerns - Environmental Review - No Effect - Archaeological

Based on the information received and available in our files, in our opinion, the proposed project should have No Effect on archaeological resources. Our analysis indicates that archaeological resources are potentially located in this project area. Should the scope of the project be amended to include additional ground-disturbing activity and/or should you

be made aware of historic property concerns, you will need to reinitiate consultation with our office using PA-SHARE.

For questions concerning archaeological resources, please contact Casey Hanson at chanson@pa.gov.

Sincerely,

A handwritten signature in black ink that reads "Emma Diehl". The signature is written in a cursive style with a long, sweeping underline.

Emma Diehl
Environmental Review Division Manager

Appendix I

Publication

TBA

Appendix J

Public Comments and Responses

TBA

Appendix K

Municipal Resolution and Adoption

TBA