

V. ALTERNATIVES TO PROVIDE NEW OR IMPROVED WASTEWATER DISPOSAL FACILITIES

A. Identify Alternatives

The Township believes that the best and most viable method to provide needed wastewater services, consistent with the Township, and County Comprehensive Plans, is to provide public sewer to areas designated for sewer service in the low density and medium density residential areas as well as light industrial/office area and highway commercial. Those areas are designated on the plan sheet found in Appendix T. OLDS would then be allowed for use in those areas outside of the sewer service areas depicted in Appendix T.

The primary needs areas identified in Plan Section III, which include Bel Air Estates and lots along Valley Road will be receiving public sewer service in the near future. The newly constructed Monacacy Interceptor will allow for collection and conveyance of wastewater generated by these areas.

1. Regional Wastewater Treatment Concepts

The Amity Township wastewater treatment plant is a sub-regional facility. It serves portions of Amity Township, Oley Township, Union Township, Earl Township, and Douglass Township. It is proposed that, given the public sewer needs in each of these municipalities, that the wastewater treatment plant be expanded to accommodate those needs.

2. Extension of Existing Municipal or Non-Municipal Sewage Facilities to Areas in Need

The primary needs areas are Bel Air Estates and the Valley Road areas. The recently completed Monocacy Interceptor will ultimately serve both of

these areas and will convey the wastewater to the Township's public sewer system.

The Limekiln interceptor was previously identified as a potential option. However, there were several disadvantages to that option:

- It would provide sewer along Limekiln Road, adjacent to some areas currently zoned as Low Density Residential.
- A pumping station would be required on Limekiln road.
- Construction would be along a state road, where restoration costs are higher.

As stated above, a sanitary sewer interceptor has been constructed to reach Bel Air Estates and Valley road. The major advantages to constructing this line is that it will be a gravity system, eliminating the need for a pump station to service the Valley Road area.

3. Continued Use of Existing Treatment Facilities Through Upgrade

In an effort to meet the flow projection needs as defined in Section IV of this Plan, the wastewater treatment plant (WWTP) will need to be expanded and upgraded to meet the increased hydraulic and organic loadings. The existing wastewater treatment plant utilizes mechanical, biological and chemical treatment processes. The WWTP was upgraded in 2003 and 2004 to provide needed maintenance and maximize the performance of the existing facilities. The upgrades included a new headworks facility, modifications to the existing oxidation ditch process, a new final clarifier, a new dechlorination system and an increase in the size of the chlorine contact tank. Following these upgrades (in 2005), the WWTP was rerated from its hydraulic capacity of 1.6 MGD to its present

capacity, 2.2 MGD. The plant maintains an organic loading capacity of 4,202 lb/day. The current treatment sequence consists of:

- a. Mechanical Screen
- b. Vortex-based Grit Removal System
- c. Raw Wastewater Pumping
- d. Primary Clarifiers
- e. Oxidation Ditch
- f. Final Clarifiers
- g. Disinfection

Sludge Handling Facilities include:

- a. Aerobic Digestion
- b. Anaerobic Digestion
- c. Belt Filter Press Dewatering System
- d. Reed Beds

The WWTP also includes an equalization basin for temporary storage of raw sewage during peak flows. A plan of the existing site is provided in Appendix J. New wastewater treatment facilities or modifications to existing facilities are required to treat the additional average annual flow projection of 0.70 MGD to meet the permit limitations expected from PA DEP.

This Plan identifies which existing facilities can be modified for continuing use, which facilities will be demolished, and to determine additional facilities that are needed to consistently produce a high-quality effluent that is in full compliance with current and anticipated effluent

standards. An evaluation of the existing system as well as the required upgrades for treatment of the additional capacity is as follows:

Wastewater Criteria Used as the Basis for Evaluation for Expansion

Annual Average Flow (AAF):	2.90 MGD
Maximum Monthly Average Flow (MMAF) ¹ :	5.08 MGD
Peak Hour Flow (PHF) ² :	9.22 MGD
Organic Loading ³ :	5,563 lb/day

¹: Based on the maximum MMAF/AAF ratio of 1.75 recorded between 2004 and 2008.

²: Based on a peaking factor of 3.18 (from the influent data compiled for the 2005 Re-Rate).

³: Based on a design influent BOD concentration of 230 mg/L (existing design: the 2008 average BOD was 198 mg/L).

The PA DEP was contacted to determine the projected effluent limitations that would be contained in the NPDES Permit as a result of increasing the design flow of the wastewater treatment plant from 2.20 MGD to 2.90 MGD. Based on this conversation, the following effluent criteria were developed for the evaluation.

Effluent Criteria Used as the Basis for Evaluation for Expansion

Parameter	2002 NPDES	Expansion		
pH	6.0 to 9.0	6.0 to 9.0	S.U.	
D.O.	5.0	5.0	mg/L	<=at all times
TRC	0.50	0.50	mg/L	Average Monthly
TSS	400	550	lb/day	Average Monthly

	600	825	lb/day	Average Monthly
	30.00	30.00	mg/L	Average Monthly
	45.00	45.00	mg/L	Maximum Daily
CBOD ₅	333	458	lb/day	Average Monthly
	534	734	lb/day	Average Weekly
	25.00	25.00	mg/L	Average Monthly
	40.00	40.00	mg/L	Maximum Daily
NH ³ -N	267	73	lb/day	Average Monthly
	20.00	4.00	mg/L	Average Monthly
TDS	13,344	18,348	lb/day	Average Monthly
	1,000	1,000	mg/L	Average Monthly
Fecal (5.1 to 9/30)	200	200	/100 mL	Average Monthly
Fecal (10.1 to 4/30)	10,000	10,000	/100 mL	Average Monthly

a. Proposed WWTP Expansion Alternatives

Three alternatives were developed for expansion of the WWTP's existing capacity both hydraulically and organically utilizing the criteria summarized in the previous tables. These alternatives are summarized below:

(1) Alternative 1: Parallel Oxidation Ditch Treatment Train

This alternative proposes to increase the WWTP's capacity by creating an additional (parallel) secondary treatment train composed of a 2-ring oxidation ditch (equal in size to the inner two channels of the existing oxidation ditch), as well as an additional final clarifier (50-ft diameter) with RAS/WAS pumping facilities. Additional upgrades include:

- Headworks: new headworks building including grit and screening equipment.

- Equalization: replace liner and aerators and construct a sectional wall.
- Primary Clarification: construct one new primary clarifier.
- Disinfection: replace existing chlorine disinfection system with a new UV system.
- Sludge Digestion: construct a new aerobic digester, convert existing anaerobic digesters to aerobic sludge holding tanks and install a new mechanical sludge thickening system.
- Sludge Dewatering: install a new centrifuge sludge dewatering system (belt press to remain for backup).
- Electrical: install a new plant-wide emergency generator.

A plan showing the proposed upgrades for Alternative 1 is included in Appendix J.

(2) Alternative 2: Parallel Activated Sludge Lagoon Train

Conversion of the existing Equalization Basin to an Activated sludge Lagoon (extended aeration process), to be operated in parallel with the existing oxidation ditch, would allow the WWTP to expand its rated capacity. Screened and degritted sewage would be diverted to the parallel train (between 30 and 50 percent of the total flow). Required upgrades to the existing EQ basin would include the installation of floating aerators, a process control system, replacement of the existing basin liner, changes to the influent and effluent structures and piping, and a new lagoon effluent pump station. This alternative would require an additional final clarifier (50-ft diameter) with RAS/WAS pumping facilities. All existing primary clarifiers would be converted to aerobic digesters. Additional upgrades include:

- Headworks: new headworks building including grit and screening equipment.
- Disinfection: replace existing chlorine disinfection system with a new UV system.
- Sludge Digestion: convert three existing primary clarifiers to aerobic digesters and convert existing anaerobic digesters to aerobic sludge holding tanks.
- Sludge Dewatering: install a new centrifuge sludge dewatering system (belt press to remain for backup).
- Electrical: install a new plant-wide emergency generator.

A plan showing the proposed upgrades for Alternative 2 is included in Appendix J.

(3) Alternative 3: Aerated Lagoon in Series with Existing Oxidation Ditch

Utilizing the existing equalization basin as an aerated lagoon operated in series with the existing oxidation ditch would reduce the effective loading to the ditch and increase the secondary treatment capacity of the WWTP. Required upgrades to the existing EQ basin would include the installation of floating aerators, a process control system, replacement of the existing basin liner, changes to the influent and effluent structures and piping, and a new lagoon effluent pump station. This alternative would require an additional final clarifier (50-ft diameter) with RAS/WAS pumping facilities. All existing primary clarifiers would be converted to aerobic digesters. Additional upgrades include:

- Headworks: new headworks building including grit and screening equipment.
- Disinfection: replace existing chlorine disinfection system with a new UV system.
- Sludge Digestion: convert three existing primary clarifiers to aerobic digesters and convert existing anaerobic digesters to aerobic sludge holding tanks.
- Sludge Dewatering: install a new centrifuge sludge dewatering system (belt press to remain for backup).
- Electrical: install a new plant-wide emergency generator.

A plan showing the proposed upgrades for Alternative 3 is included in Appendix J.

4. Need for New Community Sewage Systems

Addressing the need for new community systems primarily applied to the Bel Air Estates/Valley Road area. It would have consisted of a collection system and community drainage field. The field could have been either one or more elevated sand mounds, or a drip irrigation system.

The major drawback of this option would have been control over ownership and maintenance of the community portion of the system. Given these concerns, the Monacacy Interceptor was constructed and will provide public sewer service to this area.

5. Repair, Replacement, Upgrade of Collection and Conveyance System to Meet Projected Needs

The Township currently uses a sanitary sewer hydraulic model as a means for determining if portions of their collection and conveyance system could be impacted with the addition of flows from new development. For this 537 Plan, projected future flows were put in to the hydraulic model at locations proximate to the potential location for proposed developments. The model was run to determine those portions of the collection and conveyance system that may, in the future, be deficient. See the system plan found in Appendix X. Areas of deficiencies are highlighted on this plan. It is important to note that these areas of concern are not a certainty. The timing of development and the final physical location of development will impact the ultimate location of the noted deficiencies. As a result, the Township will continue to utilize the model to input flows from proposed developments on an as needed basis, and monitor collection and conveyance system impacts at a time closer to when the development is to occur. The costs associated with upgrades will be borne by the responsible developer.

6. Alternative Methods of Collection/Conveyance

For this Plan, extension of the collection and conveyance system to serve needs areas has been addressed with the completion of the Monocacy Interceptor. Needs areas such as Bel Air Estates and the Valley road area are going to be served by this new gravity interceptor. This interceptor will convey wastewater flow from these needs area to the Township's existing collection and conveyance system.

Future needs areas include those identified on the graphic found in Appendix U. Since these potentially developable areas are located within the Township's public sewer service district, collection and conveyance facility shall be extended to provide public sanitary sewer service. These extensions will be the responsibility of the respective developer.

B. Continued Use of Individual Sewer Disposal Systems

Proposed developments as identified in this Act 537 Plan will be served by public sewer. Any development that occurs outside of the bounds for the public sewer service area shall use individual on-lot disposal systems. The OLDS that currently serve existing developments shall continue to be utilized. The current on-lot disposal system management program will continue to be utilized.

C. Use of Small Flow Sewage Treatment Facilities

Previously, several options were discussed including a package plant at Bel Air Estates as well as a package plant to serve Bel Air Estates and the Valley road area. Ultimately, this alternative was not selected to serve the identified needs areas. It was determined that public sewer would be the best option. The needs area identified in this Plan will be served by the newly constructed Monocacy Interceptor. Wastewater will be conveyed to the Township's wastewater treatment plant.

D. Use of Community Land Disposal

Refer to the discussion in Section V.A.4. regarding community land disposal for needs areas. Further consideration of community land disposal options will not be considered since the needs areas identified in Section IV will be served by a

public wastewater collection/conveyance system with the wastewater ultimately being conveyed to the Township's wastewater treatment plant.

E. Retaining Tanks

The Township is not aware of any holding tanks beyond those that had been previously abandoned and connected to the sewer. As stated in prior planning, holding tanks are not a viable option as a long-term solution. They are more of an interim measure with the ultimate goal of connecting users to a central collection system.

F. Sewage/Septage Management Program

A sewage management program and ordinance was implemented as part of previous planning. Refer to the documentation in Appendix Y which details this program.

The program applies to the following:

1. All persons owning any property serviced by an on-lot sewage disposal system.
2. All persons installing, altering, or rehabilitating an on-lot disposal system (whether individual or community).
3. All persons owning any property serviced by a community sewage system.

The program also has provisions for inspections every three years along with "pump-outs" of systems based on region or area of the Township.

Any person owning a building served by an on-lot disposal system shall have the septic tank pumped by a licensed hauler within three (3) years after the effective

date of the ordinance in accordance with a schedule and regions developed by the Township. Pump outs will follow at a rate of at least once every three years thereafter.

An SEO shall have the authority to require repairs of any malfunctioning system. For each violation of the ordinance, the responsible party shall be subject to a fine not less than \$500.00 nor more than \$5,000.00.

G. Non-Structural Comprehensive Planning

The Berks County Planning Commission and Amity Township both have comprehensive plans in place. No revisions to these plans are anticipated to accommodate the technical alternatives presented in this section.

H. No Action Alternative

Aside from the Bel Air Estates and Valley Road area, no major problem areas were identified based on the well water and OLDS surveys. However, with projected development planned to occur in identified public sewer service areas, public sewer needs have been identified.

Impacts:

1. Water Quality and Public Health

A “no action” approach would have a negative impact by limiting the expansion of the sewage treatment plant. That would encourage residential growth using OLDS. Even with the best systems, there is a greater potential for ground water contamination from a large number of OLDS than from a central treatment plant.

2. Growth Potential

Amity Township continues to experience one of the highest rates of growth in Berks County. Sewer capacity at the Township's wastewater treatment plant has been allocated. A "no action" approach would prevent or limit additional residential, commercial, and industrial development.

3. Community and Economic Conditions

The rapid growth in the Township continues to place an additional burden on the Township's infrastructure, and the Township sees a need to expand its tax base beyond the residential sector. The Township has a small industrial base, currently concentrated in two areas (along the southern portion of Route 662, and south of Route 422). The Township would like to expand that base, which is not possible at this time due to lack of sewer capacity and potential sites with available sewer service. A "no action" approach would negatively impact the possibility of growing the local economy.

4. Recreational Opportunities

This section applies primarily to the impact on high quality waterways used for recreational purposes. The small creeks running through Amity Township, the Monocacy and Manatawny and their tributaries, have very limited recreational use. The Schuylkill River has some limited recreational use as well (primarily canoeing and "tubing"). A "no action" alternative would have no appreciable impact on the recreational values of any of these watercourses.

5. Drinking Water Sources

All drinking water in Amity Township comes from underground sources, either from private on-site wells, or from Pennsylvania-American Water Company, which obtains its water from wells. The city of Pottstown, several miles downstream from the sewage treatment plant, obtains its drinking water from the Schuylkill River. A “no action” plan would result in some minor degradation of ground water over time, and probably have no measurable impact on the Schuylkill River as a drinking water source.

6. Other Environmental Concerns

No other environmental concerns were identified during this Plan.