

5.1 POTENTIAL WASTEWATER TREATMENT ALTERNATIVES

Rules and regulations pertaining to the content of Act 537 plans are contained in Title 25 Pennsylvania Code Chapter 71. These rules and regulations require that each Act 537 plan present and evaluate alternatives for sewage service within the municipality. The following sections present several alternatives available to the Township for meeting the wastewater planning needs identified in Chapter 4. The alternatives considered in this chapter include the following:

1. Conventional collection, conveyance and treatment systems.
2. Community On-lot Disposal Systems (COLDS).
3. Continued use of on-lot disposal systems.
4. Small flow or package treatment facilities.
5. Holding tanks.
6. Sewage management programs.
7. Non-structural/Planning activities.
8. No action alternative.

These broad alternatives are then applied to the Study Areas to alleviate environmental and health impacts resulting from malfunctioning on-lot systems in the areas. Nine (9) focused alternatives to provide public sewer service to the Study Areas are presented and evaluated to determine whether they are cost-effective, environmentally sound and structurally feasible:

- 1A. New package wastewater treatment plant serving Ritzie Village Study Area with gravity flow;
- 1B. New package wastewater treatment plant serving Ritzie Village Study Area with pumping station;
- 1C. Conveyance of wastewater flow from the Ritzie Village Study Area to existing Fishing Creek Elementary WWTP;
- 2A. Conveyance of wastewater flow from Houck Manor Study Area to WHTWSA's collection system with gravity flow and pumping station;
- 2B. Conveyance of wastewater flow from Houck Manor Study Area to WHTWSA's collection system with combination of gravity and low pressure system and pumping station;
- 2C. Conveyance of wastewater flow from Houck Manor Study Area to WHTWSA's collection system with gravity flow and pumping station – alternate force main routing;
- 2D. Conveyance of wastewater flow from Houck Manor Study Area to WHTWSA's collection system with gravity flow;
3. Conveyance of wastewater flow from Holiday Park Study Area to Houck Manor collection system;
4. Conveyance of wastewater flow from Short Street Study Area to WHTWSA's collection system using low-pressure system.

As identified in Section 3.1 of this plan, West Hanover Township has purchased 414,000 gpd of treatment capacity at the Swatara Township Authority (STA) WWTP which has gone unused to this point. Wastewater flows from Westford Crossing and Country Manor Farms within the Township are conveyed to the STA WWTP through Lower Paxton Township Authority's (LPTA) Beaver Creek Interceptor. This chapter also presents alternatives relative to the use of the purchased reserve capacity at the STA WWTP. The following alternatives were considered:

1. Re-routing of wastewater flows from Westford Crossing and Country Manor Farms to existing WHTWSA collection system;
2. Increased flow to LPTA collection and conveyance facilities/utilization of reserved STA WWTP capacity; and
3. No action.

5.2 CONVENTIONAL COLLECTION, CONVEYANCE AND TREATMENT SYSTEMS

The Study Areas identified in this Act 537 Plan currently are not served by public sewers. The Holiday Park, Houck Manor and Short Street areas could be connected to the existing West Hanover Township Water and Sewer Authority facilities via new interconnecting public sewage collection and conveyance facilities consisting of gravity sewers, pumping stations and force mains or alternative collection systems. Treatment would occur at the existing WHTWSA WWTP.

5.2.1 Conveyance Alternatives

Conveyance alternatives available include conventional type gravity sewers and innovative/alternative solutions such as low-pressure sewers and grinder pump or STEP systems. The September 1992 EPA Manual "Wastewater Treatment/Disposal for Small Communities" examines the advantages and disadvantages of these systems.

Conventional Gravity Sewers

Conventional gravity sewers convey wastewater by using gravity or the differential elevations between the upstream and downstream points in the system. The sewers must be set deep enough to receive flows from individual buildings. The building sewer or lateral is typically comprised of 4-inch or 6-inch diameter pipe laid at a minimum slope of 1%. Building sewers connect directly to the collecting sewers. Where financially feasible, the collecting sewer is set at a depth that is capable of receiving basement flows. Conventional gravity sewers are constructed to meet minimum state and local requirements. Generally, they are constructed of 8-inch diameter or larger pipe with access manholes spaced a maximum of 400 feet apart and at each change of direction. Some deviations to these minimum standards are allowable. Conventional systems are connected directly to existing or proposed conveyance and treatment systems. The feasibility of conventional gravity sewers is dependent on factors such as topography, presence of rock, high groundwater tables, and density of homes. The costs of a conventional gravity system can vary dramatically depending on these factors.

Low-pressure Systems

Low-pressure systems including Septic Tank Effluent Pump (STEP) systems and Grinder Pump (GP) systems are an alternative to conventional gravity systems. STEP systems convey septic tank effluent to the treatment plant by way of low-pressure sewer lines. GP systems shred or reduce the size of raw wastewater solids, producing a pumpable slurry which is conveyed to the treatment plant through low-pressure sewer lines. Pressure sewers (STEP and GP) are most cost-effective in areas where the terrain is rolling, or the line needs to be close to the surface due to low depth to bedrock or a high water table. Pressure sewers have the disadvantage that the material is highly septic and odor problems may arise. STEP systems have the further disadvantage that the tanks need to be regularly maintained, otherwise solids may work their way into the lines causing blockages.

The most common type of alternative system in use today is the GP system. Due to the relatively favorable track record associated with this type of system, the GP system is considered most feasible for the Study Areas and will be further evaluated against the use of conventional gravity sewers where feasible.

When discussing GP systems, it is necessary to consider both the on-lot element as well as the collection system elements. The on-lot elements of a GP system consist of 4-inch or 6-inch building sewer that conveys household sewage to an on-lot pump station. On existing homes, either a new connection is made to the existing plumbing system or the existing building sewer is intercepted by the new building sewer and directed to the pump station. The on-lot pump station typically consists of a fiberglass basin with a minimum capacity of 50 gallons. The pumps are either centrifugal or semi-positive displacement units with 1-2 HP motors. The basin includes appropriate valves for isolation of the pumps. Each basin package is provided with a pump control panel, which can either be located remotely at the house or locally at the pump station.

The second component of any GP system is the collection system. A typical low-pressure sewer system consists of small diameter, plastic, pressure piping. All piping downstream of the grinder pump is under low pressure, usually 60 psi or less. The low-pressure collection system is arranged as a branch network with no loops in the system. Appurtenances of a low-pressure system consist of in-line and terminal clean-outs located at 400'-600' intervals, at changes in direction or at changes in pipe size. Air release valves are located within the system at all high points. Isolation valves are installed strategically throughout the system to facilitate maintenance. Discharge from the low-pressure system can be directly routed to a treatment plant provided the difference in elevation is not significant, or to a conventional collection or conveyance system. GP systems have been most applicable in areas where the topography is very flat, significant rock may be present, high groundwater table is present, or where the system outfall is at a higher elevation than the service area.

Collection System Construction Costs

Typically, an Authority or Municipality would be responsible for the construction and funding of an extension of public facilities to a previously developed area. In the case of a new development, sewage facilities are generally extended by the developer at their cost and dedicated to the Authority or Municipality under a written agreement. Estimates of construction cost, overall project cost and present worth of annual operating costs are included in the focused assessment of the Study Areas in Section 5.10.

5.2.2 Repair and/or Replacement of Collection and Conveyance System Components

No alternatives are anticipated which would facilitate the need for repair or replacement of existing collection or conveyance system components. The Authority should continue to maintain its existing collection and conveyance systems and perform routine inspections to detect and repair sources of infiltration and inflow. The existing pump stations have capacities that will facilitate expansion of the system, including the extension of public service to the Study Areas or other new developments.

5.3 COMMUNITY ON-LOT DISPOSAL SYSTEMS (COLDS)

Community On-lot Disposal Systems, or COLDS, are essentially small, centralized collection systems that serve isolated developed areas and involve the discharge of treated effluent to the subsurface. Many COLDS simply consist of a large septic tank followed by an absorption bed, while others consist of a conventional treatment plant whose effluent is discharged into the subsurface.

COLDS commonly service relatively small, isolated communities (i.e. less than 50 EDU's); however, there are some large COLDS that service larger communities of several hundred households. As mentioned in Section 3.3, a COLDS serves the Walnut Run Subdivision in the Township. Septic tank effluent from seven (7) residences in the Walnut Run subdivision is pumped to an absorption area consisting of two (2) elevated sand mounds. As shown in Map 5, areas of the Township contain soils rated suitable and marginally suitable for COLDS utilizing sand mound absorption systems, however there is a lack of these soils near the isolated areas of Ritzie Village and Holiday Park. Further study and fieldwork would be required to determine whether COLDS are feasible in the Township on a case-by case basis.

5.4 CONTINUED USE OF ON-LOT DISPOSAL SYSTEMS

Based on the sanitary survey conducted as part of this Act 537 Plan and outlined in Chapter 3, there is no immediate need to provide improved wastewater collection, conveyance or treatment systems to areas of the Township utilizing on-lot systems. As a result, these areas of the Township will continue to utilize on-lot disposal systems. Due to soil limitations, continued use of on-lot systems within the Township should be strictly monitored for protection against system malfunction, and careful evaluation of proposed building sites and continued implementation of the Township's On-lot Management Ordinance will be necessary to prevent OLDS problems.

5.4.1 Repair, Replacement or Upgrading of Existing Malfunctioning Systems

The Township's On-lot Management Ordinance allows the Township's certified SEO to require the repair of any on-lot 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 a gravity distribution system with a pressurized system, replacing the system with a holding tank, or other alternatives as appropriate for the specific site.

The Ordinance also establishes regulations governing replacement areas for malfunctioning on-lot systems. All new lots constructed in the Township require testing to identify both an original site and a replacement site available for future malfunctions of the original on-lot system.

The expansion or replacement of malfunctioning on-lot systems is suggested in areas of the Township where lot sizes are large enough to allow for the expansion or replacement of the system without impacting nearby drinking water supplies or causing other environmental hazards. In areas of the Township where lot sizes are small, such as in the Study Areas, the expansion or replacement of malfunctioning systems may not be feasible.

5.4.2 Water Conservation

Another method for improving the operation of on-lot systems is to encourage the use of water conservation devices. The On-lot Management Ordinance states that in lieu of repair by methods mentioned 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 replaced by water conserving devices and appliances. Wastewater generation in the structure may also be reduced by requiring changes in water use patterns in the structure served. The use of laundry facilities may be limited to one load per day or discontinued altogether.

5.5 SMALL FLOW OR PACKAGE TREATMENT FACILITIES

As detailed in Section 3.2, several small flow treatment facilities and package wastewater treatment plants within the Township have been abandoned following the extension of public sewers and the closing of the Fishing Creek Elementary School. These types of systems may be suitable for wastewater treatment in isolated areas of the Township where on-lot malfunctions are present such as the Ritzie Village Study Area but are generally discouraged within the Township.

5.5.1 Small Flow Treatment Facilities

As defined by DEP, small flow treatment facilities (SFTFs) serve from one to five single-family residences, small commercial establishments, or other sources that generate 2,000 gallons per day or less of domestic-strength wastewater. These facilities can reduce BOD, TSS, and nitrates through the use of a septic tank on each lot, an optional aerobic treatment tank, a biochemical filter, a disinfection system and tank, and an outfall sewer. They discharge to a stream, dry stream channel, or other land application (with appropriate safeguards). If an SFTF will use land disposal or a dry stream channel discharge for final disposal, a hydrogeologic evaluation must be completed to ensure drinking water sources will be protected and that effluent will not create a public health hazard or nuisance. SFTFs can be used as an alternative replacement for malfunctioning systems, or as an alternative for new construction when soils are not suitable for other systems.

The location and type of system installed will dictate the level of permitting required. Certain systems have been approved by DEP for coverage under General Water Quality Management (WQM) and National Pollutant Discharge Elimination System (NPDES) Permits. Systems not meeting the DEP requirements, or that propose discharge to a High Quality (HQ) or Exceptional Value (EV) water, must obtain Individual WQM and NPDES Permits. The Individual permitting process has additional requirements and complexities beyond the General permitting process.

SFTFs may not be located in soils that are unsuitable for conventional systems, floodways, wetlands, or areas mapped as floodplain soils or as a flood-prone area when completed FEMA mapping is not available. DEP-approved SFTF filtration systems use various configurations, including subsurface or accessible filters and single-pass (intermittent) or recirculating flow regimes. Each configuration has advantages or disadvantages for individual applications. Site and wastewater characteristics, as well as treatment goals should be examined in the choice of configuration and filter media for each individual application.

5.5.2 Package Wastewater Treatment Systems

Package treatment plants are prefabricated and pre-engineered systems that have been used primarily to treat sewage generated by mobile home parks, institutions, commercial facilities, and small communities. The plants that are on the market today are capable of meeting stringent discharge requirements, including suspended solids, biochemical oxygen demand (BOD), and nitrate-nitrogen limits. The package system generally arrives at the plant construction site as one or more modular units, which can be readily assembled by the contractor. The system usually includes a flow equalization tank, screen or comminutor, aeration tank, aeration system (diffused air or mechanical), final clarifier, chlorine contact tank, and sludge handling/disposal components. There are many advantages and disadvantages associated with package treatment systems. The following advantages should be considered:

- Minimal size requirements and site preparation.
- Relatively easy to install/short construction times.
- Lower capital cost than most mechanical systems.
- Capability to achieve high effluent quality.
- Low sludge production compared to other similar activated sludge processes.

Some disadvantages of the package system include:

- Requires more highly trained operator.
- Higher O&M costs than other mechanical systems.
- Limited operational flexibility.
- Susceptible to poor settling characteristics due to nitrification or formation of pin floc in the final clarifier.
- May require additional components or equipment to meet special effluent limits, such as phosphorus removal.
- Generates a sludge stream.

5.5.3 Operation and Maintenance of SFTFs and Package Wastewater Treatment Plants

The complexity of these systems requires increased operation and maintenance on the part of the owner. If not cared for properly, these systems can result in health nuisances or pollution problems. To ensure the proper operation and maintenance of the facility, the permit will require a level of inspection, operation, monitoring, maintenance, and reporting to be conducted by a qualified person. It is recommended that the Township or the Authority own and operate these facilities to ensure the proper operation and maintenance of these facilities. In the case of individual ownership, the Township may require specific operation and maintenance requirements based upon one or more of the methods acceptable to the DEP.

5.6 HOLDING TANKS

As indicated in Table 3-3, West Hanover Township has issued sewage holding tank permits for properties with malfunctioning OLDS systems. Holding tanks are vessels designed and constructed to store sewage prior to ultimate disposal at another site. Pumper trucks are the preferred method of conveyance of holding tank wastes. Due to the high maintenance costs resulting from frequent pumping, holding tanks are not considered to be a viable long-term alternative for typical residential demands. However, they may be viable solutions for commercial or industrial sites with minimal wastewater flow.

The Township's On-lot Management Ordinance states that installation of a holding tank may be required by the Township's certified SEO as a rehabilitative measure to repair an on-lot malfunction. In the event that rehabilitative measures are not feasible or do not prove effective, the Township may require the owner to apply for a permit to construct a holding tank. It is recommended that the Township continue to issue holding tank permits as required for the temporary repair of malfunctioning on-lot systems.

5.7 SEWAGE MANAGEMENT PROGRAMS

As described in Section 1.2.1, West Hanover Township adopted the current On-lot Management Ordinance in September 1993. A copy of the ordinance is included in Appendix F. The On-lot Management Ordinance provides for the permitting, inspection, maintenance and rehabilitation of the Township's on-lot systems. It is estimated that there are approximately 1,270 properties served by individual on-lot disposal systems in West Hanover Township. Most of these properties contain private drinking water wells.

It is recommended that the Township continue to enact the On-lot Management Ordinance and update the ordinance as necessary to assure the long-term operation of the existing and new on-lot disposal systems in the Township and to preserve the water quality of the private wells. It does not appear that new sewage management programs or alterations to the existing On-lot Management Program are needed at this time.

5.8 NON-STRUCTURAL/PLANNING ACTIVITIES

West Hanover Township's Comprehensive Plan was adopted in 2005 as noted in Chapters 1 and 4. The Township's Zoning and Subdivision and Land Development Ordinances have been enacted to protect the public health while accommodating community growth. Map 10 in Appendix J presents the Township's approved zoning map. The Township retains a Zoning Officer to oversee implementation and enforcement of its Zoning and Land Development Ordinances. The Township's SEO is charged with enforcing compliance with the Township's On-lot Management Ordinance for protection of groundwater resources.

Existing zoning and minimum lot sizes discussed in Chapter 4 provide for low-density land uses in areas where public water and sewer service are not scheduled for installation. It is the intent of the Township that on-lot sewage disposal systems continue to serve the low density areas of the Township to the extent practical, based on individual site limitations.

The existing Township rules, regulations and planning activities appear sufficient to sustain the anticipated level of development in the Township as long as sufficient public sewage facilities are provided to handle anticipated growth rates within the Designated Growth Area as described in Chapter 4. It does not appear that new non-structural planning activities are needed at this time.

5.9 NO ACTION ALTERNATIVE

The no action alternative is the continued use of residential on-lot systems in the unsewered portions of the Township. The impacts of no action to address existing, short-term, and long-term sewage facilities include several considerations. Most of the discussion within this Plan has focused on the environmental and public health and safety concerns associated with the functioning of existing on-lot sewage systems in West Hanover Township. While the sanitary survey found a low proportion of suspected or confirmed malfunctions in all areas of the Township, the soils in the Township indicate a risk of potential malfunctions. The obvious impacts of no action to improve any adverse conditions encountered include degradation of public water supplies, disease, loss of recreational use of waterways, environmental hazards, such as fish kills, and other tragedies. Economically, the no action alternative could restrict or prohibit growth to the Township's Designated Growth Area. Without facilities to accommodate potential growth, developers will be left to build their own facilities or locate elsewhere. Due to the potential negative impacts of the no action alternative, alternatives to provide improved sewage facilities to the Study Areas have been identified and are presented below.

5.10 STRUCTURAL ALTERNATIVES FOR STUDY AREAS

As discussed throughout this Act 537 Plan, there is no immediate need for improved sewage facilities in West Hanover Township based on the sanitary survey and well water sampling conducted during the preparation of this Plan. However, alternatives to provide improved sewage facilities to the Study Areas are evaluated in the sections below. Nine (9) focused alternatives are presented below and evaluated on the basis of cost-effectiveness, environmental soundness, and structural feasibility. Cost estimates are prepared for comparative purposes when applicable and detailed in Tables 5-1 to 5-9. Present worth, annual debt service, annual O&M and total annual cost per EDU for each alternative are presented in Tables 5-10 and 5-11. Annual debt service is estimated based on a 20-year, 3.172% term as provided by PENNVEST funding and a 20-year 5.25% term as provided by tax exempt financing. Actual debt service will depend on the financing scheme chosen and the actual finances of the project when completed. Present worth is estimated based on a 20-year, 4.25% term. Maps of the structural alternatives are presented in Appendix I.

5.10.1 Alternatives for Ritzie Village Study Area

Due to the remote location of the Ritzie Village Study Area and its distance from the existing WHTWSA WWTP, conveyance of wastewater flows from the Ritzie Village Study Area to the WHTWSA WWTP is economically unfeasible. In order to provide improved sewage treatment for the Ritzie Village Study Area, a package wastewater treatment facility must be constructed. The package wastewater treatment facility would be located along Fishing Creek Valley Road with discharge to Fishing Creek (WWF – Warm Water Fishery). The treatment plant size is based on an average daily flow rate of 235 gpd/EDU for the estimated 89 EDUs in the area. Ritzie Village alternatives 1A and 1B collect wastewater from each residence in the Ritzie Village Study Area with conveyance to the package wastewater treatment plant via gravity flow (1A) or pumping stations (1B).

Alternative 1A includes the conveyance of wastewater flows from the Ritzie Village Study Area to the package facility via gravity sewers. A pumping station located along Fishing Creek is included in this alternative to convey the collected flows to the package facility. Alternative 1B includes a pumping station to convey wastewater flows from Ritzie Village to a proposed pumping station to be located at the intersection of Fishing Creek Valley Road and Sleepy Hollow Road. The Ritzie Village pumping station would be located near the intersection of Mountain Road and Birchwood Road with discharge to proposed gravity sewers located along Mountain Road.

The Ritzie Village alternatives include the conveyance of wastewater flows from residences along Fishing Creek Valley Road and Sleepy Hollow Road via proposed gravity sewers. Individual grinder pumps are included in the alternatives to convey flows from select residences along Fishing Creek Valley Road, Sleepy Hollow Road, A.V. Acri Road and Maplewood Drive to the proposed gravity sewers.

Upon recommendation by the Township Board of Supervisors, an alternative to provide wastewater treatment for the Ritzie Village Study Area utilizing the existing WWTP at the Fishing Creek Elementary School was investigated. Alternative 1C collects wastewater from the Ritzie Village Study Area with conveyance to the existing Fishing Creek Elementary School wastewater treatment facility. A pumping station located at the intersection of Fishing Creek Valley Road and Sleepy Hollow Road is included in this alternative to convey collected wastewater flows to the WWTP.

A file review was conducted at DEP's Southcentral Regional Office to obtain information relative to the Fishing Creek Elementary WWTP and existing permits for the facility. Prior to the closing of the school, the WWTP operated under National Pollutant Discharge Elimination System (NPDES) permit number PA0081779. The permit is valid from 8/1/01 through 8/1/06. The permitted discharge of the facility is 0.0052 million gallons per day (5,200 gpd). A 30,000 gpd facility is proposed in Alternatives 1A and 1B to serve the Ritzie Village Study Area. Major upgrades and modifications to the existing WWTP are required to accommodate treatment of the wastewater flows from the Ritzie Village Study Area.

Alternative 1C was found to be the most costly of the structural alternatives providing public sewer service to the Ritzie Village Study Area due to costs associated with the conveyance of flows to the WWTP and required upgrades to the facility. Due to capacity limitations, age of the existing treatment facility and estimated project costs, Alternative 1C is eliminated from further consideration in this Act 537 Plan.

5.10.2 Alternatives for Houck Manor Study Area

Alternatives 2A and 2B collect wastewater flows from each residence in the Houck Manor Study Area via gravity (2A) or a combination gravity/low-pressure system (2B) with conveyance to an existing WHTWSA collection system for ultimate treatment at the WHTWSA WWTP. Both alternatives include a pumping station to be located at the intersection of Piketown Road and Linglestown Road to convey flows to an existing manhole near the Central Dauphin High School. Individual grinder pumps are included to convey flows from six (6) residences along Linglestown Road to the proposed gravity sewers. As previously discussed in Chapter 4, Pheasant Road was removed from the sewer service area serving the Houck Manor Study Area in order to obtain consistency with the Designated Growth Area as identified in the Township's Comprehensive Plan. A low percentage of confirmed on-lot malfunctions were observed on Pheasant Road during the sanitary survey completed during the preparation of this Act 537 Plan.

Alternative 2B includes eight (8) additional individual grinder pumps and low-pressure sewers to convey wastewater flows from residences along Chestnut Avenue and Walnut Avenue to the proposed gravity sewers for conveyance to the proposed pumping station. Alternative 2A utilizes gravity sewers to convey wastewater flows from these residences.

Alternative 2C modifies the routing of the force main from the proposed pump station at the intersection of Linglestown Road and Piketown Road included in Alternative 2B. In this alternative, wastewater flows from the pumping station are conveyed to existing sanitary sewers constructed to serve the proposed Winslett subdivision. Ultimate treatment of wastewater is provided at the WHTWSA WWTP in this alternative.

Alternative 2D includes the conveyance of wastewater flows from the Houck Manor Study Area to existing sanitary sewers located along Piketown Road by gravity flow along Beaver Creek with ultimate treatment provided at the WHTWSA WWTP. The proposed pumping station at the Linglestown Road/Piketown Road intersection has been removed from this alternative. This alternative will require the replacement of two existing sanitary sewer lines and two manholes in Piketown Road near the Central Dauphin High School to accommodate the depth of the gravity sewer along Beaver Creek.

Alternative 2D was found to be the most inexpensive structural alternative providing public sewer service to the Houck Manor Study Area due to the elimination of the pumping station from this alternative. Elimination of the proposed pumping station will also result in a decrease in future operation and maintenance expenses.

5.10.3 Alternatives for Holiday Park Study Area

Alternative 3 provides for the conveyance of wastewater flows from the Holiday Park Study Area to the Houck Manor collection system proposed in Alternative 2D. The collection system proposed in Alternative 3 and associated project cost estimate assumes the construction of the Houck Manor collection system to convey wastewater flows from Holiday Park to an existing WHTWSA collection system.

Wastewater flows from the Holiday Park Study Area will be conveyed to the Houck Manor collection system utilizing a gravity collection system. Individual grinder pumps are included to convey flows from three (3) residences along Piketown Road to the gravity sewers via low-pressure sewer.

At the request of the West Hanover Township Board of Supervisors, an additional structural alternative providing public sewer service to the Holiday Park Study Area was prepared. This alternative included the construction of a pumping station near the Moyer Road/Piketown Road intersection with force main connection to existing sanitary sewers constructed to serve the proposed Winslett subdivision. In this alternative approximately 56 homes will receive public sewer service, 18 less than in Alternative 3. Total projects costs for this alternative were determined to be equivalent to those associated with Alternative 3, however due to the decrease in user base and possible increase in operation and maintenance costs associated

with the pumping station, this alternative is eliminated from further consideration in this Act 537 Plan.

5.10.4 Alternative for Short Street Study Area

Alternative 4 utilizes individual grinder pumps to convey wastewater flows from five (5) residences along Short Street to the existing WHTWSA collection system for ultimate treatment at the WHTWSA WWTP through low-pressure sewer. The low-pressure sewer will discharge to an existing manhole located along Short Street.

This alternative represents the most technically feasible and cost-effective solution for wastewater management in the Short Street Study Area. Alternatives utilizing gravity sewers to convey wastewater from Short Street would require the construction of a pumping station and force main to convey flows to an existing WHTWSA collection system and would prove more costly.

5.10.5 No Action Alternative

The No Action structural alternative represents the status quo. It proposes the continued repair and construction of on-lot facilities in compliance with Chapter 72 Standards and under the guidance and permitting of the Township's SEO. In some cases these systems will not be feasible based on the site limitations, including soil and slope and space restrictions. In these instances Best Technical Guidance (BTG) permits will be the only option and should be installed under close scrutiny by the SEO. These BTG repairs do not assure the proper function of an on-lot system, they represent the best solution available for a limited site. As such, systems with BTG repairs are still considered to be "confirmed malfunctions" in the sanitary survey procedure.

This option represents the least upset to the community and status quo; however, it does not address the issues raised in the sanitary survey – those of greywater discharges, malfunctioning systems and fecal contamination of wells in the Study Areas. Greywater discharge malfunctions could be alleviated by connecting them to existing on-lot treatment systems, however it is likely that the systems will fail under the increased loading – a potential recognized by the citizens as indicated by the large number of untreated greywater discharges.

The restricted ability to repair and replace on-lot systems in the Study Areas has been discussed with the SEO. Costs for repair and replacement of systems will vary greatly from property to property; therefore, a realistic cost estimate for comparison purposes could not be prepared for this alternative.

5.10.6 Comparative Cost Estimates of Study Area Structural Alternatives

Using the assumptions outlined above, several cost opinions were prepared to use as a basis to compare the cost effectiveness of each structural alternative. Where applicable, a direct cost comparison of alternatives has been provided. Annual costs per EDU are based on these project costs and an assumed loan on the full project cost of 3.172% and 5.25% for 20 years. In reality, grant funding or other capital contributions may be available, and loans with lower interest rates or longer terms may be secured. It should be noted that the cost estimates prepared in this Act 537 Plan are first level cost estimates appropriate for planning level detail and should not be considered as final costs for financing purposes.

Tables 5-1 to 5-9 present the cost estimates for the structural alternatives and Tables 5-10 and 5-11 summarize them. Tables 5-10 and 5-11 include the estimated annual cost per WHTWSA EDU for payment of annual debt service for each alternative. As a means of comparison, the West Hanover Township Water and Sewer Authority currently has a flat user rate of \$25 per residential EDU per month or \$300 per residential EDU per year.

The structural alternatives providing public sewer service to the Ritzie Village Study Area were found to be the most costly of all the structural alternatives evaluated in this Plan and resulted in the greatest annual cost per WHTWSA user. Alternative 1A was found to be the least expensive structural alternative serving the Ritzie Village Study Area. Estimated annual cost per WHTWSA user for construction of Alternative 1A is approximately \$115/year. Alternative 2D was found to be the least expensive structural alternative serving the Houck Manor Study Area. Estimated annual cost per WHTWSA user for construction of Alternative 2D is approximately \$44/year. The cost estimate prepared for Holiday Park Alternative 3 does not include costs associated with construction of the proposed Houck Manor collection system. Estimated annual cost per WHTWSA user for construction of Alternative 3 is approximately \$43/year in addition to costs associated with construction of Alternative 2D. Construction of Short Street Alternative 4 would result in the lowest annual cost per WHTWSA user of approximately \$3/year.

Table 5-1 Cost Opinion for Ritzie Village Alternative 1A

PROJECT COST ESTIMATE FOR WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE RITZIE VILLAGE ALTERNATIVE 1A PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC. June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$131,000.00	\$131,000.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$52,400.00	\$52,400.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	2,800	L.F.	\$55.00	\$154,000.00
4	8" PVC PIPE - TOWNSHIP ROAD	9,405	L.F.	\$94.00	\$884,070.00
5	8" PVC PIPE - PENNDOT	2,350	L.F.	\$105.00	\$246,750.00
6	6" SERVICE LATERAL PIPE	1,500	L.F.	\$63.00	\$94,500.00
7	4" PVC FORCE MAIN - OUTSIDE TOWNSHIP ROAD	50	L.F.	\$38.00	\$1,900.00
8	WYE	89	EA.	\$70.00	\$6,230.00
9	CLAY DIKE	73	EA.	\$100.00	\$7,300.00
MANHOLES					
10	MANHOLES, 4-FOOT DIAMETER	74	EA.	\$2,300.00	\$170,200.00
SURFACING					
11	TEMPORARY PAVING/SURFACING	12,205	L.F.	\$4.00	\$48,820.00
STREAM CROSSINGS					
12	8" PVC PIPE	60	L.F.	\$250.00	\$15,000.00
HIGHWAY CROSSINGS					
13	8" PVC PIPE	50	L.F.	\$350.00	\$17,500.00
LOW PRESSURE SEWER					
14	LPS MAIN - TOWNSHIP ROAD	450	L.F.	\$41.00	\$18,450.00
15	LPS LATERAL	1,370	L.F.	\$25.00	\$34,250.00
16	GRINDER PUMP - SIMPLEX	14	EA.	\$7,200.00	\$100,800.00
17	ONLINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
18	END LINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
PUMP STATION					
19	PUMPING STATION	1	L.S.	\$200,000.00	\$200,000.00
PACKAGE WWTP					
20	30,000 GPD EXTENDED AIR PACKAGE WASTEWATER TREATMENT PLANT	1	L.S.	\$615,000.00	\$615,000.00

ESTIMATED CONSTRUCTION COSTS	\$2,803,170.00
CONSTRUCTION CONTINGENCY @ 10%	\$280,317.00
ENGINEERING, ADMIN, & LEGAL FEES	\$539,610.23
TOTAL ESTIMATED PROJECT COSTS	\$3,623,097.23
ESTIMATED NUMBER OF EDUs TO BE SERVED	89
ESTIMATED CAPITAL COST PER EDU	\$40,708.96

Table 5-2 Cost Opinion for Ritzie Village Alternative 1B

PROJECT COST ESTIMATE FOR WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE RITZIE VILLAGE ALTERNATIVE 1B PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC. June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$138,000.00	\$138,000.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$55,000.00	\$55,000.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	150	L.F.	\$55.00	\$8,250.00
4	8" PVC PIPE - TOWNSHIP ROAD	9,405	L.F.	\$94.00	\$884,070.00
5	8" PVC PIPE - PENNDOT	2,350	L.F.	\$105.00	\$246,750.00
6	6" SERVICE LATERAL PIPE	1,500	L.F.	\$63.00	\$94,500.00
7	4" PVC FORCE MAIN - OUTSIDE TOWNSHIP ROAD	200	L.F.	\$38.00	\$7,600.00
8	4" PVC FORCE MAIN - TOWNSHIP ROAD	800	L.F.	\$56.00	\$44,800.00
9	4" PVC FORCE MAIN - PENNDOT	1,075	L.F.	\$60.00	\$64,500.00
10	WYE	89	EA.	\$70.00	\$6,230.00
11	CLAY DIKE	60	EA.	\$100.00	\$6,000.00
MANHOLES					
12	MANHOLES, 4-FOOT DIAMETER	61	EA.	\$2,300.00	\$140,300.00
SURFACING					
13	TEMPORARY PAVING/SURFACING	13,230	L.F.	\$4.00	\$52,920.00
STREAM CROSSINGS					
14	8" PVC PIPE	40	L.F.	\$250.00	\$10,000.00
HIGHWAY CROSSINGS					
15	8" PVC PIPE	50	L.F.	\$350.00	\$17,500.00
LOW PRESSURE SEWER					
16	LPS MAIN - TOWNSHIP ROAD	450	L.F.	\$41.00	\$18,450.00
17	LPS LATERAL	1,370	L.F.	\$25.00	\$34,250.00
18	GRINDER PUMP - SIMPLEX	14	EA.	\$7,200.00	\$100,800.00
19	ONLINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
20	END LINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
PUMP STATION					
21	PUMPING STATION	2	L.S.	\$200,000.00	\$400,000.00
PACKAGE WWTP					
22	30,000 GPD EXTENDED AIR PACKAGE WASTEWATER TREATMENT PLANT	1	L.S.	\$615,000.00	\$615,000.00
ESTIMATED CONSTRUCTION COSTS					\$2,949,920.00
CONSTRUCTION CONTINGENCY @ 10%					\$294,992.00
ENGINEERING, ADMIN, & LEGAL FEES					\$567,859.60
TOTAL ESTIMATED PROJECT COSTS					\$3,812,771.60
ESTIMATED NUMBER OF EDUs TO BE SERVED					89
ESTIMATED CAPITAL COST PER EDU					\$42,840.13

Table 5-3 Cost Opinion for Ritzie Village Alternative 1C

PROJECT COST ESTIMATE FOR WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE RITZIE VILLAGE ALTERNATIVE 1C PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC. June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$146,586.00	\$146,586.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$58,634.40	\$58,634.40
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	150	L.F.	\$55.00	\$8,250.00
4	8" PVC PIPE - TOWNSHIP ROAD	9,405	L.F.	\$94.00	\$884,070.00
5	8" PVC PIPE - PENNDOT	2,350	L.F.	\$105.00	\$246,750.00
6	6" SERVICE LATERAL PIPE	1,500	L.F.	\$63.00	\$94,500.00
7	4" PVC FORCE MAIN - OUTSIDE TOWNSHIP ROAD	800	L.F.	\$38.00	\$30,400.00
8	4" PVC FORCE MAIN - TOWNSHIP ROAD	800	L.F.	\$56.00	\$44,800.00
9	4" PVC FORCE MAIN - PENNDOT	3,400	L.F.	\$60.00	\$204,000.00
10	WYE	89	EA.	\$70.00	\$6,230.00
11	CLAY DIKE	61	EA.	\$100.00	\$6,100.00
MANHOLES AND APPURTENANCES					
12	MANHOLES, 4-FOOT DIAMETER	62	EA.	\$2,300.00	\$142,600.00
13	COMBINATION AIR RELEASE VALVE	1	EA.	\$4,000.00	\$4,000.00
SURFACING					
14	TEMPORARY PAVING/SURFACING	13,505	L.F.	\$4.00	\$54,020.00
STREAM CROSSINGS					
15	8" PVC PIPE	60	L.F.	\$250.00	\$15,000.00
HIGHWAY CROSSINGS					
16	8" PVC PIPE	50	L.F.	\$350.00	\$17,500.00
LOW PRESSURE SEWER					
17	LPS MAIN - TOWNSHIP ROAD	450	L.F.	\$41.00	\$18,450.00
18	LPS LATERAL	1,370	L.F.	\$25.00	\$34,250.00
19	GRINDER PUMP - SIMPLEX	14	EA.	\$7,200.00	\$100,800.00
20	ONLINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
21	END LINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
PUMP STATION					
22	PUMPING STATION	2	L.S.	\$200,000.00	\$400,000.00
WWTP UPGRADES					
23	UPGRADES TO EXISTING FISHING CREEK ELEMENTARY SCHOOL WWTP	1	L.S.	\$615,000.00	\$615,000.00

ESTIMATED CONSTRUCTION COSTS	\$3,136,940.40
CONSTRUCTION CONTINGENCY @ 10%	\$313,694.04
ENGINEERING, ADMIN, & LEGAL FEES	\$603,861.03
TOTAL ESTIMATED PROJECT COSTS	\$4,054,495.47
ESTIMATED NUMBER OF EDUs TO BE SERVED	89
ESTIMATED CAPITAL COST PER EDU	\$45,556.13

Table 5-4 Cost Opinion for Houck Manor Alternative 2A

PROJECT COST ESTIMATE FOR WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE HOUCK MANOR ALTERNATIVE 2A PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC. June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$68,000.00	\$68,000.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$27,500.00	\$27,500.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	4,800	L.F.	\$55.00	\$264,000.00
4	8" PVC PIPE - TOWNSHIP ROAD	4,930	L.F.	\$94.00	\$463,420.00
5	8" PVC PIPE - PENNDOT	720	L.F.	\$105.00	\$75,600.00
6	6" SERVICE LATERAL PIPE	1,040	L.F.	\$63.00	\$65,520.00
7	4" PVC FORCE MAIN - OUTSIDE TOWNSHIP ROAD	60	L.F.	\$38.00	\$2,280.00
8	4" PVC FORCE MAIN - TOWNSHIP ROAD	450	L.F.	\$56.00	\$25,200.00
9	4" PVC FORCE MAIN - PENNDOT	200	L.F.	\$60.00	\$12,000.00
10	WYE	58	EA.	\$70.00	\$4,060.00
11	CLAY DIKE	55	EA.	\$100.00	\$5,500.00
MANHOLES					
12	MANHOLES, 4-FOOT DIAMETER	56	EA.	\$2,300.00	\$128,800.00
SURFACING					
13	TEMPORARY PAVING/SURFACING	6300	L.F.	\$4.00	\$25,200.00
STREAM CROSSINGS					
14	8" PVC PIPE	60	L.F.	\$250.00	\$15,000.00
HIGHWAY CROSSINGS					
15	4" PVC FORCE MAIN	50	L.F.	\$350.00	\$17,500.00
LOW PRESSURE SEWER					
16	LPS LATERAL	520	L.F.	\$25.00	\$13,000.00
17	GRINDER PUMP - SIMPLEX	6	EA.	\$7,200.00	\$43,200.00
PUMP STATION					
18	PUMPING STATION	1	L.S.	\$200,000.00	\$200,000.00
ESTIMATED CONSTRUCTION COSTS					\$1,455,780.00
CONSTRUCTION CONTINGENCY @ 10%					\$145,578.00
ENGINEERING, ADMIN, & LEGAL FEES					\$291,447.16
TOTAL ESTIMATED PROJECT COSTS					\$1,892,805.16
ESTIMATED NUMBER OF EDUs TO BE SERVED					58
ESTIMATED CAPITAL COST PER EDU					\$32,634.57

Table 5-5 Cost Opinion for Houck Manor Alternative 2B

PROJECT COST ESTIMATE FOR WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE HOUCK MANOR ALTERNATIVE 2B PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC. June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$66,500.00	\$66,500.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$26,500.00	\$26,500.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	3,670	L.F.	\$55.00	\$201,850.00
4	8" PVC PIPE - TOWNSHIP ROAD	4,070	L.F.	\$94.00	\$382,580.00
5	8" PVC PIPE - PENNDOT	720	L.F.	\$105.00	\$75,600.00
6	6" SERVICE LATERAL PIPE	880	L.F.	\$63.00	\$55,440.00
7	4" PVC FORCE MAIN - OUTSIDE TOWNSHIP ROAD	60	L.F.	\$38.00	\$2,280.00
8	4" PVC FORCE MAIN - TOWNSHIP ROAD	450	L.F.	\$56.00	\$25,200.00
9	4" PVC FORCE MAIN - PENNDOT	200	L.F.	\$60.00	\$12,000.00
10	WYE	58	EA.	\$70.00	\$4,060.00
11	CLAY DIKE	47	EA.	\$100.00	\$4,700.00
MANHOLES					
12	MANHOLES, 4-FOOT DIAMETER	48	EA.	\$2,300.00	\$110,400.00
SURFACING					
13	TEMPORARY PAVING/SURFACING	6,740	L.F.	\$4.00	\$26,960.00
STREAM CROSSINGS					
14	8" PVC PIPE	60	L.F.	\$250.00	\$15,000.00
HIGHWAY CROSSINGS					
15	4" PVC FORCE MAIN	50	L.F.	\$350.00	\$17,500.00
LOW PRESSURE SEWER					
16	LPS MAIN - TOWNSHIP ROAD	1,300	L.F.	\$41.00	\$53,300.00
17	LPS LATERAL	1,150	L.F.	\$25.00	\$28,750.00
18	GRINDER PUMP - SIMPLEX	14	EA.	\$7,200.00	\$100,800.00
19	ONLINE FLUSHING STATION	2	EA.	\$2,500.00	\$5,000.00
20	END LINE FLUSHING STATION	2	EA.	\$2,500.00	\$5,000.00
PUMP STATION					
21	PUMPING STATION	1	L.S.	\$200,000.00	\$200,000.00
ESTIMATED CONSTRUCTION COSTS					\$1,419,420.00
CONSTRUCTION CONTINGENCY @ 10%					\$141,942.00
ENGINEERING, ADMIN, & LEGAL FEES					\$284,167.88
TOTAL ESTIMATED PROJECT COSTS					\$1,845,529.88
ESTIMATED NUMBER OF EDUs TO BE SERVED					58
ESTIMATED CAPITAL COST PER EDU					\$31,819.48

Table 5-6 Cost Opinion for Houck Manor Alternative 2C

PROJECT COST ESTIMATE					
FOR					
WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE					
HOUCK MANOR ALTERNATIVE 2C					
PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC.					
June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$68,500.00	\$68,500.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$27,500.00	\$27,500.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	3,670	L.F.	\$55.00	\$201,850.00
4	8" PVC PIPE - TOWNSHIP ROAD	2,795	L.F.	\$94.00	\$262,730.00
5	8" PVC PIPE - PENNDOT	720	L.F.	\$105.00	\$75,600.00
6	6" SERVICE LATERAL PIPE	880	L.F.	\$63.00	\$55,440.00
7	4" PVC FORCE MAIN - OUTSIDE TOWNSHIP ROAD	135	L.F.	\$38.00	\$5,130.00
8	4" PVC FORCE MAIN - PENNDOT	3,550	L.F.	\$60.00	\$213,000.00
9	WYE	58	EA.	\$70.00	\$4,060.00
10	CLAY DIKE	41	EA.	\$100.00	\$4,100.00
MANHOLES AND APPURTENANCES					
11	MANHOLES, 4-FOOT DIAMETER	42	EA.	\$2,300.00	\$96,600.00
12	COMBINATION AIR/VACUUM RELEASE VALVE	1	EA.	\$4,000.00	\$4,000.00
SURFACING					
13	TEMPORARY PAVING/SURFACING	8,365	L.F.	\$4.00	\$33,460.00
STREAM CROSSINGS					
14	8" PVC PIPE	60	L.F.	\$250.00	\$15,000.00
LOW PRESSURE SEWER					
15	LPS MAIN - TOWNSHIP ROAD	1,300	L.F.	\$41.00	\$53,300.00
16	LPS LATERAL	1,150	L.F.	\$25.00	\$28,750.00
17	GRINDER PUMP - SIMPLEX	14	EA.	\$7,200.00	\$100,800.00
18	ONLINE FLUSHING STATION	2	EA.	\$2,500.00	\$5,000.00
19	END LINE FLUSHING STATION	2	EA.	\$2,500.00	\$5,000.00
PUMP STATION					
20	PUMPING STATION	1	L.S.	\$200,000.00	\$200,000.00
ESTIMATED CONSTRUCTION COSTS					\$1,459,820.00
CONSTRUCTION CONTINGENCY @ 10%					\$145,982.00
ENGINEERING, ADMIN, & LEGAL FEES					\$292,255.96
TOTAL ESTIMATED PROJECT COSTS					\$1,898,057.96
ESTIMATED NUMBER OF EDUs TO BE SERVED					58
ESTIMATED CAPITAL COST PER EDU					\$32,725.14

Table 5-7 Cost Opinion for Houck Manor Alternative 2D

PROJECT COST ESTIMATE					
FOR					
WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE					
HOUCK MANOR ALTERNATIVE 2D					
PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC.					
June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$57,000.00	\$57,000.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$23,000.00	\$23,000.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	5,690	L.F.	\$55.00	\$312,950.00
4	8" PVC PIPE - TOWNSHIP ROAD	3,245	L.F.	\$94.00	\$305,030.00
5	8" PVC PIPE - PENNDOT	720	L.F.	\$105.00	\$75,600.00
6	6" SERVICE LATERAL PIPE	880	L.F.	\$63.00	\$55,440.00
7	WYE	58	EA.	\$70.00	\$4,060.00
8	CLAY DIKE	55	EA.	\$100.00	\$5,500.00
MANHOLES					
9	MANHOLES, 4-FOOT DIAMETER	56	EA.	\$2,300.00	\$128,800.00
SURFACING					
10	TEMPORARY PAVING/SURFACING	5,265	L.F.	\$4.00	\$21,060.00
STREAM CROSSINGS					
11	8" PVC PIPE	80	L.F.	\$250.00	\$20,000.00
HIGHWAY CROSSINGS					
12	8" PVC PIPE	50	L.F.	\$350.00	\$17,500.00
LOW PRESSURE SEWER					
13	LPS MAIN - TOWNSHIP ROAD	1,300	L.F.	\$41.00	\$53,300.00
14	LPS LATERAL	1,150	L.F.	\$25.00	\$28,750.00
15	GRINDER PUMP - SIMPLEX	14	EA.	\$7,200.00	\$100,800.00
16	ONLINE FLUSHING STATION	2	EA.	\$2,500.00	\$5,000.00
17	END LINE FLUSHING STATION	2	EA.	\$2,500.00	\$5,000.00
ESTIMATED CONSTRUCTION COSTS					\$1,218,790.00
CONSTRUCTION CONTINGENCY @ 10%					\$121,879.00
ENGINEERING, ADMIN, & LEGAL FEES					\$244,001.76
TOTAL ESTIMATED PROJECT COSTS					\$1,584,670.76
ESTIMATED NUMBER OF EDUs TO BE SERVED					58
ESTIMATED CAPITAL COST PER EDU					\$27,321.91

Table 5-8 Cost Opinion for Holiday Park Alternative 3

PROJECT COST ESTIMATE					
FOR					
WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE					
HOLIDAY PARK ALTERNATIVE 3					
PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC.					
June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$56,200.00	\$56,200.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$22,500.00	\$22,500.00
SEWER LINE					
3	8" PVC PIPE - OUTSIDE TOWNSHIP ROAD	2,475	L.F.	\$55.00	\$136,125.00
4	8" PVC PIPE - TOWNSHIP ROAD	7,225	L.F.	\$94.00	\$679,150.00
5	6" SERVICE LATERAL PIPE	1,420	L.F.	\$63.00	\$89,460.00
6	WYE	74	EA.	\$70.00	\$5,180.00
7	CLAY DIKE	47	EA.	\$100.00	\$4,700.00
MANHOLES					
8	MANHOLES, 4-FOOT DIAMETER	48	EA.	\$2,300.00	\$110,400.00
SURFACING					
9	TEMPORARY PAVING/SURFACING	7,775	L.F.	\$4.00	\$31,100.00
STREAM CROSSINGS					
10	8" PVC PIPE	40	L.F.	\$250.00	\$10,000.00
LOW PRESSURE SEWER					
11	LPS MAIN - TOWNSHIP ROAD	550	L.F.	\$41.00	\$22,550.00
12	LPS LATERAL	300	L.F.	\$25.00	\$7,500.00
13	GRINDER PUMP - SIMPLEX	3	EA.	\$7,200.00	\$21,600.00
14	ONLINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
15	END LINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
ESTIMATED CONSTRUCTION COSTS					\$1,201,465.00
CONSTRUCTION CONTINGENCY @ 10%					\$120,146.50
ENGINEERING, ADMIN, & LEGAL FEES					\$251,106.19
TOTAL ESTIMATED PROJECT COSTS					\$1,572,717.69
ESTIMATED NUMBER OF EDUs TO BE SERVED					74
ESTIMATED CAPITAL COST PER EDU					\$21,252.94

Table 5-9 Cost Opinion for Short Street Alternative 4

PROJECT COST ESTIMATE					
FOR					
WEST HANOVER TOWNSHIP ACT 537 PLAN UPDATE					
SHORT STREET ALTERNATIVE 4					
PREPARED BY HERBERT, ROWLAND AND GRUBIC, INC.					
June 16, 2005					
ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EXTENSION
GENERAL					
1	MOBILIZATION	1	L.S.	\$3,800.00	\$3,800.00
2	TRAFFIC MAINTENANCE & PROTECTION	1	L.S.	\$1,500.00	\$1,500.00
LOW PRESSURE SEWER					
3	LPS MAIN - TOWNSHIP ROAD	500	L.F.	\$41.00	\$20,500.00
4	LPS LATERAL	420	L.F.	\$25.00	\$10,500.00
5	GRINDER PUMP - SIMPLEX	5	EA.	\$7,200.00	\$36,000.00
6	ONLINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
7	END LINE FLUSHING STATION	1	EA.	\$2,500.00	\$2,500.00
MANHOLES					
8	MANHOLES, 4-FOOT DIAMETER	1	EA.	\$2,300.00	\$2,300.00
SURFACING					
9	TEMPORARY PAVING/SURFACING	500	L.F.	\$4.00	\$2,000.00
ESTIMATED CONSTRUCTION COSTS					\$81,600.00
CONSTRUCTION CONTINGENCY @ 10%					\$8,160.00
ENGINEERING, ADMIN, & LEGAL FEES					\$21,542.40
TOTAL ESTIMATED PROJECT COSTS					\$111,302.40
ESTIMATED NUMBER OF EDUs TO BE SERVED					5
ESTIMATED CAPITAL COST PER EDU					\$22,260.48

Table 5-10 - Summary of Cost Opinions for Structural Alternatives (PENNVEST Financing)

Alternative	Estimated Project Cost	Annual Debt Service	Annual O&M Cost	Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Present Worth Per EDU	Annual Cost Per EDU	Monthly Cost Per EDU	Annual Cost Per Customer
Ritzie Village 1A	\$3,623,097	\$226,025	\$30,000	\$256,025	\$398,831	\$4,021,928	89	\$45,190	\$2,877	\$240	\$115
Ritzie Village 1B	\$3,812,772	\$238,845	\$30,000	\$268,845	\$398,831	\$4,211,603	89	\$47,321	\$3,021	\$252	\$120
Ritzie Village 1C	\$4,054,495	\$255,183	\$30,000	\$285,183	\$398,831	\$4,453,326	89	\$50,037	\$3,204	\$267	\$128
Houck Manor 2A	\$1,892,805	\$115,644	\$3,054	\$118,698	\$40,601	\$1,933,406	58	\$33,335	\$2,047	\$171	\$54
Houck Manor 2B	\$1,845,530	\$112,449	\$3,054	\$115,503	\$40,601	\$1,886,131	58	\$32,520	\$1,991	\$166	\$52
Houck Manor 2C	\$1,898,058	\$115,999	\$3,054	\$119,053	\$40,601	\$1,938,659	58	\$33,425	\$2,053	\$171	\$54
Houck Manor 2D	\$1,584,671	\$94,818	\$3,054	\$97,872	\$40,601	\$1,625,272	58	\$28,022	\$1,687	\$141	\$44
Holiday Park 3	\$1,572,718	\$90,619	\$3,868	\$94,488	\$51,428	\$1,624,146	74	\$21,948	\$1,277	\$106	\$43
Short Street 4	\$111,302	\$6,463	\$270	\$6,733	\$3,586	\$114,889	5	\$22,978	\$1,347	\$112	\$3

Notes:

Annual Debt Service Calculations Assume PENNVEST Financing of 3.172% for 20 Years and Tapping Fee Revenues from New Connections
 Present Worth Calculations Assume 4.25% for 20 Years

Table 5-11 - Summary of Cost Opinions for Structural Alternatives (Tax Exempt Financing)

Alternative	Estimated Project Cost	Annual Debt Service	Annual O&M Cost	Annual Cost	Present Worth of Annual O&M	Total Present Worth	Number of EDUs	Present Worth		Monthly Cost		Annual Cost Per Customer
								Per EDU	Per EDU	Per EDU	Per EDU	
Ritzie Village 1A	\$3,623,097	\$270,407	\$30,000	\$300,407	\$398,831	\$4,021,928	89	\$45,190	\$3,375	\$281	\$134	
Ritzie Village 1B	\$3,812,772	\$285,744	\$30,000	\$315,744	\$398,831	\$4,211,603	89	\$47,321	\$3,548	\$296	\$141	
Ritzie Village 1C	\$4,054,495	\$305,290	\$30,000	\$335,290	\$398,831	\$4,453,326	89	\$50,037	\$3,767	\$314	\$150	
Houck Manor 2A	\$1,892,805	\$138,352	\$3,054	\$141,406	\$40,601	\$1,933,406	58	\$33,335	\$2,438	\$203	\$64	
Houck Manor 2B	\$1,845,530	\$134,529	\$3,054	\$137,583	\$40,601	\$1,886,131	58	\$32,520	\$2,372	\$198	\$62	
Houck Manor 2C	\$1,898,058	\$138,776	\$3,054	\$141,830	\$40,601	\$1,938,659	58	\$33,425	\$2,445	\$204	\$64	
Houck Manor 2D	\$1,584,671	\$113,436	\$3,054	\$116,490	\$40,601	\$1,625,272	58	\$28,022	\$2,008	\$167	\$53	
Holiday Park 3	\$1,572,718	\$108,413	\$3,868	\$112,281	\$51,428	\$1,624,146	74	\$21,948	\$1,517	\$126	\$51	
Short Street 4	\$111,302	\$7,733	\$270	\$8,002	\$3,586	\$114,889	5	\$22,978	\$1,600	\$133	\$4	

Notes:

Annual Debt Service Calculations Assume Tax Exempt Financing of 5.25% for 20 Years and Tapping Fee Revenues from New Connections
 Present Worth Calculations Assume 4.25% for 20 Years

5.11 INTERMUNICIPAL WASTEWATER TREATMENT ALTERNATIVES

At the request of the West Hanover Township Board of Supervisors, alternatives relative to the utilization of the Township's reserve capacity in the STA WWTP were evaluated and are presented in the following sections. The alternatives are evaluated utilizing present worth analysis. It should be noted that the assumptions and cost estimates used to prepare the present worth analyses are preliminary in nature as intermunicipal agreements between West Hanover Township, LPTA and STA providing for the conveyance of West Hanover Township wastewater flows to STA's treatment facility have not been resolved at this point.

For long-term planning purposes, the 5 and 10-year wastewater flow projections to the WHTWSA WWTP developed in this Plan as well as ultimate buildout flow projections were used to identify any required expansions of the WHTWSA WWTP in the evaluation of the proposed alternatives. Ultimate buildout flows were obtained from information provided in the Township's Comprehensive Plan. Maps of the inter-municipal wastewater treatment alternatives identified in this Plan are included in Appendix I.

5.11.1 Rerouting of Sewage Flows

The 1978 Intermunicipal Agreement between the West Hanover Township Board of Supervisors and LPTA authorized LPTA to collect sewer rental charges from the 274 EDU's in the Westford Crossing and Country Manor Farms subdivisions. LPTA also assumed responsibility for the operation and maintenance of the sewers serving the developments. Wastewater flows from the developments are part of LPTA's flow to the STA WWTP.

The 1978 Agreement granted West Hanover Township authorization to acquire the operation and maintenance of the sewer systems and to bill the users of the systems if so desired upon written notification to LPTA. West Hanover Township agreed to pay LPTA a fee for the continued transmission of sanitary sewage from the developments to the STA WWTP upon taking over rights to the sewer systems.

Alternative 5 of this plan consists of the rerouting of wastewater flows from the Westford Crossing and Country Manor Farms subdivisions to existing WHTWSA collection facilities with treatment at the WHTWSA WWTP. In this alternative, WHTWSA will assume billing of sewer rental fees to users in the Westford Crossing and Country Manor Farms subdivisions, thus increasing the WHTWSA user base. This alternative does not result in utilization of the Township's reserved capacity in the STA WWTP; however, WHTWSA may receive an economic advantage due to the increase in their customer base.

Due to the geographic location of Westford Crossing and Country Manor Farms, wastewater flows from these subdivisions are unable to be conveyed to existing WHTWSA collection facilities utilizing gravity flow. Alternative 5 includes the construction of a pump station and force main along Sarhelm Road to convey wastewater flows from these areas to an existing WHTWSA collection system at Bradford Estates. Gravity sewers paralleling the existing LPTA Beaver Creek Interceptor are proposed in this alternative to convey the flows from the subdivisions to the proposed Sarhelm Road pump station.

The connection of Westford Crossing and Country Manor Farms to WHTWSA's collection system will result in an estimated flow increase of 0.065 mgd (65,000 gpd) to the WHTWSA WWTP. The increased flow, in addition with the 10-year and ultimate buildout projections will result in the need for a future expansion of the existing WHTWSA WWTP to accommodate the increased flows.

5.11.2 Increased Flow to Beaver Creek Interceptor/Utilization of Purchased Capacity

Alternative 6 of this plan includes increasing the amount of wastewater flows transmitted from West Hanover Township to LPTA's collection and conveyance facilities and utilization of the Township's reserved capacity in the STA WWTP. In this alternative, WHTWSA will assume billing of sewer rental fees to users in the Westford Crossing and Country Manor Farms subdivisions with all flows from these subdivisions continuing to be conveyed to the STA WWTP. Wastewater flows from existing and proposed WHTWSA served developments in the Beaver Creek drainage basin will also be conveyed to LPTA's Beaver Creek Interceptor. Treatment of all West Hanover flows connected to LPTA's facilities will be provided at the STA WWTP.

To facilitate the connection of existing and proposed developments in West Hanover Township north of Interstate 81 to LPTA's facilities, West Hanover Township will have to construct an interceptor paralleling Beaver Creek, beginning at a point near WHTWSA's Piketown Road pumping station with connection to the existing Beaver Creek Interceptor at a point where Interstate 81 crosses Beaver Creek. This alternative will allow for the abandonment of the Piketown Road pumping station. Wastewater flows from Bradford Estates can be conveyed to LPTA's facilities by constructing a force main from the existing pump station at Bradford Estates with connection to the gravity sewers serving Country Manor Farms. A total wastewater flow of 0.30 mgd will be conveyed to the STA WWTP in this alternative utilizing the 10-year flow projections developed in this Plan. It is anticipated that West Hanover Township can utilize its entire reserved capacity in the STA WWTP (0.414 mgd) at ultimate buildout in this alternative.

In order to accommodate the increased wastewater flows from West Hanover Township, upgrades of LPTA's Beaver Creek Interceptor, Beaver Creek Pumping Station, force main and downstream gravity sewer and the Nyes Road Interceptor are required.

Because the areas proposed to be served by the LPTA facilities and STA WWTP in Alternative 6 are outside the area identified in the 1978 Agreement between West Hanover Township and LPTA, West Hanover Township will be required to obtain capacity in the LPTA's facilities. Also it is uncertain at this time whether West Hanover Township has capacity in the STA Joint Use Interceptor as this issue is currently in arbitration. Therefore costs associated with Alternative 6 include the construction of a relief interceptor paralleling the existing Joint Use Interceptor, sized to accommodate the flow from West Hanover Township. Estimates of operating costs for treatment at STA's WWTP utilized in the present worth analysis were obtained based on flow projections to the STA WWTP and the proportioning of operating costs as identified in the 1985 Agreement with STA.

No expansion of the WHTWSA WWTP is expected in Alternative 6 utilizing 10-year flow projections developed in the plan. However, an expansion of the WHTWSA WWTP is anticipated at ultimate buildout flows.

5.11.3 No Action

The No Action intermunicipal alternative is the continued conveyance of wastewater flows from Westford Crossing and Country Manor Farms to LPTA's Beaver Creek Interceptor and conveyance of future West Hanover Township flows to WHTWSA's WWTP. LPTA will continue to bill the users of the sewer systems serving the Westford Crossing and Country Manor Farms developments and will remain responsible for the operation and maintenance of these systems. West Hanover Township's reserved capacity at the Swatara Township Authority WWTP will continue to remain unused.

As discussed in Chapter 4, no expansion of the WHTWSA WWTP is required for the No Action intermunicipal alternative utilizing the 10-year flow projections developed in this plan. However, treatment plant expansion is required at ultimate buildout.

Upon recommendation by WHTWSA, an intermunicipal alternative providing for WHTWSA to assume billing of sewer rental fees to the Westford Crossing and Country Manor Farms subdivisions was investigated. In this alternative, wastewater flows from the Westford Crossing and Country Manor Farms subdivisions continue to be conveyed to STA's WWTP for treatment; however, operation and maintenance of the sewers serving these areas would become the responsibility of WHTWSA as stated in the 1978 Agreement. All other West Hanover Township wastewater flows will be conveyed to the WHTWSA WWTP. It is assumed that in this alternative, West Hanover Township would be responsible for upgrades to LPTA and STA facilities should WHTWSA assume billing rights for the Westford Crossing and Country Manor Farms subdivisions. The present worth costs associated with this alternative were found to be greater than those associated with the No Action intermunicipal alternative (Alternative 7). Due to the present worth cost of this alternative and uncertainties relative to STA's Joint Use Interceptor, it is recommended that the Township not pursue this alternative at this time.

5.11.4 Present Worth Analysis of Intermunicipal Wastewater Treatment Alternatives

Using the assumptions outlined above, a present worth analysis was conducted to evaluate the intermunicipal wastewater treatment alternatives identified in this Act 537 Plan. Annual debt service is calculated based on total project costs for each alternative and an assumed loan on the full project cost of 5.25% for 20 years. Present worth is estimated based on a 20-year, 4.25% term. In reality, grant funding or other capital contributions may be available, and loans with lower interest rates or longer terms may be secured. The present worth analyses of the intermunicipal wastewater treatment alternatives are displayed in Tables 5-12 through 5-14 and are summarized in Table 5-15.

From the present worth analysis of the intermunicipal alternatives, utilization of West Hanover Township's reserved capacity in the STA WWTP (Alternative 6) results in the greatest cost per WHTWSA EDU due to required upgrades of LPTA and STA facilities. The No Action intermunicipal alternative (Alternative 7) presents the lowest cost per WHTWSA EDU. Conveyance of all West Hanover Township wastewater flows to the WHTWSA WWTP (Alternative 5) results in slightly higher costs per EDU than Alternative 7 due to construction of the Sarhelm Road pumping station and force main.

Table 5-12 Present Worth Analysis for Intermunicipal Alternative 5

INTERMUNICIPAL ALTERNATIVE 5 - CONVEYANCE OF ALL FLOWS TO WHTWSA WWTP	
Alternative 5A - Township Growth in Approved Subdivisions	
Estimated Wastewater Flows:	
Estimated Flow to WHTWSA WWTP (gpd):	736,990
Estimated Flow to Swatara WWTP (gpd):	0
Total Wastewater Flow	736,990
Required Improvements and Associated Costs	
Total Project Cost to Connect Westford Crossing/Country Manor Farms:	\$831,270
WHTWSA WWTP Expansion (1):	\$372,000
Total Project Costs	\$1,203,270
Annual Debt Service for Improvements (20 Years @ 5.25%)	\$97,298
Annual Operation and Maintenance (O&M)	
WHTWSA WWTP O&M:	\$762,545
Total Annual O&M Costs	\$762,545
Present Worth of O&M (20 Years @ 4.25%)	\$10,137,546
Total Present Worth (20 Years)	\$11,340,816
Total WHTWSA WWTP Customer Base (EDUs)	3779
Present Worth Cost / EDU	\$3,001
Alternative 5B - Ultimate Buildout	
Estimated Wastewater Flows:	
Estimated Flow to WHTWSA WWTP (gpd):	1,128,735
Estimated Flow to Swatara WWTP (gpd):	0
Total Wastewater Flow	1,128,735
Required Improvements and Associated Costs	
Total Project Cost to Connect Westford Crossing/Country Manor Farms:	\$831,270
WHTWSA WWTP Expansion (2):	\$3,100,000
Total Project Costs	\$3,931,270
Annual Debt Service for Improvements (20 Years @ 5.25%)	\$317,888
Annual Operation and Maintenance (O&M)	
WHTWSA WWTP O&M:	\$852,695
Total Annual O&M Costs	\$852,695
Present Worth of O&M (20 Years @ 4.25%)	\$11,336,034
Total Present Worth (20 Years)	\$15,267,304
Total WHTWSA WWTP Customer Base (EDUs)	5446
Present Worth Cost / EDU	\$2,803
Notes:	
(1) Taken from January 20, 2004 correspondence to the Township from Gannet Fleming, Inc. for WWTP expansion to 1,000,000 gpd with outfall relocation (may not be necessary at this flow).	
(2) Taken from January 20, 2004 correspondence to the Township from Gannet Fleming, Inc. for WWTP expansion to 1,500,000 gpd.	

Table 5-13 Present Worth Analysis for Intermunicipal Alternative 6

INTERMUNICIPAL ALTERNATIVE 6 - UTILIZATION OF SWATARA WWTP CAPACITY	
Alternative 6A - Township Growth in Approved Subdivisions	
Estimated Wastewater Flows:	
Estimated Flow to WHTWSA WWTP (gpd):	434,780
Estimated Flow to Swatara WWTP (gpd):	302,210
Total Wastewater Flow	736,990
Required Improvements and Associated Costs	
Total Project Cost to Upgrade LPTA Facilities (1):	\$506,000
Total Project Cost to Upgrade Swatara Joint Use Interceptor (2):	\$1,200,000
Total Project Cost for WHTWSA Interceptor (2):	\$540,000
Total Project Cost to Connect Bradford Estates to Westford Crossing:	\$148,091
Total Project Costs	\$2,394,091
Annual Debt Service for Improvements (20 Years @ 5.25%)	\$193,589
Annual Operation and Maintenance (O&M)	
WHTWSA WWTP O&M:	\$692,728
Lower Paxton Township Authority O&M:	\$12,000
Swatara Township Authority O&M:	\$166,870
Total Annual O&M Costs	\$871,598
Present Worth of O&M (20 Years @ 4.25%)	\$11,587,349
Total Present Worth (20 Years)	\$13,981,440
Total WHTWSA WWTP Customer Base (EDUs)	3,779
Present Worth Cost / EDU	\$3,700
Alternative 6B - Ultimate Buildout	
Estimated Wastewater Flows:	
Estimated Flow to WHTWSA WWTP (gpd):	714,735
Estimated Flow to Swatara WWTP (gpd):	414,000
Total Wastewater Flow	1,128,735
Required Improvements and Associated Costs	
Total Project Cost to Upgrade LPTA Facilities (1):	\$506,000
Total Project Cost to Upgrade Swatara Joint Use Interceptor (2):	\$1,200,000
Total Project Cost for WHTWSA Interceptor (2):	\$540,000
Total Project Cost to Connect Bradford Estates to Westford Crossing:	\$148,091
WHTWSA WWTP Expansion (3):	\$372,000
Total Project Costs	\$2,766,091
Annual Debt Service for Improvements (20 Years @ 5.25%)	\$223,670
Annual Operation and Maintenance (O&M)	
WHTWSA WWTP O&M:	\$757,423
Lower Paxton Township Authority O&M:	\$12,000
Swatara Township Authority O&M:	\$222,977
Total Annual O&M Costs	\$992,400
Present Worth of O&M (20 Years @ 4.25%)	\$13,193,329
Total Present Worth (20 Years)	\$15,959,420
Total WHTWSA WWTP Customer Base (EDUs)	5,446
Present Worth Cost / EDU	\$2,930
Notes:	
(1) Taken from July 20, 2004 correspondence to WHTWSA from CET Engineering Services.	
(2) Taken from January 20, 2004 correspondence to the Township from Gannet Fleming, Inc.	
(3) Taken from January 20, 2004 correspondence to the Township from Gannet Fleming, Inc. for WWTP expansion to 1,000,000 gpd with outfall relocation which may not be necessary at this flow.	

Table 5-14 Present Worth Analysis for Intermunicipal Alternative 7

INTERMUNICIPAL ALTERNATIVE 7 - NO ACTION (WESTFORD CROSSING & COUNTRY MANOR FARMS REMAIN LPTA CUSTOMERS)	
Alternative 7A - Township Growth in Approved Subdivisions	
Estimated Wastewater Flows:	
Estimated Flow to WHTWSA WWTP (gpd):	672,600
Estimated Flow to Swatara WWTP (gpd):	0
Total Wastewater Flow	672,600
Required Improvements and Associated Costs	
No Expansion of WHTWSA WWTP Required	\$0
Total Project Costs	\$0
Annual Debt Service for Improvements (20 Years @ 5.25%)	\$0
Annual Operation and Maintenance (O&M)	
WHTWSA WWTP O&M:	\$747,727
Total Annual O&M Costs	\$747,727
Present Worth of O&M (20 Years @ 4.25%)	\$9,940,553
Total Present Worth (20 Years)	\$9,940,553
Total WHTWSA WWTP Customer Base (EDUs)	3,505
Present Worth Cost / EDU	\$2,836
Alternative 7B - Ultimate Buildout	
Estimated Wastewater Flows:	
Estimated Flow to WHTWSA WWTP (gpd):	1,064,345
Estimated Flow to Swatara WWTP (gpd):	0
Total Wastewater Flow	1,064,345
Required Improvements and Associated Costs	
WHTWSA WWTP Expansion (1):	\$3,100,000
Total Project Costs	\$3,100,000
Annual Debt Service for Improvements (20 Years @ 5.25%)	\$250,670
Annual Operation and Maintenance (O&M)	
WHTWSA WWTP O&M:	\$837,877
Total Annual O&M Costs	\$837,877
Present Worth of O&M (20 Years @ 4.25%)	\$11,139,042
Total Present Worth (20 Years)	\$14,239,042
Total WHTWSA WWTP Customer Base (EDUs)	5172
Present Worth Cost / EDU	\$2,753
Notes:	
(1) Taken from January 20, 2004 correspondence to the Township from Gannet Fleming, Inc. for WWTP expansion to 1,500,000 gpd.	

Table 5-15 Summary of Present Worth Analyses for Intermunicipal Alternatives

Intermunicipal Alternative	Present Worth Cost per WHTWSA EDU 10-Year Projection	Present Worth Cost per WHTWSA EDU Ultimate Buildout
Alternative 5 - All flows to WHTWSA WWTP	\$3,001	\$2,803
Alternative 6 - Utilization of Swatara WWTP Capacity	\$3,700	\$2,930
Alternative 7 - No Action	\$2,836	\$2,753

5.12 CONCLUSIONS

Based on the discussion above, the following are recommendations for the wastewater planning needs enumerated in Chapter 4.

1. Public sewer service should be provided in the Houck Manor and Short Street Study Areas.

As shown in the cost analyses of the prepared alternatives, the provision of public sewer service to the Houck Manor and Short Street Study Areas is economically feasible due to the proximity of these areas to existing WHTWSA wastewater collection systems. Providing public sewer service to the Houck Manor and Short Street areas is further recommended due to the location of these areas within the Township's Designated Growth Area.

The alternatives formulated in this Act 537 Plan to provide public sewer service to the Houck Manor and Short Street Study Areas represent technically feasible and cost-effective solutions for wastewater management in these areas. Of the identified alternatives, it is recommended that the Township pursue Alternative 2D to serve the Houck Manor Study Area and Alternative 4 to serve the Short Street Study Area. These alternatives are environmentally sound, resulting in the abandonment of malfunctioning on-lot systems in the areas and secondary treatment of the wastewater at the WHTWSA WWTP.

Alternatives formulated to provide public sewer service to the Ritzie Village Study Area are the most costly structural alternatives identified in this study due to the remote location of the area and lack of existing collection facilities nearby. Alternatives 1A and 1B require the construction of a package treatment facility to treat wastewater generated in the area. These alternatives do provide environmentally sound solutions for wastewater management in the Ritzie Village Study Area as malfunctioning on-lot systems are removed and secondary treatment of the wastewater is achieved at the package facility. It is recommended that public sewer service not be provided to the Ritzie Village Area at this time due to cost and location outside of the Designated Growth Area. However, the Township may consider providing public sewer service in this area in the future should funding become available.

2. The occurrence of malfunctioning on-lot systems and greywater discharges in the Holiday Park area should be eliminated.

Following the construction of a collection system serving the Houck Manor Study Area, it is recommended that the Township implement Alternative 3 to provide public sewer service to the Holiday Park Study Area. This alternative will become more economically feasible following the construction of the Houck Manor collection system and will eliminate the occurrence of on-lot system malfunctions and greywater discharges in this area identified by the sanitary survey. Secondary treatment of the wastewater at the WHTWSA wastewater

treatment plant (WWTP) will be provided in this alternative.

In the interim until the design of sanitary sewer facilities in the Holiday Park Study Area has commenced, it is recommended that the Township complete a detailed OLDS management program in this area in addition to the current Township-wide On-lot Management Ordinance. This program should include the following activities:

- Inspection of all on-lot systems within the Holiday Park Study Area by the Township's Sewage Enforcement Officer.
- Preparation of a report detailing the findings and repair recommendations. This report will be submitted to DEP within 12 months of DEP approval of this Act 537 Plan.
- Following DEP approval of the report, progress reports identifying the status of OLDS repairs will be submitted to DEP twice annually until design of sanitary sewer facilities in this area has commenced.

3. The existing WHTWSA wastewater treatment facility has ample hydraulic capacity to accommodate the 5- and 10-year growth projections based on development shown in Table 4-6 and existing flows. The Authority's 2004 Chapter 94 Report states that an apparent organic overload is anticipated to occur in 2009.

The 5- and 10-year flow projections developed for this plan indicate the existing WHTWSA wastewater treatment facility has ample capacity to accommodate the projected development in the Designated Growth Area as well as the extension of public sewer service to the Houck Manor, Holiday Park, and Short Street areas. The Authority will manage the apparent organic overload through a rerating of the existing wastewater treatment facility or minor modifications to the facility when necessary. The Authority will continue to monitor available capacity at the pumping stations per Chapter 94 requirements and will upgrade stations nearing capacity as required.

4. Sewage needs for future developments not listed in Table 4-6 are unknown at this time. If development occurs in the Township, sewage planning should be undertaken in a manner that will provide adequate service to the developments. In order to properly evaluate consistency with Township Planning Documents and capacity within the WHTWSA system, planning module exemptions will not be granted for proposed developments located outside the Designated Growth Area identified in the Township Comprehensive Plan which propose connection to the WHTWSA sewer system. Instead, Act 537 Plan Revisions for such developments must be submitted to the Township for review. Developer construction and dedication to the Authority can greatly affect the feasibility of sewer extensions.

Developments occurring within the Township should connect to the WHTWSA sewer system when feasible as outlined in the Township's *Subdivision and Land Development Plan*. Developer constructed facilities should be dedicated to the Authority. In some instances, these developer extensions will allow the feasible connection of existing homes and businesses. When feasible, these existing buildings should be connected to the WHTWSA sewer system with appropriate planning.

Proposed developments which will be located outside of the Designated Growth Area will be required to submit Act 537 Plan Revisions to the Township for review and approval. Planning module exemptions for such developments will not be granted by the Township. This will allow the Township to ensure consistency with Planning Documents and the available capacity within the WHTWSA sewer system.

5. Wastewater flows from existing and proposed subdivisions in the Township should continue to be conveyed to the WHTWSA wastewater treatment facility with the exception of the existing Westford Crossing and Country Manor Farms areas.

The present worth analysis performed in this Act 537 Plan to evaluate the intermunicipal alternatives for wastewater treatment was based on correspondence between West Hanover Township and their neighboring municipalities. Currently, agreements between the municipalities relative to the Joint Use Interceptor have not been resolved. The present worth analysis does make it clear, however, that costs associated with the utilization of the Township's reserved capacity in STA WWTP (Alternative 6) are much greater than conveying all Township flows to the WHTWSA facility (Alternative 5) and the selected No Action alternative (Alternative 7) due to costs associated with upgrading LPTA and STA facilities. It is recommended that West Hanover Township take no action at this time to utilize their reserved capacity in the STA WWTP, however, as intermunicipal agreements are finalized, the Township should reevaluate alternatives presented in this Act 537 Plan.

6. The Township should continue to implement the On-lot Management Ordinance in areas of the Township served by OLDS.

As discussed in Chapter 3, a low percentage of confirmed on-lot malfunctions were observed during the sanitary survey completed in this Act 537 Plan. The implementation of the Township's On-lot Management Ordinance may be responsible for preventing the malfunction of on-lot systems as the Ordinance provides for the inspection, maintenance and mandatory pumping of on-lot systems. The Township should continue to implement the Ordinance in areas of the Township served by OLDS to prevent the malfunctioning of the on-lot systems and to preserve the water quality of private well supplies.