Chambersburg WWTP Upgrade Project Summary
May 2012

A. SERVICE AREA & MAJOR PROBLEMS

The service area of the existing Chambersburg Wastewater Treatment Plant (WWTP) includes the entire Borough of Chambersburg, along with portions of Greene, Hamilton, and Guilford Townships, in Franklin County, Pennsylvania. A small portion of Letterkenny Township is also serviced through Hamilton Township.

The Chambersburg WWTP is located in the Potomac River Basin within the Chesapeake Bay Watershed, and will therefore be subject to Total Phosphorous (TP) and Total Nitrogen (TN) limits of the Commonwealth's recently adopted Chesapeake Bay Tributary Strategy.

The Pennsylvania Department of Environmental Protection's (PADEP) regulations will require that WWTPs cap the discharge of TP and TN to 0.8 mg/L and 6.0 mg/L, respectively, at the current design flow of the plant. At the plant's current design flow of 6.8 MGD, the annual TP and TN loading caps for the plant will be 16,560 pounds and 124,199 pounds, respectively. Using those loading caps and the proposed design flow of 11.28 MGD, the actual TP and TN effluent concentrations will be 0.48 mg/L and 3.62 mg/L, respectively. This represents a 40% reduction in the effluent concentration for these nutrients.

The existing treatment facilities at the Chambersburg WWTP are not able to meet the newly adopted nutrient caps. Therefore, an upgrade to the WWTP will be required to meet the TN and TP caps. In addition to meeting the TN and TP caps, an expansion from 6.8 MGD to 11.28 MGD is needed to accommodate the anticipated growth within the service area. The proposed design flow of 11.28 MGD is a combination of the 20-year flow projections from Chambersburg Borough, Hamilton Township, Greene Township, and Guilford Township.

Consistent with typical peaking factors intended to account for diurnal flow patterns and inflow and infiltration for treatment facilities of this size, the treatment processes have generally been sized to accommodate a peak flow of 28.2 mgd, arrived at by applying a 2.5 peaking factor to the design ADF or 11.28 mgd. However, it has been observed that, due to high amounts of inflow and infiltration, current flows associated with extreme storm events will at times exceed a standard 2.5 peaking factor. As a result, the hydraulic conveyance capacity of the WWTP, that is to say, the influent pumping station and all of the WWTP's internal piping, has been designed for a peak flow of 33.5 mgd.

This value of 33.5 mgd, equivalent to a peaking factor of approximately 3.0, was selected for a several reasons. Although it is lower than the highest peaking factor that has been observed recently during extreme storm events combined with high groundwater conditions, it is anticipated that this peaking factor will be reduced over time.

All of the flow contributing municipalities will be completing I&I remediation projects, which, over time, will remove I&I from the system. In addition, given the current rate of

new connections, and Greene's connection limitation, significant additional connections are not anticipated in the short-term, which will provide the participants time to implement I&I reduction measures and realize some I&I reduction benefits while the flows associated with new connections slowly increase over the 20 year planning period. Finally, any new extensions that are constructed as part of the projected growth will be installed in accordance with best standard practices and with materials that will minimize inflow and infiltration over time. The combined effects of all of these factors will reduce the overall peaking factor over the planning period, and it is anticipated to equalize at a peaking factor of approximately 3.0.

It is also noted that the peaking factor of 3 is appropriate given the hydraulics of the conveyance system. Hydraulic modeling indicates that the collection/conveyance system has a conveyance capacity of approximately 33.5 mgd. As such, with this hydraulic design capacity selected, the treatment plant will be capable of treating the flow conveyed by the system during storm events.

B. DESCRIPTION OF PROJEC T COMPONENTS

The WWTP upgrade will consist of the following primary components:

Liquid Processing System Upgrades

- Replacement of the existing headworks and influent pumping station with a new headworks that includes fine screening and a new influent pumping station with higher capacity pumps.
- Upgrade of the existing grit removal system to accommodate the future ADF of 11.28.
- Modification and supplementation the existing Vertical Loop Reactor (VLR) treatment process to provide biological nutrient removal. The existing VLR has four loops that presently operate in series. As part of this project, one loop will be modified to operate as a pre-anoxic reactor, and one will be modified to operate as a secondary anoxic reactor. The other two loops will operate as aerobic reactors. Additional aerobic reactor volume will be constructed, in the form of a fine-bubble diffused air reactor tank, downstream of the existing VLR to provide additional aerobic treatment volume for full nitrification. This will be followed by a deoxygenation tank that will remove the available dissolved oxygen. A portion of the flow from the deoxygenation tank will be recycled to the pre-anoxic portion of the existing VLR, while the balance of the flow will be conveyed to the secondary anoxic reactor for further denitrification treatment. Effluent from the secondary anoxic zone will be re-aerated prior to flowing to the secondary clarifier splitter box. Phosphorus removal will be enhanced by metal salt addition in the clarifiers.
- Two new secondary clarifies will be constructed and an accompanying return activated sludge (RAS) pumping station installed.

- As part of an phase 1 project, the UV System has recently been expanded to accommodate the projected 11.28 MGD ADF.

Solids Handling System Upgrades

The solids handling process will be upgraded so that there are no longer two separate solids products produced, but rather one Class B solids product. This will be attained by the following modifications:

- The waste activated sludge (WAS) will be withdrawn from the secondary clarifiers and pumped to the existing aerated waste sludge holding tank.
- This WAS will be thickened by the existing rotary drum thickeners.
- The thickened WAS will be combined with the gravity-thickened primary sludge in a new acid phase anaerobic digester.
- Flow from the acid phase digester will be directed into a gas phase anaerobic digester, which will be provided by converting the existing primary digester to be used for this purpose.
- The digested solids will be pumped to the existing belt filter presses to be dewatered and then taken off-site as a Class B biosolids product.

The electrical and SCADA systems will be upgraded as required to accommodate the upgrades. All of the upgrades will be designed for the projected ADF of 11.28 mgd with appropriate peaking factors.

C. COST ESTIMATES & PROJECT FUNDING

Costs related to the Chambersburg WWTP upgrade project are currently estimated at approximately $35,000,000.

Cost sharing for the Chambersburg WWTP upgrade project is based upon the percentage of the new flows that each partner will require. The Borough of Chambersburg will require 0.69 MGD or the total additional 4.48 MGD that will be obtained by virtue of the upgrade. This is equivalent to 15.4%.

D. MUNICIPAL COMMITMENTS

An Intermunicipal Agreement (IMA) was entered into by the Borough of Chambersburg, Greene Township Municipal Authority, Township of Greene, Hamilton Township Municipal Authority, Township of Hamilton, Guilford Township Authority, and Township of Guilford on September 13, 2010. The IMA addresses the terms of the provision of wastewater transportation, treatment, and disposal services in and to the Treatment Plant. To effectuate the IMA, the Borough, Townships, and Authorities also enacted resolutions requesting that the Borough submit an Act 537 Plan revision to PADEP to implement the capacity requests in the IMA.

The Borough is responsible for ownership, operation, and maintenance of all public wastewater facilities within the Borough. They also oversee the planning, design, permitting, and construction of renovations to the public sewer system within the Borough. The Borough is responsible for setting and collecting both the annual user rentals billed to customers and the tapping fees charged for new connections to the municipal wastewater system with the Borough of Chambersburg.

No new municipal departments or authorities will be required to implement the activities described in this Plan.

E. IMPLEMENTATION SCHEDULE

The following schedule is proposed for the WWTP upgrade and expansion:

TABLE PS-1
IMPLEMENTATION SCHEDULE FOR THE
CHAMBERSBURG WWTP UPGRADE AND EXPANSION PROJECT

Activity	Date
Submit Water Quality Management (WQM) Part II Application to PA DEP	May 2012
Receive WQM Part II Approval from PADEP	August 2012
Advertise Project for Bids	Fall 2012
Open Bids	November 2012
Award Construction Contract	December 2012
Construction Complete, Start-up Performed	Summer 2014

F. ENVIRONMENTAL ISSUES

The Pennsylvania Natural Diversity Index (PNDI) search of the treatment plant and the resulting correspondence indicates there is one environmental issue associated with the proposed project. However, the response letter from the DCNR, dated April 15, 2010, indicates there will be no likely impact to the special concern species or resources.