HRG

Herbert, Rowland & Grubic, Inc.
Engineering & Related Services

AN EMPLOYEE-OWNED COMPANY

2021 NORRISTOWN MUNICIPAL WASTE AUTHORITY SEWER CAPACITY STUDY

Submitted to:

NORRISTOWN MUNICIPAL
WASTE AUTHORITY
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Submitted by:

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2021 ENR MidAtlantic TOP DESIGN FIRMS DESIGN FIRM OF THE YEAR

1.0 Executive Summary

The Municipality of Norristown has identified three (3) areas which are expected to be re-developed in the near future. By the request of the Norristown Municipal Waste Authority (Authority), a sewer flow capacity study was completed in the Authority's Collection System for the following areas:

1. **Location 1: Norristown State Hospital – Stanbridge Street – MH 77-31**
2. **Location 2: Kennedy High School – Germantown Pike – MH 115-18**
3. **Location 3: River Front Property – Intersection of US 202 and East Washington Street – MH 45A**

This Study and succeeding appendices present the findings and recommendations of the 2021 Norristown Municipal Waste Authority Sewer Flow Capacity Study (Study) completed by Herbert, Rowland & Grubic, Inc. (HRG). The purpose of this Study was to calculate the existing reserve capacity within the sewer pipes of the sewer sections adjacent to Locations 1 – 3 and to evaluate the need for any potential upgrades to increase reserve capacity for the evaluated existing sewer lines. This Study includes the pipe capacity calculations, analysis of the existing collection system, limiting capacity breakdown for sewer lines of concern, alternative analysis of sewer improvements, opinions of probable construction and total project costs for potential alternatives, identification of alternatives and HRG's recommendations to consider as a result of this Study.

Once the existing information was collected, and assumptions based on site conditions were made, the pipe capacity computations were completed, and sewer pipe segments were assigned priority levels ranging from A through D (least to most reserve capacity). The results of these calculations indicating that of the one hundred and thirty-two (132) individual pipe segments evaluated, two (2) pipe sections were classified as Priority B, five (5) pipe sections were classified as Priority C, and the remaining pipe sections were classified as Priority D. It was identified that none of the evaluated pipes require immediate replacement or improvements due to capacity.

With the reserve capacities calculated for each of the pipe segments along the three flow paths, the estimated potential connections from the three (3) re-development areas were calculated based off Norristown's zoning classifications from the existing zoning map and ordinances. After analyzing each location and potential future EDU connections, the Authority's Collection System may require upgrades to increase the reserve capacities for the estimated potential connections from the future developments in Locations 1 thru 3.

An alternative analysis was performed to identify and evaluate potential upgrades to increase the reserve capacities for the pipe segments along the flow paths from each of the identified locations. Under the existing flow conditions (no additional flow from the three (3) areas), all pipe segments appear to have adequate capacity to convey the peak flow rates to the WWTP, with the limiting reserve capacity from all three (3) locations being 887 EDUs (Flow path from Location 1).

Table 5 of the Study provides estimated potential connected flow rates from each of the three (3) locations based on the Norristown Zoning Map. Based on the estimated connections, the following is a summary of HRG recommendations to upgrade the collection system to convey both the existing peak flows as well as the potential future connections:

Location 1 – The current limiting capacity along the flow path from Location 1 is 887 EDUs. It was estimated that an additional 2,550 EDUs could be connected to the existing collection system from Location 1, if developed, which exceeds the existing reserve capacity by 1663 EDUs. Based on the estimated reserve capacities that were calculated for each pipe segment along the flow path from Location 1, HRG recommends that the Authority implements Alternative 1, in order for the collection system to have the reserve capacity to convey both the existing peak flows as well as the additional estimated flows.

- Alternative 1 includes replacing approximately 340 LF of 21-inch clay pipe with PVC pipe, and 6 manhole replacements. The Engineer's Opinion of Project Cost for this alternative was estimated to be $400,000.00. Implementing this alternative would increase the limiting reserve capacity to 3,707 EDUs

Location 2 – The limiting capacity along the flow path from Location 2 was estimated to be 2,199 EDUs. As indicated in Table 5 of the Study, it was estimated that the property at Location 2, if developed, could potentially add an estimated 84 EDUs to the existing collection system. Based on the estimated reserve capacities that were calculated for each pipe segment along the flow path from Location 2, all pipe segments appear to have the required reserve capacity to convey both the existing peak flow rates as well as the additional estimated flows. If the property is developed and is connected to the collection system, the new limiting reserve capacity in the flow path from Location 2 would be approximately 2,115 EDUs.

Location 3 – The limiting capacity along the flow path from Location 3 was estimated to be 4,338 EDUs. As indicated in Table 5 of the Study, it was estimated that the property at Location 3, if developed, could potentially add an estimated 395 EDUs to the existing collection system. Based on the estimated reserve capacities that were calculated for each pipe segment along the flow path from Location 3, all pipe segments appear to have the required reserve capacity to convey both the existing peak flow rates as well as the additional estimated flows. If the property is developed and is connected to the collection system, the new limiting reserve capacity in the flow path from Location 3 would be approximately 3,943 EDUs.

Additional Location 4 – By request of the Authority, a fourth location was added to the Study after the initial study was underway. The property located at the intersection of Main Street and Dekalb Street was identified as an additional location with potential for near term development. The same approach for determining the limiting capacity from this Location was used as described for Locations 1 through 3. The limiting capacity along the flow path from Location 4 was estimated to be 12,727 EDUs. Based on the size of the property and the Zoning Region this property is located in, all pipe segments appear to have the required reserve capacity to convey both the existing peak flow rates as well as the additional estimated flows if this property were to be developed.

Prior to any potential construction or connections to the Authority system, HRG recommends updating the sewer flow capacity calculations with flow metering data currently being obtained to confirm the assumptions that were made. HRG also recommends that the Authority confirm the rim and invert elevations along each of the flow paths from the three (3) identified locations.

2.0 Acknowledgements

Herbert, Rowland & Grubic, Inc. (HRG) would like to thank the individuals who provided information and assistance to HRG during the preparation of this Study including John Larson & Bruce Kratz of the Authority and Windsor Tracy, PLS of Cedarville Engineering Group, LLC. This Study was prepared by Alex Bar, EIT and Michael Vital, EIT and reviewed by Josh Fox, PE of HRG for quality assurance/quality control prior to issuance.