Performance Engineers Inc.

Memo

To: Mr. Kyle Keller, RS (DHD4) **Date:** 5/7/2021

From: Aaron Nordman

Re: Tuscarora Township Proposed Sewer Expansion – Phase I

Performance Engineers, Inc. (PEI) has been working with Tuscarora Township on the feasibility of extending municipal sewer into the residential area west of their existing commercial sewer district. As part of this process, we have performed an evaluation of this area to assess the suitability of these properties for onsite septic systems. The basis for this determination is whether or not the properties can comply with the District Health Department No. 4 Sanitary Code regulations for onsite sewage treatment and disposal. Specifically, we have performed the analysis utilizing the dimensional setback requirements of the Code as the basis for evaluating compliance on a neighborhood-wide scale. A map depicting the service area for Phase I of the proposed sewer expansion and the Sanitary Code setback limitations is included for reference.

The proposed service area covers a total of approximately 3,251,207 square feet and 168 properties. The Code requires a 100-foot surface water setback, which renders about 65 (38%) of these properties non-compliant. The remaining 103 properties may be subject to additional setbacks related to the constant and/or intermittent flow of surrounding ditches (50-feet required for "intermittent wet area"), but for our purposes, we will ignore this.

The Code requires a 10-foot setback from property lines, a 50-foot radius around a well, and 10-feet from a foundation. If we look at these minimum requirements and extrapolate this to a theoretically optimized lot, where the neighbor's well does not impact it, we estimate that any lot under about 0.2 acres (8,712 sf) would not reasonably be expected to meet the Code requirements for an onsite septic system. This assumption is based on the following dimensional information:

- Property line setback (100'x75' lot) requires 2,650 sf
- Well isolation (50' radius) requires 7,854 sf
- House footprint of 900 sf with 10-foot setback requires 2,500 sf
- Small driveway of 16' by 30' requires 480 sf
- Assume no garage, shed, or other accessory structures

So, the theoretical small house on a small lot described here requires 5,630 sf for just the driveway, house, and property setbacks. When you add the well envelope, the theoretical land required is 13,484 sf before you even begin to place an onsite septic system, which itself would require at least another 400 sf in ideal conditions. The reality is that any property under about 0.3 acres will have difficulty fitting everything on their site. However, in our conservative analysis, we identified 29 properties, outside of the surface water setback that are under 0.2 acres. This alone means that at least 94 properties (56%) cannot meet the Sanitary Code's dimensional requirements and are thus non-conforming.

Based on this analysis, the area is severely limited in regard to properties being able to install onsite septic systems that would adequately protect the surrounding environment and adjacent property owners from the potential impacts of an onsite septic system discharge, per the Code's isolation distances. There could be arguments made against our theoretical home and property dimensions, such as overlapping well envelopes or overlapping well and property line setbacks. However, this is why we have conservatively identified only the properties under 8,712 sf. and we did not take into account the Code requirement for a property to have not only room for the drainfield, but also an equivalent replacement area. Nor did we take into account the very likely scenario that many of these properties will have high groundwater conditions that require "mounded" drainfields that take up even more space. It is probably closer to 75% of the properties in this area that would need some form of variance from strict application of the Code for a new or replacement onsite septic system.

In summary, PEI believes that we have clearly demonstrated that over 51% of the properties within the proposed service area have non-conforming septic systems that do not provide adequate horizontal isolation in accordance with the Sanitary Code. While we have done this dimensionally, utilizing aerial imagery, tax maps, and AutoCAD software, we believe that an actual field investigation would only turn up additional issues. We appreciate your willingness to review the analysis presented here. We are particularly interested to see if any of your field experience and history in this area will be able to support our analysis, or if you have found actual conditions to be other than as presented. Either way, we look forward to your review and invite you to reach out with any questions.

Sincerely,
Performance Engineers, Inc.

Aaron Nordman

Aaron Nordman, P.E.
Principal