

1. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023 states in the scope of report that "The three specific renovation parameters requested are Nitrogenous compound concentrations, effluent plume travel time and exposure from viruses."
 - a. From the Ledyard IWWC October 4, 2022 meeting minutes, the following information was requested:
 - 1) Hydraulic analysis
 - 2) Nitrogen dilution analysis
 - 3) Nitrate removal assessment
 - 4) Bacteria timetable analysis
 - b. This information was again requested at the January 3, 2023 with the following additional information:
 - 1) Item 10.c Commissioner DeBrot's memo received January 3, 2023 quoted from the Scientific Basis for Wetland & Watercourse Buffer Zones that "Sediment, phosphorous, nitrogen, herbicides, and insecticides can all be at least partly removed from runoff and leachate" with a follow on question of "What will the total pollutant load be from this proposal?"
 - c. A lot of discussion occurred at the January 3, 2023 IWWC meeting of the request and concurrence of the IWWC for more information as stated in Groton Utilities / Statement of Proposed Avery Brook Subdivision December 2, 2022 including using "the guidelines for renovation and hydraulic analysis found in the DEEP's "Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems" and the DPH's "Design Manual – Subsurface Surface Disposal Systems for Households and Small Commercial Buildings".
 - 1) DEEP's Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems dated February, 2006 Section I, Page 1, paragraph 3 states "The microbial pollutants include pathogenic bacteria, protozoa and viruses. Nitrogen, Phosphorous and synthetic organic chemicals are the chemical constituents of domestic wastewater that are of major concern with respect to contamination of groundwater."
 - d. No analysis of Phosphorous was presented in the Renovation Analysis.
2. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023 states in the Effluent Travel Time to Wetlands, Travel Time Determination that "The minimum travel time recommended by the *Manual*, and normally required by DEEP, is 21 days. The 21 day minimum is considered sufficient to remove pathogenic bacteria in the effluent to acceptable levels."
 - a. DEEP's Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems dated February, 2006 Section X, Page 3, states "a travel time of 56 days is indicated between a SWAS and existing and potential sensitive receptors such as: a. the outer limit of the cone of depression of a public (community) drinking water supply well; b. a surface water body used, or intended to be used, as a source of public (community) drinking water supply; c. a private drinking water supply well serving an individual residence; d. an impoundment used for aquaculture. The minimum required travel time to all other points of concern should be not less than 21 says, and a greater travel time is preferable."
 - 1) This development is near a surface water body used as a source of public drinking water supply and also neighboring property owners' wells are only 75' away based on DPH regulations.
 - 2) Virus travel time distance based on the quoted 21 day minimum is 197'.
 - 3) Virus travel time distance based on the 56 day requirement is 524'.
3. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023 states in the Effluent Travel Time to Wetlands, Travel Time Determination that "It should be noted that this guidance far exceeds the requirements of the Connecticut Public Health Code for a septic system serving a single family dwelling: i.e. 75' between any component of the septic system and a potable water supply well."
 - a. The analysis is to evaluate for the cumulative effects of 26 single family dwellings and not a single family dwelling.
4. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023 Nitrogen Analysis section states "The target concentration is 10 mg/L, which is the EPA drinking water standard for Total Nitrogen (TN)."
 - a. What is the current Total Nitrogen concentration that will be affected by the addition of effluent from 26 new subsurface sewage disposal systems?
 - b. What will the predicted final Total Nitrogen Concentration be?

- c. The EPA drinking water standard for Total Nitrogen is stated as 10mg/L on Page 9; however, on page 15, this is stated as the allowable discharge.
- 5. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023 Nitrogen Analysis section states "It is our opinion that groundwater on the entire site intersect one or more plumes from the proposed 26 SSDS, therefore the entire area of the subject site can be considered as contributing to infiltrated rainfall for dilution."
 - a. This contradicts the below language provided in DEEP's Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems dated February, 2006 Section X, Page 41.
 - 1) "Using the total lot area as the effective infiltration area, where the SWAS occupies only a small portion of the lot width, results in overestimating the affect of nitrogen dilution by infiltrated precipitation."
 - 2) "When the lot width is substantively greater than the width of the SWAS, the spread may not be such that the plume covers the entire lot area, and therefore the total lot area should not be used as the effective infiltration area."
 - b. Using a more limited area for calculating Nitrogen dilution by infiltrated precipitation will increase the Total Nitrogen value.
- 6. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023 calculated the Nitrogen load using a Discharge per Bedroom/day of 45 gal/day and includes the statement "135gpd (45 gpd/bedroom) considered to be an average discharge from a 3-bedroom house in CT."
 - a. The Basis for discharge to Subsurface Sewage Disposal System ("SSDS") received on 3/7/23 states that 45gpd/bedroom is used because "the fact that the 150 gallon per bedroom design requirement contained in the public health code is no longer a representative standard for projecting actual SSDS discharges to the soil."
 - 1) Is this just the applicant's opinion of why a lesser standard than the CTDPH publishes should be used when calculating the Total Nitrogen load?
 - 2) Why should the commission consider using values other than the recognized public health standards to make its decision?
 - 3) The included e-mail response from NPU contains the justifying statement: "This is lower than the DPH design standard of 75 gpcd, but sensible since many of the residential uses in Norwich are multi-family units with reduced, or no, exterior watering needs", "residents outside of Norwich used approximately" "59.9 gpcd." "This makes sense as the outlying towns have larger residential developments which typically have greater landscaping needs."
 - 4) What is a reasonable expected occupancy of each home in this development and is it different than the average of the entire town which also includes multi-family and age restricted units?
 - 5) 4 persons per house was used in the GEI Water Study for the Proposed Stoddards Warf Road Subdivision dated July 6, 2022, Section 4 for the water balance determination.
 - 6) 45 gpd/day with a household size of 2.68 persons (round to 3 for this purpose) would assume 1 person per bedroom. Any household in which more than 3 persons reside will increase the discharge per bedroom per day calculation.
 - b. On page 9 of the same report, a value of 150gpd is used to calculate bacteria travel time.
 - c. DPH publishes a standard of 150gpd.
 - d. Recalculating for Nitrogen Concentration using a Discharge per Bedroom/day of 150gpd results in 19.01mg/L which exceeds the allowable limit of 10mg/L.
- 7. Avery Brook Homes Septic System Effluent Renovation Analysis dated February 3, 2023, Appendix A shows the 197' measurement for bacteria time travel.
 - a. On lot #7, this measurement is shown from the primary septic location vice the backup although the backup location is nearer to the wetland boundary. If measured from the backup septic location, the 197' measurement on lot #7 will land in wetlands.
 - b. Any slight shift eastward of the groundwater contour map will direct wastewater flows into the wetlands on lots 6, 7, and 8.
 - c. The letter from Stephen Studer to Harry Heller dated February 24, 2023 states the following which if done, may alter the groundwater contours.

- 1) "The groundwater contour map is incomplete and inconsistent in that the number of test points is insufficient and are located only within the interior of the site. The groundwater contour map does not show groundwater elevations at the property line of off-site, nor does it consider wetland or watercourse elevations directly adjacent to the applicant property. At a minimum, additional test points are needed in order to extend the groundwater contours to the edge of the applicant's property and to reflect the connection of groundwater and surface water both on and adjacent to the development site."
- 2) "The groundwater elevation readings were taken within a short window of time and likely do not reflect seasonal changes which would typically occur around the entire perimeter of the applicant's property. What is most important to a proper analysis of effluent impacts to wetlands and watercourses is an accurate understanding of the predominant water table elevations, predominant groundwater flow directions and travel times over the course of the year, and not just those representative of early January 2023."

