

February 26, 2024

Maria Dal Pra  
Supervisor Peaine Township  
36825 Kings Highway  
Beaver Island, Michigan 49782

Re: Request for information pertaining to sewage treatment and disposal system design and occupancy limits

Maria,

This correspondence is in response to your email inquiry (Feb 21, 2024) requesting clarification of this department's position regarding occupancy of a dwelling relative to sewage treatment and disposal system design parameters. Specifically, your question related to what the occupancy limit of a residence or short-term-rental is relative to the number of bedrooms in the dwelling.

There are approximately 45 health districts in the State of Michigan, each of which has their own sanitary code drafted and approved by the State under Act 368 PA 1978 (the Michigan Public Health Code). Codes differ greatly, including in the sizing and basis for design of residential sewage treatment and disposal systems.

The Health Department of Northwest Michigan has always utilized the number of bedrooms as the basis for design (which is the most common factor) with potential for modification to the design based upon proposed additional waste-generating activities/apparatuses. Section 5-13 of the District Sanitary Code (hereafter, "the Code") outlines sewage treatment and disposal system sizing **per bedroom** based upon the soil type. The figures stated in this section are commonly accepted industry standards for the number of square feet of drainage area required to accept a daily flow of wastewater generated **per bedroom in a residential dwelling**.

The soils listed in Section 5-13 are considered to have a permeability rate (minutes/inch) greater than 60 min/inch. The percentage of silt and clay in any given soil, even certain soils listed in table 5-13, can be such that a soil can be classified as "impervious or a limiting stratum" as defined in Section 2-27 of the Code. Soil structure and compaction are other characteristics which affect soil permeability.

In addition to permeability rates, there are generally accepted industry standards for the application rate of different water source types in various soil types. The generally accepted industry standard, which is accepted by the State of Michigan also, is 1 gallon/square foot/day for residential wastewater in sand soil for a trench system and 0.5 gallon/square foot/day for a bed system. Each soil type has a generally accepted industry standard which is represented in the varying sizing requirements for different soils. The application rate varies based upon the

system design type such as a trench vs a bed system. Bed systems are designed at a lower capacity rate per square foot as they do not have the sidewall area which can be utilized when the bottom area no longer accepts wastewater and provides an acceptable longevity of the system.

The industry range of volume of wastewater an average person will generate in a residential setting varies from approximately 50 to over 100 gallons per day. Currently, based on information available, the Environmental Protection Agency estimates that 50 to 70 gallons of wastewater is generated per person/day but has published volumes up to 100 gallons/person/day.

**The Code trench sizing requirement of 125 square feet per bedroom in sand soil with an application rate of 1 gallon/square foot implies that, with an occupancy of two (2) people/bedroom , the per person daily waste generation rate would be 62.5 gallons.** If it were assumed that a bedroom occupancy was three (3) people, the per person daily flow rate would be 41.6 gallons. This rate, 41.6 gallons/day/person, has only been used by this department for multi-dwelling community wastewater systems as directed by the State of Michigan. Studies have shown that per-bedroom daily flow rates decrease as the number of dwellings served by a single community wastewater system increases.

Utilizing the commonly accepted soil application rates for residential wastewater, the per person daily wastewater generation rates (50-100 gal/day) and sewage treatment and disposal system sizing requirements noted above, it can be extrapolated from the requirements of the The Code that the design factor for maximum occupancy of a bedroom is two (2) people.

You had noted in your email that the City of Charlevoix has an occupancy limit standard of 2 people/bedroom and 2 additional people per floor. Keep in mind that the vast majority of these homes are served by a municipal sewer system and not individual on-site systems. I am not aware of the basis of this standard or if it relates at all to wastewater generation. For properties served by the Beaver Island community wastewater system (Main Street), while this is a municipally owned "community wastewater treatment and disposal system" it also has a limited capacity and a regulated maximum daily discharge rate.

The vast majority of sewage treatment and disposal systems on Beaver Island are designed for a maximum of two (2) or three (3) bedrooms as indicated on permit applications received. This would then result in the vast majority of the dwellings on the island being limited to a maximum occupancy of four (4) to six (6) people.

In the determination of maximum occupancy of a dwelling, the number of "bedrooms" indicated by the owner should not be the determining factor. The determining factor of the capacity of the dwelling should be based upon the design capacity of the sewage treatment and disposal system, which is listed on the permit issued for the system installation. A basic study conducted in Charlevoix County of septic system design vs number of bedrooms in a residence showed that approximately 80% of dwellings in the group had one or more bedrooms than the sewage treatment and disposal system was designed and permitted for.

Additionally, you may wish to review Section 2-7 of the The Code which is the definition of a "bedroom" used by this department. The referenced "International Residential Code" has the following four standards for a "bedroom":

- A. A bedroom needs at least two methods of egress
- B. A bedroom ceiling needs to be at least 7 ft tall over a minimum of 50% of the floor area
- C. In addition to the entrance/egress door, a window can serve as the secondary egress if it is between 24-44 inches from the floor, it has at least 5.7 square feet for the opening and must measure no less than 24 inches high or 20 inches wide
- D. The room should be at least 70 square feet and cannot be less than 7 feet in any horizontal direction

Keep in mind that these standards are based upon safety and not convenience. I have personally seen spaces within a residence called and used as "bedrooms" which do not meet these safety standards and are offered as "short-term-rental" occupancy. Financial greed can cloud the perception of safety hazards.

If the township were to consider restricting short-term rental usage to be within the daily flow capacity of the sewage treatment and disposal system, our department has in place provisions for these types of evaluations. We currently provide this service to Eveline Township for their short-term-rental ordinance program and have in the past to others as well.

However, if the township or townships are considering implementing a short-term rental or "time-of transfer" (property sale) ordinance which would include sewage and/or water supply evaluations by the Health Department, please bring us into the discussion. We would need to determine if current staffing is sufficient to provide such service as proposed.

Thank you for considering these issues in your discussions and reaching out for clarification as to the methodology and standards used by our department as it relates to wastewater. If you have any further questions, please feel free to contact me at the Charlevoix Branch office of the Health Department of Northwest Michigan.



Michael Jones, RS, BSEH  
Environmental Health District Supervisor