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December 19, 2007

Steve LaRosa  
Heindel and Noyes  
P.O. Box 4503  
Burlington, VT 05406

Re: Evaluation of Addison County Wastewater Systems

Dear Steve,

I have now read the report and reviewed the supported data and think the report is pretty impressive considering the budget and time constraints. While reading the report I found some issues that I think could be clarified and a couple of clerical mistakes that should be corrected. The list below reflects only the order in which I noted them and not any relative significance.

1. The report states that average water use per person is much lower than the design flows, which would be expected, as design flows are selected to include the high end of the range as opposed to being the average flow. Still, these numbers are below what I would expect. The 2002 EPA manual indicates that studies totaling 1500 houses found an average of 68 GPD/person. I also remember some very detailed monitoring, performed by Ralph Michael for the Hawk Mountain development in Plymouth, found average flows of around 50 GPD/person in a community that was designed around low flow fixtures. Based on your determination that showers average 20 gallons per person, and the other calculated uses, it appears that some of the houses are sparing in their use of water. I did find a contradiction for #40 where the text indicates 4 users and the water consumption table 2-2 indicates 5. Table 2-4 is related to this number as well. This would have a negligible effect on your calculated average. I would appreciate any insight you have on this, but if the actual water usage is higher than what is calculated the systems were still functioning properly during your periods of observations.

2. One big question is the difference between the identified levels of mottling, which I assume you consider to be redoximorphic features, and the groundwater level monitoring that was done. If, in fact, the redoximorphic features consistently appear above the actual free water table, this might explain the reason why systems are claimed to function without surfacing even though the hydrogeologic calculations indicate otherwise. In addition to your suggestion for a full springtime monitoring cycle, which I strongly support, I would like your opinion on the accuracy of the water level prediction based on redoximorphic features in various soil types, and any design factors that might be added to the Rules to account for the difference, if one exists.
3. The legend on the map for map #3 in the first appendix should read 0.1 – 1.0.
4. You note in the report that the spring of 2007 was a normal to below normal year for ground water levels. Do you have any thoughts on the functioning of the systems in this study if the SHWT were to rise to the levels indicated by the redoximorphic features?
5. The map showing the depth to water table may be a little misleading to those who look at the category of 3' – 99' and do not realize this is likely the bedrock water level.
6. At site #11, mottles are identified at 6". Considering the soil type and the other information included, are these mottles indicative of a SHWT?
7. The photos and monitoring results at site #43 suggest that surfacing has occurred, but your text does not mention it. If no surfacing has occurred, you might add a statement so there will not be a question about it.
8. I note that many of the sites have soil logs indicating better soils than the soil maps. While not unexpected, this is good news in that, despite the negative impression left by the county soil maps, there are areas that can be developed.
9. The data from the automatic and manual groundwater monitoring for site # 52 seem inconsistent. I also noted the field notes from the soil borings indicated surface saturation and odors at both MW-2 and MW-3. Is this representative of borderline failure?

10. Looking at #54, and at some others, it appears that the reported slope reflects the system construction rather than the natural ground slope. Site # 82 indicates a 15% slope in the text while the engineer's plan shows a nearly flat site. Please clarify as this would seem to be related to one of the report recommendations.
11. The second photo in #54 appears to be the same as that for #56.
12. I found site #57 to be very interesting. It is logged as a clay soil, it has a relatively high loading rate, and the monitored water level never approaches the level at which mottles are first noted. Do you have any thoughts about why?
13. At a quick look, sites #80 and #83 would appear to qualify under the current Rules for a performance based design approach.
14. In your summary you suggest that site #90 has evidence of failure. Maybe you should add something to the description on page 59 that explains this conclusion.
15. Please point me to the reference material related to virus removals. My quick look at the 2002 EPA Onsite Wastewater Treatment Manual did not find a reference to 6-8 log removals for viruses.
16. Please expand a little on our comment that systems loaded at design flow, but constructed with 2 gal/day/linear foot of system would be marginal but would function properly. How would you expect sites to look with this loading rate? Would they appear as they do now, or would there be evidence of leakage? Would walking around the downslope area be OK or would it be so soft that the soil would be disturbed with free water appearing in shallow depressions?
17. Are you making a recommendation that the Rules be changed? If so, please give any specific factors that you recommend. One immediate question that comes to mind is if 3" to mottling is a factor, can you substitute groundwater monitoring that finds free water at 3"? You should also address how accurately mottling can be identified and whether this can be done in areas that have been plowed.

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18. The majority of the sites investigated are reported to not be in a state of failure. Considering the selection process it is reasonable to consider if there was not a self-screening process that eliminated failed systems from review. Based on the research to date, is it clear that the majority of failed systems would not satisfy one or more of the design parameters that are suggested as the basis of successful designs? If so, then there seems to be a clear basis for separating functioning systems from non-functioning systems.

From my review I see three interesting questions. Would the selected systems be considered to not be failed if observed throughout the normal monitoring period during a year with average water levels? Does the SHWT reach the levels indicated by the redoximorphic features or is the free water level deeper than predicted which provides the needed hydraulic capacity? Does the research indicate that the sites have more hydraulic capacity than our mathematical models and on-site testing predict?

Please contact me at 241-3027 or at the address/phone number above if you have any questions.

Sincerely,

Roger Thompson, Jr.  
Regional Office Programs Manager

CC: Christine Thompson, Director WWMD