

**Initial Report to the Legislature on the Use of the  
Performance Based Approach  
for the Design of Wastewater Disposal Systems  
Subject to the Wastewater System and Potable Water Supply Rules**

**January 15, 2005**

**Submitted by:** \_\_\_\_\_  
**Elizabeth McLain, Secretary  
Agency of Natural Resources**

**Purpose:** This is the first of two reports required in Act 133 of the 2001 Adjourned Session. Subsection (j) - Monitoring, of Section 15 – Transition and Implementation, requires the Secretary to prepare reports in consultation with the Agency of Commerce and Community Development and the Technical Advisory Committee describing the performance of systems approved using the performance based approach and the effect on land use development patterns.

**History:** Prior to the passage of Act 133, the basic site limitations related to minimum naturally occurring soil had not been revised since 1982. Each lot was required to have a suitable area of naturally occurring soil that was at least 24” deep over bedrock. The soil within this area was also required to have at least 24” of naturally occurring soil above the seasonal high water table (SHWT). A site with less depth to the SHWT that was successfully drained to lower the SHWT to more than 24” from the surface could be approved. Any lot that could not meet both of these requirements was not acceptable for development, regardless of any site modifications that might be proposed.

With the acceptance of the performance-based approach, lots with as little as 18” of naturally occurring soil could be considered for approval. The requirement for 24” of naturally occurring soil above the SHWT was replaced with a requirement for a site-specific hydrogeologic analysis. The results of the analysis must indicate that while the wastewater system is in use, the resulting combination of the naturally occurring groundwater plus the addition of effluent to the ground from the disposal system, would remain at all times at least 6” below the surface of the naturally occurring ground. This is the required “performance” in the performance-based approach.

During the development of the rules needed to implement the changes in the minimum site conditions, it was expected and intended that lots that could not be developed under the previous rules would be permitted under the new rules. As the discussion proceeded it was clear that there were concerns that the new rules might allow for development in areas within towns that were both not previously developed and where the residents of those towns might not consider such development as desirable. There were also concerns that changes in development patterns might result in unintended consequences such as increased erosion that could affect streams and lakes.

In response to the above noted concerns, the legislature took certain actions. First, the legislature included a prohibition against adoption of rules that allowed for the placement of wastewater disposal systems on slopes exceeding 20% for new development on any lot created after June 13, 2002. The legislature further limited the use of the performance-based approach for approvals on lots created after June 13, 2002 to those towns with both a confirmed town plan and a zoning ordinance. This restriction expires on July 1, 2007 and is intended to create a window of opportunity for municipalities to consider the effects the reduction in minimum site conditions might have and to take any action they deem appropriate. In addition, the legislature required that the location of the performance based systems, and the operation of the systems, be

tracked and the results reported to the legislature so that any desirable or undesirable trends could be considered.

The first performance-based systems were permitted after August 16, 2002 when the rules implementing Act 133 became effective. During the remainder of 2002 only a limited number of systems using the performance-based approach were designed and approved. This appears to be related to the new skill levels required in soil identification and in making the hydrogeologic analyses as well as concerns related to additional liability with the new systems. The Technical Advisory Committee (TAC) and the Agency developed a “desktop” hydrogeologic analysis that was distilled into a short document that was adopted as a procedure by the Agency. This was done to assure designers that if they followed the procedure they could expect both that the system would function and that it would be permitted by the Agency. During the spring of 2003, the Agency provided multiple training sessions during which the performance based approach and the use of the “desktop” hydrogeologic approach were explained. More than 150 designers received this training. As the designers received the training and developed the expertise, more systems have been designed using the performance-based approach.

**Data:** The Regional Office electronic data system was queried for all primary and replacement systems that were approved based on the performance based approach. One hundred and twenty projects were identified. Several of the projects involved multiple lot subdivisions where more than one of the approved lots used the performance-based approach for either the primary or the replacement system, or for both systems. In total, this resulted in raw GPS (global positioning system) information for 212 points. While attempting to convert the information to a format for plotting in the VGIS (Vermont Geographic Information System), it was determined that some of the data was incomplete or in obvious error. A total of 186 points were entered into the VGIS. This information was then plotted and is shown on the attached map. At least one data point appears in 61 towns. Fifteen towns have three or more projects using the performance based approach.

**Geographic Analysis:** At this time the only analysis completed has been based on the geographical location of the data points. Preliminary observations by the Agency of Commerce and Community Development, the Agency of Natural Resources, and the Technical Advisory Committee include:

1. By overlaying the data points on the VGIS map layer based on E-911 addresses it is apparent that few of the data points are located within existing settlements.
2. There is a slight trend towards locations at higher elevations.
3. There is a large section of the state, along the Connecticut River, from the Canadian border down to the northern edge of Windsor County where no

performance-based systems have been approved. The reason for this is not clear.

4. The systems in southern Vermont tend to be clustered in relatively wealthy, resort towns such as the Stratton, Dover, and Wilmington corridor and in Woodstock and Barnard.
5. There is a cluster of systems in Addison County, particularly in the town of New Haven.
6. There is a cluster of systems in Franklin County, centered in the towns of Georgia and Fairfax.

One goal of the rule changes pertaining to minimum site conditions was to enable infill development of existing settlements. The data does not indicate that this is happening. It is not clear whether this is because other limitations, such as the presence of existing water supply locations, are the real limitation or because the changes in site conditions are not sufficient to overcome the soil limitations of the potential infill areas.

Now that some data has been entered into the VGIS, there is an opportunity to examine the data when placed on other existing data layers within the system. It is possible to plot the data versus elevation and versus soil mapping units to better determine the impact of the new systems. Until the location of the systems approved without using the performance based approach are also included in the VGIS, it will not be clear if there are distinct areas within towns that can only be developed using the performance based approach.

**Analysis of System Performance:** There is insufficient data to make any statement about the operation of performance-based systems. To date, only a very few inspection reports have been received. It is unknown at this time whether this is because only a few systems were built before 2004 and therefore the reports are not yet due, or because the permit requirement for the inspection report has been ignored. This will become much clearer by the end of 2005, as at that point there will be a significant number of systems that have been operational for at least a year. If the reports are not forthcoming, the Agency will have to divert resources from other projects to obtain compliance with the permit condition that requires inspection and reporting of the operation of the systems.

**Use of the Collected Information:** While the attached map is at such a large scale that it is difficult to use the information with any precision, the information can easily be viewed on a computer, using Arc View software. The VGIS system allows a user to focus on a small area, for instance an individual town, and overlay all of the other map layers. As noted above there are layers for soils and elevation, but there are also layers for wetlands, animal habitats, and transportation networks. It would be possible to arrange for demonstrations of the use of the VGIS system to analyze the data collected for this report as well and to demonstrate the use of the VGIS system for other planning processes.

**Work to be Completed:** There are several tasks that need to be completed prior to the final report to be submitted by January 2007, including:

- A. Ensure that all data is collected and entered into the tracking system in a uniform method.
- B. Determine if there is a method of data entry that would allow for electronic transfer from the Regional Office Tracking System into the VGIS.
- C. Ensure that the required annual inspections are done. This will involve a significant amount of work because it first must be determined if a particular system has been constructed and placed in use. Some systems are not constructed for several years after the permit is granted.
- D. Match the data for the performance based systems against the other data layers in the VGIS system, particularly as more systems are approved and the data is entered into the system, to determine if there are correlations that can be used for planning purposes. While it is not anticipated that there will be a significant number of failures of performance based designs, should this problem occur, there may be some correlation with a particular data layer that will be useful in determining the cause and correction of the failures.

# MEMORANDUM

TO: Christine Thompson – Director, Wastewater Management Division,  
Vermont Department of Environmental Conservation

FROM: Peg Elmer – Director, Planning Division and Andy Flagg, Planning  
Coordinator, Vermont Department of Housing & Community Affairs

DATE: January 12, 2005

RE: Act 133 (2001-2002) Report to the Legislature

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Thank you for the opportunity to provide input and comment to the “Performance-Based” system report to the Legislature as required by Act 133 of 2001-2002. Accompanying these comments is a map we have derived from the performance-based systems’ location data compiled from permit information by the Department of Environmental Conservation (DEC) and received here between 12/29/04 and 1/5/04. This is the “initial” report to the legislature, with a “final” report due in 2007.

The reports, which are to be done in consultation with the Agency of Commerce and Community Development and the technical advisory committee has two parts: (1) the performance of the systems, and (2) the effect on land use patterns that results from the use of those systems. We will leave the first to DEC but would like to address the second.

**Land Use Implications:** We don’t have time before the report deadline to effectively analyze the data collected thus far. To do that we would want to share this data with regional planning commission staff and other planners, and compare the data with slope and other GIS information. The attached map has overlaid the system location information on the E911 data, which indicates building locations. This provides a crude representation of settlement patterns in Vermont. It is immediately clear that few of the systems are located in villages. Most are quite isolated, and appear to be in higher elevations. There may be a relationship to land values, such as the number that have occurred in Barnard, given the expense of the systems.

Most of Vermont’s villages do not have public wastewater treatment systems, but we have a statutory land use goal “to plan development so as to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside.” Soil limitations in those villages for wastewater treatment have been a major barrier to implementing this goal. It was hoped, in the passage of the sewage reform legislation,

that the alternatives would assist in encouraging growth to occur in growth centers – to help maintain the integrity of Vermont’s settlement pattern as we grow. However, concern that the alternatives would spur the opposite result – sprawling single-family homes on outlying, previously-marginal land for development – led to the requirement for this report.

In addition, Act 133 provided that the alternative systems could only be used in municipalities with a confirmed planning process and zoning bylaws, until July 1, 2007. That recognized both that growth management in Vermont had relied heavily on the former wastewater system siting standards, and also that the former 10 acre exemption had impacted land use patterns strongly as well as the number of failed systems. In the 1997 “On-Site Sewage Reform Land Use Implications Study” produced by this Department, we concluded that the “degree to which the outcome of the reform is beneficial depends on the existence of strong and effective land use planning in Vermont.”

Last year, the statute (24VSAC Chapter 117) that enables local land use regulation was substantially revised and updated. Funding was provided for extensive training of local decision-makers on those revisions, which has just begun. The need for this education is large and will be ongoing as the volunteers have a constant turnover. So far the education is focusing on immediate (mostly procedural) revisions to bylaws that are necessary to meet statutory deadlines. It will probably be another year before training on how municipalities can utilize the tools to manage growth can get underway.

There is a relationship between slope, erosion and water quality that should be managed in developing at higher elevations. The state is also initiating extensive training of local officials on the relationship between land use decisions and watershed protection, which could incorporate the connection to the changes in siting wastewater systems brought by Act 133.

We found data points for the performance-based systems located in 61 of the 250 towns, i.e. approximately 24% of all towns. Noticeable gaps are found in the Northeast Kingdom and Orange County areas. Whereas many towns in the Northeast Kingdom would not qualify to use the systems given the requirement for a confirmed planning process and zoning bylaws, the absence in Orange County is harder to explain. We also can recognize that more than half of the number of towns and a clear majority of the individual systems permitted were constructed in the northern half of the state, with a significant concentration in the northwest corner. There may be a relationship to practitioners and/or regulators in particular areas, and their promotion or acceptance of these systems.

**Next Steps:** In order to prepare for a more in-depth response for the 2007 report on land use implications, we would recommend that DHCA form a committee that includes

representatives from DEC, the regional planning commissions, the Vermont Planners Association and the League of Cities and Towns to examine this data, to determine the information needed to perform a more effective analysis and to develop recommendations on how best to prepare municipalities to manage for growth that may be attracted by the availability of these systems.

We have noted several concerns with the data that was collected. Some of our concerns have arisen due to the difficulty in deciphering the various coordinate systems that were used by those collecting the GPS data. We highly recommend that the WWMD require future coordinates to be reported in the statewide, standard, State Plane Coordinate System using the NAD83 Datum. For further information, please reference the VGIS data standards located at:

[http://www.vcgi.org/techres/default.cfm?page=../standards/default\\_content.cfm](http://www.vcgi.org/techres/default.cfm?page=../standards/default_content.cfm).

Specifically, of the 212 data points that were reported, we could only geographically locate and map 186 points within the State boundary. This was due to the fact that some of the systems had no coordinates and some of the GPS (global positioning system) data reported was unintelligible.

**To conclude: This is important information to help guide effective planning for future development in Vermont. We look forward to participating in the gathering and analysis of the data for the 2007 final report. Thank you.**