Circular Ltr. #95-8

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH AND ADDICTION SERVICES

TO: Directors of Health, Chief Sanitarians, Consulting Engineers, Licensed Installers

FROM: Frank A. Schaub, Chief FAS
On-Site Sewage Disposal Section

SUBJECT: Minimum Leaching System Spread (MLSS) Update

DATE: August 22, 1994

It has been several months since MLSS was incorporated into the Technical Standards. Generally, we are pleased with the feedback we have received and hope that MLSS has become a valuable tool in determining whether or not a particular leaching system requires a more intense hydraulic review.

As with any new change, we have received questions from many of you and would now like to provide clarification regarding certain aspects of the MLSS criteria.

I. UNIFORM APPLICATION OF STACKED TRENCHES:

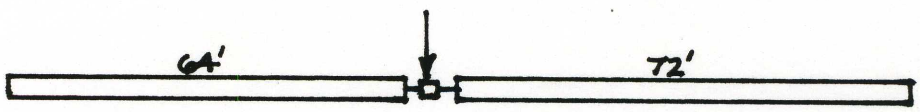
The most frequent request for clarification has been analysis of leaching systems where trenches are stacked and individual trenches do not meet MLSS. Many of you recognize that unbalanced stacking can produce hydraulic overloading. The primary goal of MLSS is to apply sewage fairly uniformly over the entire length of application. If each individual trench does not meet the Minimum Leaching System Spread, it may be possible for us to analyze the impact by one of several methods.

As an example, if we have a four bedroom house on a site with maximum ground water at 24 inches, slope of 5 percent and a perc rate of 25 minutes per inch, the required minimums would be: (See Appendix A of Technical Standards for MLSS criteria)

Leaching system required per code, 1000 sq. ft.
MLSS = (HF, 34 x FF, 2.0 x PF, 2.0) = 136 ft.

DESIGN OPTIONS:

If we need 1000 square feet with a spread of 136 ft. minimum, we could use a product that provides 1000/136 = 7.35 sq.ft. per lineal foot. If we selected a 30 inch high gallery at 7.4 sf/lf then the design would be as follows:



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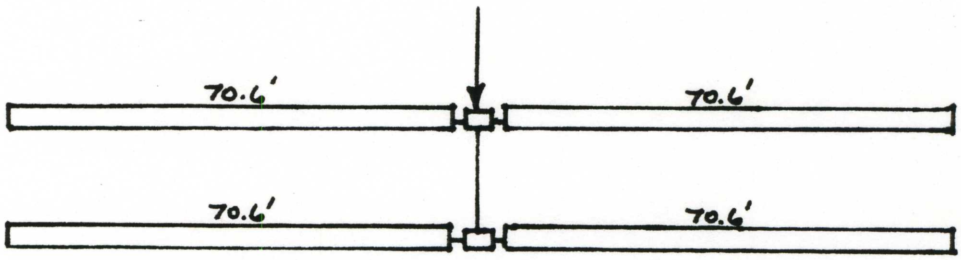
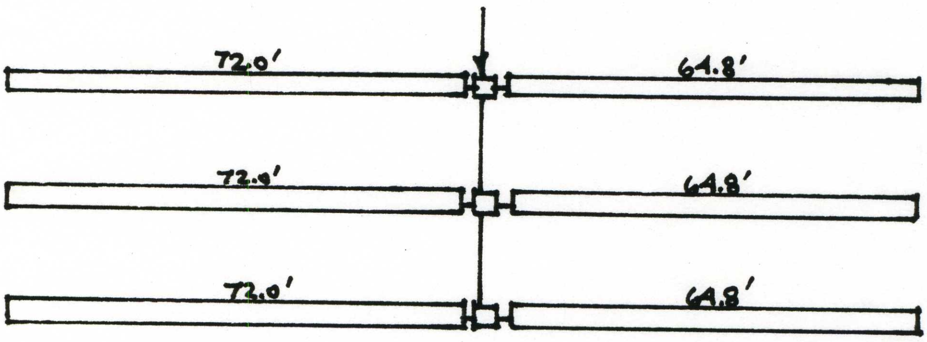
If we wanted a 2 row system, we would have to provide a minimum of 3.68 SF/LF (1000 sq. ft./2 rows /136 = 3.68 sf/lf) therefore, 14 inch Bio Diffusers or 16 inch Infiltrators providing 3.7 sf/lf and 3.8 sf/lf, respectively, would be acceptable utilizing the following configuration:

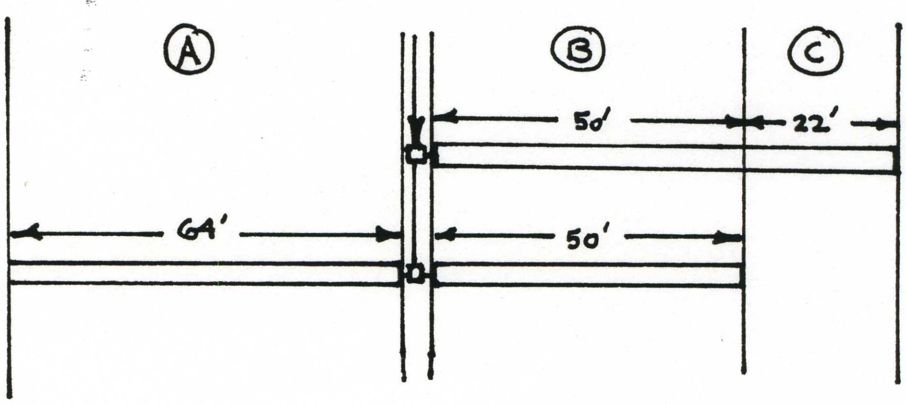


A three row design could be used by providing a minimum of 2.45 sf/lf (1000 sq. ft./3 rows/136 = 2.45 sq.ft. sf/lf). Standard 30 inch wide trenches providing 2.7 sf/lf or 12 inch Contactor 75's providing 2.6 sf/lf could be used. The Contactor configuration would appear as follows:



II. <u>STAGGERED OR STACKED NON-UNIFORM APPLICATIONS</u>:

Occasionally, site conditions make it necessary for engineers to configure systems which are not neat and simple with each trench meeting MLSS. It is possible for us to analyze these designs to assure hydraulic overloading does not occur. For the previous example sited, assume an engineer submits a plan utilizing 12" high leaching galleries (5.9 sf/lf) in the following configuration:



It should be obvious that hydraulic overloading is not critical in sections A and C of this design. Section B has stacking of 2 segments each 50 feet long. A simple mathematical analysis can be performed to determine if the percentage of leaching system which is stacked equals or exceeds the required hydraulic window for that section.

To determine if hydraulic overloading will occur in a particular hydraulic window perform the following analysis:

1. Draw section lines (perpendicular to natural contour lines) at the end of the leaching rows wherever the number of rows change within a hydraulic window (see example above).

2. Determine the minimum spread required for the design using MLSS criteria.

   In this case <u>MLSS = 34 x 2.0 x 2.0 = 136 ft</u>

3. Divide the cumulative length of system within the section with the most "stacked" elements (Section B: 50 + 50 = 100 ft) by the total length of system provided (Total: 62 + 50 + 50 + 24 = 186 ft).

   <u>Section Utilization = 100/186 = 54% Utilization</u>

   This indicates that 54% of the anticipated sewage flow will be within section B's hydraulic window when system is fully utilized.

4. Divide the length of spread provided in the hydraulic section of concern (Section B: 50 ft) by the minimum spread required from Item 2 above (MLSS = 136).

   <u>Hydraulic Capacity = 50/136 = 37% Capacity</u>

   Note: Only use MLSS criteria, not actual length of system if length provided exceeds MLSS criteria.

5. If the percentage of Section Utilization exceeds the percentage of Hydraulic Capacity then hydraulic overloading will likely occur within this section of the system and, therefore, the design should be rejected.

   <u>Section Utilization = 54% Hydraulic Capacity = 37%</u>
   Design should be rejected

This type of analysis should be performed whenever a "stacked" system configuration is of concern. The risk of hydraulic overloading will be greatest where unequal "stacking" occurs, therefore, it is important to understand the benefit of <u>uniform application</u>.

III. <u>PIGGY-BACK SYSTEMS</u>:

In the past few months, we have reviewed subdivision plans and have been requested to analyze the impact of leaching systems which are positioned on top of each other on separate lots or on the same lot. It is important that we consider the overload potential to avoid discharging too much effluent onto a particular soil column. This analysis should be performed subsequent to each individual system being evaluated. To determine the impact of the two systems, MLSS criteria should be utilized based upon the <u>total</u> number of bedrooms for both houses. Where soil characteristics or percolation rates differ system to system, the down gradient system's conditions should take precedence.

We have also been asked to set a minimum separation distance whereby "piggy-back" systems would likely not affect each other. Although there is no definitive way of calculating this distance, we recognize that there is a tendency for sewage to dissipate once it leaves the system. Because of this fact it is our opinion that the "piggy-back" effect will be minimal as along as the leaching systems are more than 50 feet apart. Under these conditions each system can be analyzed independently.

IV. <u>HYDRAULIC RESERVE</u>:

The Technical Standards clearly require MLSS to be applied to the primary leaching area only. It is desirable to provide additional hydraulic relief to facilitate future expansion of a residence, commercial or industrial building. If additional hydraulic capacity is provided either by installing the primary system more then the required MLSS or if this capacity is clearly shown in the reserve area on design plans, this will make our job much easier in the future when analyzing requests by the property owner to enlarge the structure or dwelling. If no additional hydraulic reserve is provided, property owners may be restricted to a one time one room addition unless site specific hydraulic analysis is performed by a design engineer to demonstrate suitability.

V. <u>HYDRAULIC GRADIENT</u>:

As our experience with plan review grows, it is evident that there are several different methods for calculating the hydraulic gradient based upon use of existing contours or spot elevations. Our general recommendation is that we consider the slope beginning at or near the uppermost leaching trench and extend a distance of 25 to 50 ft. down gradient from the primary system.

VI. <u>DEPTH TO RESTRICTIVE LAYER</u>:

The soil conditions near the lowest trench are most critical when analyzing hydraulic capacity. Therefore, in most cases use the depths to restrictive layer in this area when calculating MLSS. Even though soil depths within the leaching area may be somewhat different, the down gradient receiving soil layer actually governs the total quantity of sewage which will be absorbed and dispersed.

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