THE HIGHLAND COUNCIL
BUILDING STANDARDS

Professional Policy Note

The Design of Filter Mounds

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1. General

Filter mounds have been increasingly used in the Highland Area to allow developments to proceed on ground with extremely poor soil infiltration, as an alternative to taking a discharge to watercourse, sea etc.

In theory they provide a further treatment of effluent discharge and until recently were acceptable on ground with virtually no infiltration. Some research now indicates that filter mounds are not suitable to overcome poor percolation conditions, since they will simply result in seepages around the ground surface.

The most common failures in mound systems are at the granular fill material/filter material interface in the mound. The quality and quantity of wastewater or the filter material cause these failures.

The views on the use of filter mound are changing, brought about due to research into mound failures, the guidance in the 2007 Technical Handbooks has taken this into consideration and changed the way filter mounds should be designed and their suitability assessed.

2. Guidance

The Technical Handbooks have introduced a new document as the first point of guidance for the design of filter mounds.
This guidance is only suitable for domestic sized buildings and should be used with caution.
BRE 478, Mound Filter Systems for the Treatment of Domestic Wastewater, was published by the Building Research Establishment in response to the need for clear guidance.
It describes a design for filter mounds and should be used by surveyors in checking filter mound designs.

3. Procedures

When a filter mound is proposed, surveyors should direct the designer to the document BRE 478, and advise that a design in its terms should be submitted.
The minimum information required, by this document, to design, and therefore to check, the suitability of a site for a mounded system is: -

For Site / System suitability

1. A soil profile down to bedrock level or 1300mm, whichever is the deepest.
2. Infiltration or percolation tests of the top 300mm of naturally occurring soil.
3. The maximum high ground water level.

4. The natural gradient of the site
5. A site plan indicating, as well as the proposed mound system:-
   All other physical aspects of the site (Buildings, driveways, septic tanks boundaries, watercourses and springs etc. and their distance from the proposed mound.
6. Calculation sheet for the drain field sizing and overall mound size

For System effectiveness: -

1. Sand fill specification and sourcing details, including percolation rates. (and if deemed necessary Purchase evidence)
2. Cross section of the proposed mound showing all layers and dimensions.
3. Method statement for the construction of the mound.
4. Inspection of the subsoil preparation, prior to the mound construction being started.
5. Detailed maintenance and use information (User Manual)

The submitted design should then be checked against this document, and as previously, the filter sand quality should be queried and if felt necessary, evidence of it's purchase advised and sought prior to any Completion Certificate being accepted.
There appears to be a considerable amount of research currently being undertaken on the use and design of mound systems, particularly in the U.S.A. (Where the system originated). Currently, however, BRE 478 is felt to be the only adequate design and verification tool available.

Generally the guidance indicates that a mound system may be used where **SITE INVESTIGATION** demonstrates that **all** of the following site requirement conditions exist.

1. There is at least 0.25 m of naturally occurring soil above the bedrock.
2. The maximum high groundwater level is at least 0.25 m below the natural ground surface.
3. The percolation coefficient, K, of the naturally occurring soil ranges from 0.3 m/day to 36 m/day in the upper 300 mm of the soil.
4. The slope of the original ground surface over the proposed site does not exceed 12% (1 in 8) slope. (**Note** site modification is not acceptable to attain the maximum slope).
5. All specified minimum horizontal and vertical separation distances for the design and location of the mound can be met.

Appendix 6 of BRE 478 gives causes and solutions to common mound system problems.