

LABSS INFORMATION PAPER INFOP14 - 2016 Version 3 – September 2016

PRIVATE WASTEWATER TREATMENT TO DWELLINGS

Disposal of wastewater to very low permeability ground

Applicable to Domestic and Non-Domestic Buildings in relation to

Section 3: Environment

Mandatory Standard 3.9 Private wastewater treatment systems – infiltration systems

Clause 3.9.2 Design of infiltration fields

BACKGROUND**Mandatory Standard 3.9**

Every private wastewater treatment system serving a building must be designed and constructed in such a way that the disposal of the wastewater to ground is safe and is not a threat to the health of the people in or around the building.

Guidance Clause 3.9.2

An infiltration system serving a private wastewater treatment plant or septic tank should be designed and constructed to suit the conditions as determined by the ground into which the treated wastewater is discharged.

TECHNICAL CONSIDERATIONS

The proposal here is for a drip dispersal system being the final dispersal arrangements of a two-component private wastewater treatment system. The major design features of a drip dispersal system are

- the pressure dosing, and
- the controlled dispersal components.

A complete wastewater treatment system, consisting in part a drip dispersal system, requires some treatment processes upstream of the pumping and dispersal system. This pre-treatment process, which as a minimum removes solids and provides required levels of additional treatment, prior to discharge to the drip dispersal component.

Drip dispersal is a shallow slow rate pressure-dosed system used for land application of wastewater. This type of system uses small diameter piping with drip emitters, and must be preceded by filtering mechanisms, which conforms to the manufacturer's specifications for the particular emitter used. Effluent must be adequately filtered before distribution through the drip tubing and emitter system.

Subsurface drip dispersal networks have the capability of equally distributing effluent at relatively low application rates over the entire absorption area with the goal of preventing saturation of the soil. Wastewater is applied at a controlled rate in the plant root zone. Shallow placement of the drip emitter lines is intended to allow for enhanced evapotranspiration and plant uptake of effluent as compared with conventional subsurface dispersal systems. The drip line is installed directly into the soil without aggregate or other media.

GENERAL CONCLUSIONS OF THIS FORM OF TREATMENT

The complete wastewater treatment comprises a primary treatment plant the design of which is relatively conventional. This primary treatment device then discharges to a pumped controlled system to disperse the treated wastewater to the soil at a shallow level. Dispersal relies on controlled flow and intermittent flow to ensure dispersal and recovery over the "soakaway" area. A list of supporting papers is shown in Annex A below, but this list is not the only "evidence" which may be available to the designer or verifier. The specialist designer / supplier of the system has a duty to provide authoritative information to indicate the scope and the limitations of their installations.

EVIDENCE OF WORKABILITY

While there are supporting documents available to support the design philosophy of the drip dispersal system (see Annex A below) – much of it is supplied by the designers and/or suppliers with little or no fully accountable or accredited confirmations of the design or its limitations.

The secondary treatment plant comprising the pumping chambers and the drip dispersal system itself relies on mechanical means of control and dispersal to ground unlike a conventional soakaway system such as a mounded soakaway. As before, there is little independent and accountable accreditation of the system.

However, it is clear that provided:

1. the system is installed fully in accordance with the design criteria available, and
2. a fully independent porosity test is available to confirm the soakaway potential and absorption capability of dispersal ground area in accordance with the system needs,

there may be merit in considering such a treatment proposal within the limits as indicated below in the DECISION Section. A correctly specified drip-distribution system could, in ¹low-risk applications, allow for disposal of wastewater in a manner that is “safe and is not a threat to the health of people in or around the building.” This is on the basis that this secondary treatment will typically remove 95%+ of the organic load in domestic wastewater, and consequently effluent from a treatment plant serving a single dwelling could be dealt with.

¹**Low-risk applications** namely a single dwelling served by a packaged treatment plant (as opposed to a septic tank) on a site with a percolation value $V_p < 140$ sec/mm.

DECISION

1. For a single dwelling served by a packaged treatment plant (as opposed to a septic tank) verifiers may wish to consider on a case-by-case basis acceptance of the drip dispersal system subject to the undemoted criteria being met and confirmed

The level of information to be provided by the applicant would be expected to include, as a minimum:

- a detailed site investigation including evidence that $V_p < 140$ sec/mm,
- a detailed packaged treatment plant specification including evidence that effluent BOD < 20 mg/l,
- a population equivalent of not more than 7,
- installation and design must be carried strictly in accordance with the system specialist manufacturers and suppliers’ documentation specific to the site under consideration,
- evidence of SEPA consultation,
- details of any measures required to prevent frost/physical damage to system, and
- evidence of an owners guide to a system and treatment field maintenance plan.

2. Where ²higher-risk applications are concerned, “approval cannot be recommended without a UKAS Accredited assessment report to confirm design and installation criteria.”

²**Higher-risk applications** namely any development other than that covered by item¹

ANNEX A

This is not an exclusive list – other evidence may be available

Drip Dispersal Systems Technology Assessment and Design Guidance - Iowa Department of Natural Resources
Report No 161 – EPA Assessment of Disposal options for treated wastewater from single houses on low permeability subsoils
Ash Environmental Technologies - Drip Distribution Systems for Percolation Areas