

Environment Alliance – working together

## pollution prevention guidelines

### Treatment and disposal of sewage where no foul sewer is available: PPG4

These guidelines are jointly produced by the Environment Agency for England and Wales, the Scottish Environment Protection Agency, and the Environment and Heritage Service for Northern Ireland (referred to here as 'we' or 'us'). You should consider all sites individually and we advise you to consult one of our local offices as early as possible. You can find contact details at the end of these guidelines.

Following the good practice described does not remove your obligation to comply with relevant legislation and to prevent pollution from your site. Pollution of the environment is a criminal offence and compliance with one or more Guidance Note is not a defence to such offences. It is recommended that you check the references to other sources of guidance to ensure they are still current.

In this document sewage is defined as the water borne wastes of a community or household.

The Construction Products Regulations 1991 dictate the essential requirements that a sewage treatment system must fulfil to be legally supplied in the UK. Where we use the word 'must' in this guidance, compliance with that particular part of the guidance is a legal requirement under these regulations. The Trading Standards Authorities enforce these regulations.

## 1. Introduction

Choosing the right sewage treatment and disposal method for your site is essential to ensure value for money, effective long-term performance, protection of public health and the environment, and compliance with relevant legislation.

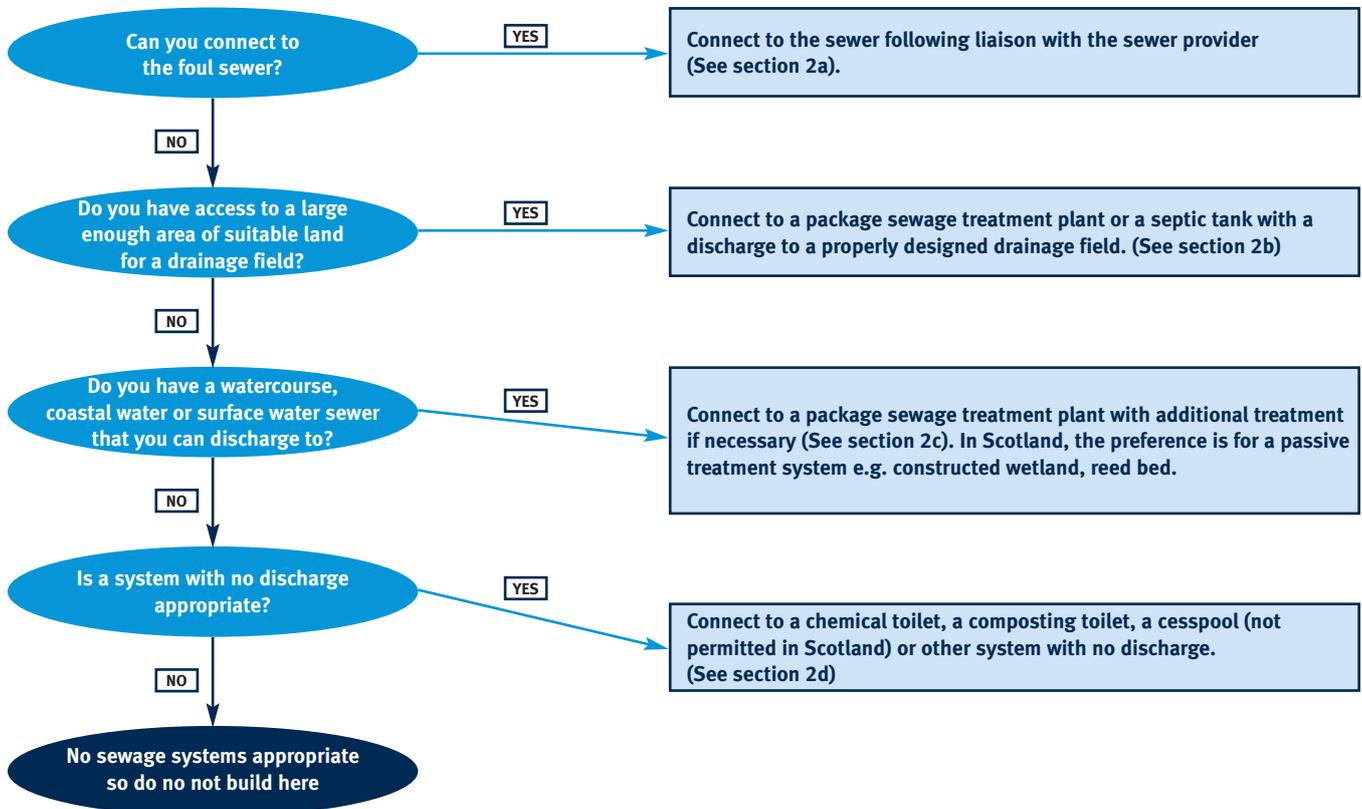
This guidance will help you choose the correct option for your circumstances by telling you about;

- ◆ the sewage treatment and disposal methods available.
- ◆ the maintenance requirements of the system you choose.
- ◆ the basic legal requirements.

Sewage treatment and disposal can be provided by a sewer provider (that is the public 'foul' sewer) or by a private sewage treatment system. Developments proposing the use of private sewage treatment systems are usually only acceptable where connection to the public sewer is not possible. Although if a treatment system is proposed that offers a more sustainable solution to the overall water management of the site, that might be acceptable.

## 2. Sewage treatment and disposal - Selecting the best option

Use the flowchart and questions below to help you choose the best system for your site. When you have selected an option you should continue to read the relevant section in this guidance. You should always seek expert advice before making your final decision. (See reference 2 for more information on selecting the best option)



### a) Can You Connect To Foul Sewer?

Discharge to foul sewer is the preferred option as the sewage is conveyed to a purpose built and closely monitored sewage treatment plant, so development proposals in sewered areas should connect to public sewer. If the development is not within the public sewer catchment, the applicant should contact the sewer provider to see if it is possible to connect to the foul sewer, for example, via pumping. This is usually a legal requirement and you should check with your local planning authority and sewer provider. If you cannot connect to the foul sewer you will need to complete a written report to show that that you have investigated the possibility of sewer connection. (See section 7c). In Scotland, you will need confirmation from the Statutory sewerage undertaker (Scottish Water) that all possible routes have been investigated, for example, connection by pumping, connection financed by developer contributions or a duty to connect to the main sewer at a later date with a private treatment plant used in the interim period.

Also if it can be demonstrated that the proposed sewage treatment and disposal system offers a more sustainable solution to the overall water management of the site than connection to the foul sewer, we will consider the installation of that system.

### b) Can You Discharge To Land?

If you have access to a suitable area of land you should consider a discharge into a properly designed and sized drainage field: effluent from a package sewage treatment plant or a septic tank can be discharged into it. The micro-organisms in the soil break down any organic matter left in the effluent and ensure that it does not harm the environment. Package sewage treatment plants are often a suitable option where groundwater or the surrounding environment is vulnerable, or where there are multiple or commercial premises, as this will discharge a better quality effluent to the drainage field. Septic tanks are often a suitable option for small-scale residential developments where sufficient land is available for an adequate drainage field. A small-scale development is considered to be one that accommodates approximately 15 people or their equivalent, although particularly good site conditions may allow a drainage field to properly treat effluent for a higher population equivalent.

If you choose to spread the discharge into land via a drainage field, you should check there is enough suitable land to do this. You will need a good depth of well-drained, well-aerated soil. Avoid steeply sloping sites and sites prone to waterlogging. It should be located away from watercourses, wells, boreholes and from any dwelling. More details are in Section 3.2. A diagram of a drainage field is in Figure 1.

You should always check any restrictions with us and your local planning authority. The exact area of land required for your drainage field will be determined by a percolation test. A competent person should do this and details can be found in Appendix A. A discharge from a package sewage treatment plant requires a smaller drainage field for effective treatment than a discharge from a septic tank. Drainage mounds can provide an alternative to drainage fields in certain circumstances. More details on drainage mounds are in Section 3.2 (g).

### **c) Can you Discharge to a Watercourse, Coastal Waters or a Surface Water Sewer?**

If it is not possible to discharge to a drainage field and you can discharge to a watercourse, coastal waters or to a surface water sewer you should consider installing a package sewage treatment plant or a passive sewage treatment system such as a reed bed. These can treat the sewage to a sufficient standard that it can be discharged directly to the receiving waters. The receiving waters must be able to dilute the effluent so that it does not harm the environment. You are likely to need our written consent and you should always contact us before deciding on this option. If you discharge to a surface water sewer, you are likely to need the consent of the sewer provider.

### **d) Other Forms of Treatment and Disposal**

If your site is unsuitable for a drainage field and you cannot discharge to a watercourse you should consider other forms of treatment and disposal. These might include

- ◆ cesspools (not accepted in Scotland)
- ◆ chemical toilets
- ◆ composting toilets

## **3. Methods of treatment**

### **3.1 Package sewage treatment plants**

If you can discharge to a watercourse or your drainage field requires a better quality effluent than that from a septic tank, a package sewage treatment plant might be the most appropriate method. Our consent is required for a discharge from a package sewage treatment plant to a watercourse or drainage field (see section 7). The European Standard (EN 12566-3) contains details of the design and construction of package sewage treatment plants. The unit you choose will have to have to comply with certain parts of this standard in the future. You should check with your supplier that the unit you choose fully complies with legal requirements (see Reference 4).

a) There are several different types of package sewage treatment plants available, each with a slightly different treatment technique, but each type provides a treatment unit or biological zone where the sewage comes into contact with micro-organisms that break down the organic matter in the sewage. If the unit you choose does not have a settlement tank, the sewage may need to pass through a separate settlement tank or septic tank before it enters the package sewage treatment plant to allow large solids to settle out. Any such upstream settlement tank must be adequately sized to work properly.

b) A package sewage treatment plant can treat the effluent from a septic tank where effluent quality needs to be improved.

c) You are likely to require consent from us to make any discharges from a package sewage treatment plant. This consent will set quality and volume limits. You should seek our advice on the likely effluent quality standard required before ordering the plant so that you can seek assurances from the manufacturer that the plant will consistently comply with these standards.

d) In some cases the discharge from your package sewage treatment plant may require additional treatment to meet any consent limits. This can be achieved by using an additional treatment system such as a reed-bed or wetland system, disinfection, filtration or settlement (See section 4). In Northern Ireland you might be required to add a reed-bed of at least 4 square metres if you are discharging to a watercourse with a rainfall catchment of less than 2 square kilometres. You should contact us for advice.

e) Package sewage treatment plants need a steady flow of sewage to keep the micro-organisms alive and to operate most effectively. If your site may generate erratic loads (for example holiday accommodation, scout camps) you should seek specialist advice as you might need a flow balancing system to even out the flow.

f) Some package sewage treatment plants can be designed to treat organic trade effluents such as milk washings or vegetable washings. You should contact the manufacturers for further advice.

### 3.2 Septic tanks

If you have suitable land to create an effective drainage field, a septic tank system might be most appropriate. Our consent is often required for a discharge from a septic tank to a drainage field (see section 7). Factory made septic tanks must comply with the Construction Products Regulations. You must ask your supplier to confirm that the unit you are buying has the appropriate certification.

a) A septic tank is usually a two- or three-chamber system, which holds sewage to allow the solids to form into sludge at the bottom of the tank. Here it is naturally broken-down and the remaining liquid effluent then drains from the tank through an outlet pipe. This provides settlement and some biological treatment but the effluent is **not** fully treated as it emerges from the system.

b) Effluent from a septic tank must have additional treatment before discharge into the water environment. The most common form of additional treatment is to spread the effluent into land via a drainage field. You should not use deep soakage pits, which concentrate the discharge in one place and bypass soil layers. Alternatively, septic tank effluent can be passed to a package sewage treatment plant, a reed bed or a gravel filter for further treatment before discharging to the environment.

c) The most common form of drainage field is a subsurface irrigation area, comprising of perforated infiltration pipes laid in shingle filled trenches (See Figure 1). You should locate drainage field drains at as shallow a depth as possible, usually within 1 metre of the ground surface. The micro-organisms in the soil break down the remaining organic matter and should prevent any pollution.

d) Before you can dispose of effluent via a drainage field you need to calculate the area of land you need. This should be done using the percolation test shown in **Appendix A**. An independent professional should conduct the test and provide a certificate according to BS 6297:1983 (or any future issues of that Standard) or any other nationally accepted method, and ensure compliance with any building regulations. Areas of heavy clay or steeply sloping sites are not normally suitable (See reference 6). The drainage field should be sited so it remains nominally 1metre (1.2 metres in Northern Ireland) above the water table during winter. Where possible this should be confirmed by means of a trial pit dug to at least 1.5metres below the invert level of the drains. **We do not carry out percolation tests or trial pits. In some areas, building control bodies may wish to witness the test.**

e) The percolation test should not be carried out during abnormal weather conditions such as heavy rain, severe frost or drought.

f) Any septic tank and drainage field system must be located in such a position that it cannot affect surface or ground waters and cannot cause a nuisance to nearby residential properties. The Building Regulations set minimum distances from certain features and you should consult your local authority to ensure you locate your plant appropriately.

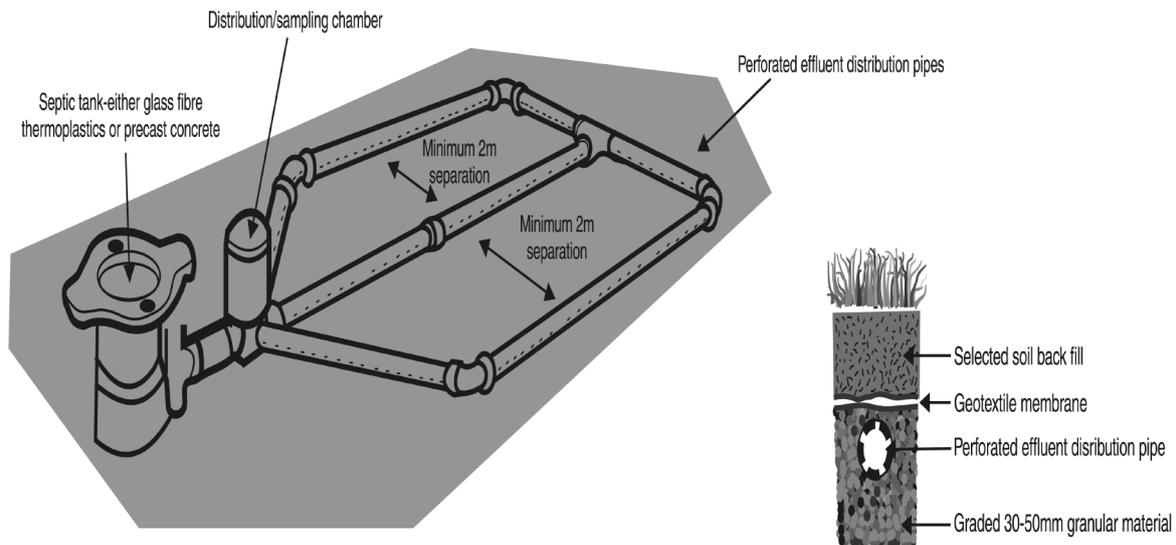
g) Guidance on the assessment of general conditions of the site and its suitability for installing a drainage field are in the technical guidance supporting your local Building Regulations. Details of how to find this technical guidance is provided in references 8,9 and 10. These documents also contains details of drainage mounds, which are elevated mounds of earth which provide an aerated layer of soil to treat the discharge where a conventional drainage field is inappropriate due to occasional water logging.

h) If you discharge effluent to a drainage field or drainage mound, you must follow the advice in the 'Groundwater Protection Code: Use and construction of septic tanks and other non-mains sewerage systems', which provides advice on protecting groundwater (Reference 14).

i) For domestic properties, the capacity of a septic tank should be sized according to guidance supporting the Building Regulations available in References 8, 9 and 10. The minimum size for 4 domestic users is 2700 litres. Your supplier will be able to assist you in the sizing of your septic tank.

j) Septic tanks are not suitable for the treatment of trade effluent unless the effluent is very similar to domestic sewage

**Figure 1: Schematic Diagram of a Drainage Field (Taken from Approved Document H to the Building Regulations - Reference 8)**



### 3.3 Cesspools

If you require a temporary sewage disposal system whilst you are preparing a permanent solution, a cesspool might be a suitable method. We don't encourage the use of cesspools and you might need permission from the local authority Environmental Health Officer. In Scotland, the Building Standards do not permit the use of cesspools. The minimum capacity of a cesspool is set in guidance supporting the Building Regulations available in References 8 and 10. You should check with your supplier to make sure the unit you buy fully complies with legal requirements.

a) A cesspool is a covered watertight tank used for storing sewage. It has no outlet and relies on road transport for the removal of raw sewage. It is the least sustainable option for sewage disposal. You should consider a cesspool as a temporary measure pending a more satisfactory solution, such as the provision of mains drainage.

b) A cesspool requires regular emptying and must not be allowed to overflow. We recommend you install a level warning device to indicate when it is nearly full. You should check that whoever empties your cesspool is registered with us to carry waste. You can use your local authority or a private contractor as an emptying service (you should check, as emptying services may be non-existent or expensive in your area).

c) The average household of three people will produce 9,000 litres of sewage in about two weeks, the capacity of a typical emptying tanker. (See reference 11 for more information on sewage production volumes)

d) You should site a cesspool where it cannot affect surface or ground waters and cannot cause a nuisance to nearby residential properties. The Building Regulations set minimum distances from certain features and you should consult your local authority to ensure you locate your plant appropriately.

### 3.4 Waterless toilets - Chemical toilets and composting toilets

If you require temporary or mobile sewage treatment and disposal or your site is located in an isolated area away from sewers, electric power and running water, a chemical or composting toilet might be a suitable method of private sewage treatment and disposal.

a) Waterless chemical toilets are self-contained systems that rely on chemicals (biocides) to control foul odours. They are used at locations like campsites, construction sites and at large events. We recommend that you use either the foul sewer or a centralised waste collection and disposal facility to dispose of chemical toilet wastes. You should always contact the sewer provider before emptying to foul sewer. If there is no foul sewer available you should contact us for advice about your disposal options and legal requirements. You must not discharge effluent from a chemical toilet into a watercourse, surface drain, the ground or groundwater.

b) Composting toilets use natural processes to convert waste matter into compost. They are useful at remote sites, such as a nature reserve, where there is no public sewer or mains water supply. They may require maintenance and the addition of materials such as sawdust to aid the composting process. Some may produce concentrated fluid fertiliser or dry compost for use. These should not be discharged to a watercourse.

## 4. Additional treatment systems for further improving effluents before discharge to a watercourse (effluent polishing systems)

### 4.1 Reed Bed Systems

A reed-bed or wetland system should improve the quality of effluent discharges from septic tanks, a settlement tank or package sewage treatment plants. This enhanced level of treatment might be required before a discharge is allowed into a sensitive or small watercourse, a watercourse that receives many discharges, or a drainage field where groundwater is vulnerable. Our consent is required for a discharge from a reed-bed to a watercourse or drainage field (see section 7). In some cases the addition of a reed bed is a legal requirement.

a) Reed-beds are specially designed and constructed plots with a granular medium and an impermeable base which can be used to improve effluent quality. They have the advantage of having no moving parts and require less maintenance than package treatment plants. Reed-beds rely on the ability of certain plants to absorb and transport oxygen through their stem system to the root zone, where it can be taken up by the organic material present in the sewage and so purify the effluent. (See reference 12)

b) Before you install a reed-bed, you should consult us to discuss whether it will be a satisfactory means of treating the effluent given the local circumstances. Any reed-bed should be properly designed, constructed and maintained.

Guidance on the design and construction of reed-bed treatment systems is available in BRE Good Building Guide No 42 (reference 12).

### 4.2 Partial or Seasonal Drainage Field

This is a hybrid option incorporating an overflow to a watercourse from the highest point of the drainage field. They can provide a disposal solution for sites where there is a high water table in winter and low surface water flows in summer.

### 4.3 Disinfection

Disinfection can be provided for effluent discharges into watercourses that enter or lead to bathing, shellfish or recreational waters. The disinfection process kills off many of the bacteria present in the effluent and prevents the development of infections and ill health in those using the bathing or recreational waters. The disinfection can be achieved by several methods but for each of them the effluent quality has to be quite good for the treatment to be effective. It will not work on septic tank effluent without additional treatment. The equipment manufacturer should state the capability of their equipment.

### 4.4 Filtration

There are several filtration systems on the market that can filter effluent from package sewage treatment plants and polish the effluent to a better quality. These include sand filters, drum filters, membrane filters and micro-filters. They take up a smaller area of land than some other options but they require ongoing maintenance and usually need a power supply.

### 4.5 Stabilisation ponds

Stabilisation ponds allow the effluent to be retained and improved for a while before discharge to a watercourse or soakaway. They are only suitable for effluents that have already been treated to a high level as any significant residual organic matter can make the pond smell foul. They can provide an attractive natural habitat for plants and animals. However, high nutrient levels usually mean they are unsuitable for fish.

### 4.6 Gravel Beds

Gravel beds spread effluent evenly across a bed of gravel. The effluent is further treated as it comes in contact with micro-organisms living on the gravel surface. The effluent quality should be quite good before it is treated this way or the gravel bed can block and stop working. Gravel beds sometimes require a power supply. They are often able to cope with uneven flows.

### 4.7 Drainage Mounds

Drainage mounds are constructed from layers of different material which the effluent passes through and the micro-organisms within the layers breaks down any residual organic matter. They require an area of appropriate land but like gravel beds, they are often able to cope with uneven flows.

## 5. Calculating the right size for your chosen sewage treatment system

The size of sewage treatment system you will require depends on the number of people that occupy the site and their activities. When you have chosen the right type of system using the information in Sections 2 and 3, you should then contact your chosen supplier. You will need to provide them with detailed information about the sewage to be treated and they will calculate the size of unit that you need. Use Table 1 below to calculate the likely sewage production in litres for the activities on your site. You can find out more information on sizing sewage treatment facilities from the British Water Code of Practice on Flows and Loads (Reference 11).

It is essential to give your supplier accurate information. If the information is wrong the sewage treatment facility you are provided with is likely to be inadequate and will not treat the sewage effectively. This can pollute the environment and produce foul smells near your property. You must identify any expected variations in flow (for example rural pubs that are very busy at weekends) or trade effluents entering your drains (for example milk washings from an ice cream factory).

Particular care is needed in designing treatment systems for catering establishments, where significant quantities of grease and cooking oil are produced. If these pass into treatment plants or drainage fields they interfere with treatment and can block drains. You should seek expert advice and install grease traps where necessary.

**Table 1: Guideline per capita Sewage Volumes- for more detailed information see the British Water Code of Practice, Flows and Loads - 2 (Reference 11)**

Property	Volume per person or activity (litres per day)	Property	Volume per person or activity (litres per day)
Domestic	200	Offices	50 (without a canteen)
Hotels	300 per guest	Factories	50 (without a canteen)
Restaurants	30 if full meal luxury catering	Public Houses	12 per customer
Campsites	75	Caravans	100 if non serviced touring
Day school	50 (without a canteen)	Rest Homes	350
Boarding school	200 per resident	Hospitals	450

## 6. Operating and maintaining your chosen sewage treatment system

### Operation

a) Sewage treatment is an ongoing process and the micro-organisms must stay healthy for the system to work. You should desludge the system regularly to prevent the build up of sludge and solids so that sewage flows freely through the unit. You should check that anyone you use to remove sludge from the system is registered with us to carry waste. This may be the local sewer provider or a private contractor. Sludge should normally be removed every 12 months or in accordance with the manufacturer's instructions.

b) Sewage treatment plants use biological treatment that requires a stable environment to work well. You should check that the plant is protected against substances that might damage it and kill the micro-organisms. Check with the manufacturer's instructions on the use of cleaning materials, such as bleach. Do not use the connecting drains to dispose of chemicals, oils, solvents, grease or paintbrush cleaning fluids.

c) No clean uncontaminated roof or surface water should enter the sewage treatment system. This may be a legal requirement. This can reduce the system's capacity and can cause solids to be flushed out which may cause pollution and flooding.

d) You must make sure that when the system is installed, a notice is fixed within the building describing the maintenance needed for your sewage treatment plant. This will help subsequent occupants of the property and ensure that the system continues to be maintained effectively. The notice should detail the treatment system's size, type and location along with details and frequency of the required maintenance operations.

e) If the site changes ownership, the manufacturer's instructions and any consent to discharge for the system should be transferred to the new owners.

f) You must make sure there is adequate vehicular access to empty and maintain your system.

## Maintenance

Use operators experienced in dealing with sewage treatment plants to carry out the maintenance identified in the manufacturer's instructions. The manufacturer of your system should be able to provide you with the details of an appropriate company. We recommend that you enter into a maintenance agreement with a suitable contractor. British Water have established a service training scheme for accreditation of engineers and details of accredited engineers can be found on their website (Reference 13).

a) If the system requires a power supply, it must be available with no breaks in supply, as this can lead to the death of the micro-organisms. We recommend you fit an alarm to warn you of any electrical failure.

b) If the system discharges to a watercourse, the outfall should be inspected monthly to check effluent quality. If you notice any deterioration, maintenance contractors should be called out to assess the performance of the unit right away. Deterioration of effluent quality is indicated by the development of grey slime on the bed of the stream, bad smells coming from the stream or an obvious difference in the plant life downstream of the discharge point.

c) More information on maintaining sewage treatment systems is available in References 4, 8 and 15.

## 7. Consent And Land Use Planning Requirements

You should contact us as early as possible when planning sewage treatment for the site to clarify which discharge criteria will be imposed and which treatment system will be most appropriate. You should do this before making an application for building control approval, as the information we provide will influence the type of system that may be installed.

### Land Use Planning

a) Any proposals for non-mains sewerage systems must take account of the requirements of Building Regulations and should be discussed with the local planning authority at an early stage and well before any planning application is made. In particular, approval for the construction and installation may be needed from the local authority's building control department. In England and Wales this is governed by the Building Regulations (England & Wales) 2000 (as amended) and guidance "Wastewater Treatment Systems and Cesspools" The Requirement H2 (See reference 8). For Scotland Section 3 of the Technical Handbook from the Scottish Building Standards Agency (Reference 9) provides guidance on achieving compliance with The Building (Scotland) Regulations 2004. For Northern Ireland, Technical Booklet N (Reference 10) provides guidance on achieving compliance with the Building Regulations (Northern Ireland) 1990.

b) In England, DETR Circular 03/99 provides guidance on the relevant land use planning considerations that Local Planning Authorities, developers and others should take into account when involved with planning applications for developments involving non-mains foul drainage. This guidance is provided in Wales under the title WO Circular 10/99. (See reference 7). In Scotland Scottish Planning Policies 1 (para 51) and 7 (para 21) identify drainage as a material consideration in the determination of any planning application (See references 16 and 17).

c) DETR Circular 03/99 and WO Circular 10/99 advise that planning applications involving proposed non-mains foul drainage should be accompanied by a Foul Drainage Assessment. The assessment is designed to give Local Planning Authorities and consultees such as the Environment Agency sufficient information to enable them to determine these planning applications. The installation or replacement of non-mains foul drainage systems alone can also amount to a development requiring planning permission. If in doubt check with your Local Planning Authority.

d) Septic tanks or package sewage treatment plants of any sort must not be located in an area at risk of flooding.

## Consents

e) **Consent from the relevant Agency is required for any discharge of sewage effluent into inland watercourses, lakes, coastal waters and groundwaters.** In England and Wales, consent might also be required for any discharge into a drainage field or a self-contained pond. Consent is always required for a discharge to a self-contained pond in Scotland and to a drainage field in Northern Ireland and Scotland. In Scotland application for consent for small scale sewage discharges can be made online (see SEPA website).

f) The consent you receive may be referred to as an authorisation, registration, licence, permit, or a 'consent to discharge', depending where your site is located.

g) The holder of the discharge consent for a sewage treatment plant is responsible for ensuring that the plant is well maintained and that the effluent complies with the consent conditions. Such consents are not granted automatically, and are not normally granted where a public foul sewer is available. We make an administration charge for application for consent and there may be an annual fee to cover monitoring and other costs. Full details can be supplied on request.

h) If the system serves more than one property or in Scotland if the system serves more than 15 people, you should consider forming a legal entity such as a management company for the system, to avoid problems identifying responsibilities in the future. To do this, you should seek legal advice.

i) In England and Wales, if a discharge is to be made to a 'Main River' watercourse, separate Agency permission for the outfall structure will also be required under the provisions of the Water Resources Act 1991. This provision does not apply in Scotland and Northern Ireland.

j) If you are issued with consent to discharge from your system, you will need to install a sampling chamber downstream of the unit so that representative samples of the effluent can be sampled.

k) Other permissions might be required, for example from a riparian owner (the person who has the rights to manage the watercourse) or drainage board and you should contact the appropriate person as soon as possible.

If you require any of these consents or permissions, the appropriate authority or Agency will send you an application form on request. The application form will contain details of application charges and any annual charge that you will have to pay.

## 8. Useful references

- 1 Septic tank systems: A regulator's guide (SP144BT) 1998. CIRIA, [www.ciriabooks.com](http://www.ciriabooks.com), Tel: 020 7549 3300
- 2 Septic tank systems: Options (SP144L2). CIRIA, [www.ciriabooks.com](http://www.ciriabooks.com), Tel:020 7549 3300
- 3 Septic tank systems: Design and installation (SP144L3). CIRIA, [www.ciriabooks.com](http://www.ciriabooks.com), Tel: 020 7549 3300
- 4 EN 12566-3:2005 Small wastewater treatment systems for up to 50 PT – Part 3: Packaged and/or site assembled domestic wastewater treatment plants. This will be available from the Stationary Office once it has been adopted and published by the British Standards Institute, [www.tsoshop.co.uk](http://www.tsoshop.co.uk), 0870 600 5522
- 5 EN 12566-1:2000 Small wastewater treatment systems for up to 50PT – Part 1: Prefabricated septic tanks. ISBN 0 5803606 1 X. Available from The Stationary Office, [www.tsoshop.co.uk](http://www.tsoshop.co.uk), 0870 600 5522
- 6 Code of Practice for the Design of Small Sewage Treatment Works and Cesspools. BS6297:1983. British Standards Institute. ISBN 0580131238. Available from The Stationary Office, [www.tsoshop.co.uk](http://www.tsoshop.co.uk), Tel: 0870 600 5522
- 7 Planning requirement in respect of the use of non-main sewerage incorporating septic tanks in new development. DETR Circular 03/99 /WO Circular 10/99. Available from The Stationary Office, [www.tsoshop.co.uk](http://www.tsoshop.co.uk), Tel: 0870 600 5522
- 8 The Building Regulations 2000, Drainage and Waste Disposal - Approved Document H 2002 Edition. ISBN 0117536075 (see section H2, Waste water treatment systems and cesspools and Appendix H2-A, Maintenance). Available from The Stationary Office, [www.tsoshop.co.uk](http://www.tsoshop.co.uk), Tel: 0870 600 5522
- 9 Section 3 (Environment) of the Technical Handbook, Scottish Building Standards Agency available at [www.sbsa.gov.uk/current\\_standards/tbooks.htm](http://www.sbsa.gov.uk/current_standards/tbooks.htm) Provides guidance on achieving compliance with The Building (Scotland) Regulations 2004
- 10 The Building Regulations (Northern Ireland) 1990 – Technical Booklet N, ISBN 0-337-08225-1. The Stationary Office, Belfast, Tel: 02890 238 451, [www.enquiries@tsoireland.com](mailto:www.enquiries@tsoireland.com).
- 11 British Water Code of Practice – Flows and Loads –2, Sizing criteria, Treatment Capacity for Small Wastewater Treatment Systems (Package Plants). 2005. ISBN 1 9034810 5 8. British Water, [www.britishwater.co.uk](http://www.britishwater.co.uk), Tel: 020 7957 4554
- 12 Building Research Establishment Good Building Guide No 42 (GG42) Reed Beds 2001. ISBN 1860814379. BRE, [www.brebookshop.com](http://www.brebookshop.com), Tel: 01344 404 407
- 13 The British Water website will provide information on the development of qualifications for contractors and those contractors who hold such qualifications at [www.britishwater.co.uk](http://www.britishwater.co.uk), Tel: 020 7957 4554
- 14 Groundwater Protection Code: Use and Construction of Septic Tanks and other Non-Mains Sewerage Systems. Publication due Autumn 2006. Phone DEFRA publications for more information, Tel: 0845 955 6000.
- 15 The British Water Code of Practice – Maintenance of Package Sewage Treatment Plants. Available from British Water at [www.britishwater.co.uk](http://www.britishwater.co.uk), Tel: 020 7957 4554
- 16 Scottish Planning Policy 1: The Planning system 2002. ISBN 0755922840 <http://www.scotland.gov.uk/library5/planning/spp1.pdf>
- 17 Scottish Planning Policy 7: Planning and Flooding 2004. ISSN 17411203 <http://www.scotland.gov.uk/Resource/Doc/47210/0026394.pdf>

## Appendix A: Percolation Test

Avoid carrying out this test in extreme weather conditions such as drought, frost and heavy rain.

- a) Excavate at least two (three in Northern Ireland) holes 300mm square to a depth 300mm below the proposed invert level (bottom of pipe) of the infiltration pipe and space them evenly along the proposed line of the subsurface irrigation system.
- b) Fill each hole with water to a depth of at least 300mm and allow to seep away overnight.
- c) Next day, refill each hole with water to a depth of at least 300mm and observe the time in seconds for the water to seep away from 75% full to 25% full (i.e. a depth of 150mm).
- d) Divide this time by 150. This answer gives the average time in seconds ( $V_p$ ) required for the water to drop 1mm.
- e) The test should be carried out at least three times with at least two trial holes. The average figure from the tests should be taken.  
This is the **percolation value  $V_p$**  (in seconds).
- f) The average figure for the percolation value ( $V_p$ ) is obtained by summing all the values and dividing by the number of values used.
- g) Drainage field disposals should only be used when percolation tests indicate average values of  $V_p$  between 15 and 100 and the preliminary assessment of the trial hole tests has been favourable.
- h) The minimum value of 15 ensures that untreated effluent cannot percolate too rapidly into ground water.
- i) Where  $V_p$  is above the limit of 100 effective treatment is unlikely to take place in a drainage field as there will be inefficient soakage in this location which may lead to sewage ponding on the surface.
- j) For domestic premises, the floor area of the drainage field (**A** in square metres) required may be calculated from:

$$A = p \times V_p \times 0.25 \text{ for septic tanks}$$

$$A = p \times V_p \times 0.20 \text{ for package sewage treatment plants}$$

Where;

$p$  is the number of people served by the tank (this should be the maximum number of people that **could** live in the house).

$V_p$  is the percolation value described above.

If in doubt, consult your professional advisor or local authority building control officer for advice.

**Would you like to find out more about us, or about your environment?**

**Then call us on**  
**08708 506 506 (Mon-Fri 8-6)**

**Environment Agency**  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

**HEAD OFFICE**  
Rio House  
Waterside Drive  
Aztec West  
Almondsbury  
Bristol BS32 4UD  
Tel: 01454 624 400  
Fax: 01454 624 409

**incident hotline**  
**0800 80 70 60 (24hrs)**

**Scottish Environment Protection Agency**  
[www.sepa.org.uk](http://www.sepa.org.uk)

**CORPORATE OFFICE**  
Erskine Court  
The Castle Business Park  
Stirling FK9 4TR  
Tel: 01786 457 700  
Fax: 01786 446 885

**floodline**  
**0845 988 1188**

**Environment and Heritage Service**  
[www.ehsni.gov.uk](http://www.ehsni.gov.uk)

**HEAD OFFICE**  
17 Antrim Road  
Lisburn  
County Antrim BT28 3AL  
Tel: 028 9262 3100  
Fax: 028 9267 6054