

Landfill Restoration General Guidance

Background

This guidance relates to landfills which hold a Permit from SEPA under the Pollution Prevention and Control (Scotland) Regulations 2012.

All operators of operational landfill sites must comply with the Landfill (Scotland) Regulations 2003 and the Pollution Prevention and Control (Scotland) Regulations 2012 (PPC Regulations). Conditions for compliance with these regulations will be included in the site's PPC permit, which is issued by SEPA. All landfill operators are required to prepare, use and periodically review a Management Plan as a condition of their PPC permit. This states how the site will be operated in order to achieve permit compliance. More operational landfills are heading towards restoration and operators are required to review their Management Plans to ensure they are fit for purpose and that operations are being carried out in accordance with the Plans.

There exists within many landfill site PPC permits a requirement to produce and operate the site in accordance with a Closure and Aftercare Plan, and provide this Plan to SEPA. This plan should ensure that the installation can be maintained to avoid pollution risk up to the point of SEPA accepting surrender of the permit. The Closure and Aftercare Plan is not likely to contain all the information required by a Restoration Management Plan and is considered a separate document. The Restoration Management Plan should be prepared at the design stage of the landfill to ensure that the landfill is progressively restored.

Through a number of recent consultations with the landfill sector and partner regulatory agencies, it has become clear that there is a range of dated, unclear and overlapping guidance available in Scotland in relation to requirements for restoration of landfill sites. As such, SEPA has identified the need to produce simple, clear and unambiguous guidance on this subject.

Legislation and government focus on development of a circular economy is increasingly diverting waste from landfill. This is supported by SEPA policies including the Waste to Resources Framework and the Landfill Sector Plan. As we move towards landfill bans in 2021 and 2025 the ongoing need for such a large national bank of landfills will reduce. As such, a significant percentage of this estate will need to be restored. This will include sites which are filled to capacity but there will also be a need to restore sites which have not been completed to their initial proposed contours.

What is Landfill Restoration ?

Landfill restoration is traditionally the placement of waste soils or other approved materials above the engineered cap. This is emplaced for a number of reasons, including the desire to return the land to an appropriate use, like grazing or forestry, to ensure the cap is appropriately protected, to improve visual amenity and minimise surface water run-off.

Increasingly restoration is a term also used for the return of sites to approved land use where the landfill activity has not been completed to original plans, usually because there is not enough waste to achieve this.

Landfill restoration is the use of waste soils or other suitable materials to return the land to an appropriate condition for a pre-approved land use. Waste materials used must be suitable for completing the planned restoration and must not be used in excessive quantities, otherwise the activity may be classed as waste disposal.

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Legislative context

Landfill restoration is subject to a range of legislative requirements, regulated by different agencies. As a minimum, there is usually a requirement for restoration under both planning consent and the PPC Permit conditions. It is important to note that there is a difference between a legal obligation and legal permission or limit. This can cause potential conflict. For example, a planning consent may authorise the infilling of land to a certain depth without making it a requirement that the infilling should take place to that level. Restoration should always be undertaken with the minimum quantity of waste necessary to achieve the stated restoration purpose.

Restoration plans have, in the past, been prepared by operators in various formats and in varying levels of detail. SEPA intends, through the development of this guidance, to standardise the Restoration Plan requirements for all Operators.

For Scottish Landfill Tax compliance purposes, as a minimum, restoration must be required by a 'relevant instrument' and planning permission and an authorisation are such 'relevant instruments'. An authorisation, such as a PPC permit and the conditions contained within, would include a Restoration Plan, approved by the regulatory team responsible for permit compliance.

Suitable Restoration materials

The scope of this guidance document is the use of waste in landfill restoration. However, it must be acknowledged that in recent years the scientific research around restoration activities has vastly increased, and SEPA has supported a range of trials, particularly around restoration of abandoned opencast mining sites. Many of the principles and much of the knowledge derived from this research can be applied to landfill restoration including broadening the scope of suitable waste types for use, and understanding quality and quantity issues, particularly in relation to nutrient inputs and balances. Operators must demonstrate that the quality of the material used and structure and chemistry of restoration layers are appropriate.

There is also increasing investment in and development of the recycled soils and aggregates market. Many of the outputs of these processes can meet approved protocols and British Standards, yet the markets for them remain limited. Some of this limitation is down to definitions of waste and the regulatory requirement for these 'products' to remain classified as waste. SEPA will work with operators who wish to develop restoration products to specific standards in order to remove unnecessary legislative barriers, so long as environmental protection remains adequate.

The onus remains on operators who intend to undertake restoration activities to open these discussions with SEPA, and to demonstrate that the waste types used for restoration do not pose an unacceptable environmental risk.

SEPA will support, with minimum intervention, Restoration Management Plans that meet pre-defined requirements relating to depth, techniques and suitable materials. We will use internal and independent experts to assist in setting these limits and assessing novel proposals.

SEPA will support innovation in the field of landfill restoration regarding materials, depths and techniques so long as adequate justification is provided and the proposals cause no adverse environmental impact.

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SEPA will not support activities which are inadequately justified or unnecessary and/or which appear to be waste disposal activities.

It is for operators to justify their proposals and to demonstrate that they will have no adverse environmental impacts. Operators may be liable for Scottish Landfill Tax if material used for restoration is inappropriate or excessive. Operators may also be liable for Scottish Landfill Tax if restoration takes place where no approved Restoration Plan is in place for the activity. For further information on Scottish Landfill Tax please visit www.revenue.scot

Use of restoration materials to create topsoil and subsoil

Whatever the original nature of the restoration material(s) used, landfill restoration should aim to create a soil profile which contains topsoil and subsoil layers.

The topsoil layer should consist of material with a suitable nutrient and organic matter content to support growth of the vegetation that is intended for the restored site. Extractable phosphorus concentration in topsoil should not exceed 30mg/l if measured using the SRUC method or 45mg/l if measured using the ADAS method; lower concentrations are likely to be required for non-agricultural land uses such as woodland or semi-natural habitat creation. Topsoil organic matter content should be in the range 2 – 20%. If using a manufactured topsoil in landfill restoration, SEPA would generally expect this to conform to BS3882:2015, with the additional requirement that extractable phosphorus concentration in topsoil should not exceed 30mg/l if measured using the SRUC method or 45mg/l if measured using the ADAS method. If manufactured topsoil will not confirm to BS3882:2015, Operators will be required to explain why and provide justification for this in their Restoration Management Plan.

The subsoil layer should consist of material that provides suitable conditions to allow adequate growth of roots for the vegetation intended for the restoration site. Subsoil should contain lower organic matter and extractable phosphorus concentrations than topsoil, with extractable phosphorus concentrations not exceeding 4.4mg/l if measured using the SRUC method or 15mg/l if measured using the ADAS method.

Discussion of appropriate topsoil and subsoil depths and bulk densities for successful restoration of landfill sites is included in the section 'Minimising Waste Quantities', below.

Minimising Waste Quantities

The quantity of waste used to undertake a restoration activity must be the minimum required. SEPA will accept general guidance limits determined from industry practice and research studies in most circumstances. For example, a rooting depth of at least 1 metre is recommended for agricultural crops with a topsoil depth of 0.1 – 0.3m and the remainder being subsoil. Forestry Commission guidance indicates that the minimum guideline depth where the end use is woodland is 1.5m of rootable placed soil cover. The guidance does not, however, usually state a maximum depth. As a general guide, SEPA would not expect a depth of greater than 1.25m for restoration for agricultural purposes and would not expect a depth of greater than 2 metres for restoration for tree planting.

Deliberate compaction of wastes to allow more material to be used in the restoration is not acceptable; as well as unnecessarily increasing the quantity of waste that will be used, it is likely to reduce the success of the restoration by leading to waterlogging and poor rooting conditions that will hamper vegetation establishment. Bulk density for topsoil and the upper half of the subsoil should lie within the range 1.3 – 1.5 tonnes/m³. Bulk density for the lower half of the subsoil should lie within the range 1.5 -1.7 tonnes/m³, with the lower end of both ranges being generally suitable for restoration to agriculture and the upper end of both ranges being generally suitable for restoration to forestry.

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SEPA will support the proposals for restoration up to these profiles, for these purposes. Any additional material above these figures will require operators to provide adequate supporting justification.

Assessment and Authorisation Process

If a revised or new Restoration Management Plan is to be submitted to SEPA, the operator should use the Landfill Restoration Plan Operator Notification form and should refer to the Operator Notification Guidance when completing the form.

It is SEPA's intention to approve Restoration Management Plans with minimum delay and no unnecessary regulatory or financial burden on operators.

Existing approved restoration plans shall be submitted to SEPA on request and will be subject to review against the criteria set out in this and other relevant guidance.

SEPA will review 'standard' plans and aim to provide a response to operators within 4 weeks. Where further justification is provided by the Operator for 'non-standard' plans, then SEPA will use internal expertise and partner agency support to review and respond to operators without delay, with the aim of responding within 8 weeks.

Our aim is to work with operators to ensure that suitable Restoration Management Plans for all landfill sites are approved as soon as possible. However, in cases where a suitable plan is not submitted or is inadequate SEPA will use relevant regulatory tools to secure delivery.

An approved Restoration Management Plan forms part of the Management Plan and all operations on site are required to be carried out in accordance with the Management Plan. Any proposed change(s) shall be submitted in writing to SEPA. The Management Plan shall only be amended if either (a) SEPA gives written consent to the proposed change(s) or (b) SEPA has not indicated to the Operator that the proposed changes are rejected.

SEPA intends to work with operators to develop and agree restoration plans which meet current standards in a pragmatic and least formal manner possible, but will not hesitate to use relevant regulatory tools should submissions not be timely or of adequate quality.

Useful Links:

The Land Regeneration and Urban Greenspace Research Group – Imported Soil or Soil-Forming Materials Placement (BPG Note 5) – [https://www.forestry.gov.uk/pdf/lru_bpg05.pdf/\\$FILE/lru_bpg05.pdf](https://www.forestry.gov.uk/pdf/lru_bpg05.pdf/$FILE/lru_bpg05.pdf)

Forest Research best practice guidance notes on land regeneration – <https://www.forestry.gov.uk/fr/bpgn>

Forestry Commission (Scotland) Guidance Note 19 – April 2001 – <http://scotland.forestry.gov.uk/images/corporate/pdf/guidancenote19.pdf>

Earthcare Technical and ADAS – Guidance on Suitable Organic Material Applications for Land Restoration and Improvement – July 2015 – [Guidance on suitable organic material applications for land restoration and improvement?](#)

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Landfill Restoration and Aftercare – Environmental Protection Agency Ireland –

<https://www.epa.ie/pubs/advice/licensee/EPA%20Landfill%20Restoration%20and%20Aftercare.pdf>

Waste Management Paper 26E – Landfill Restoration and Post Closure Management – Consultation Draft
– Environment Agency – August 1996

[Code of Practice for the use of sludge, compost and other organic materials for land reclamation](#) – published
by SNIFFER in 2010.