



GOOD PRACTICE GUIDE FOR HANDLING SOILS

Sheet 17:

Release & Removal of Stones and Damaging Material from Scraper & Bulldozer Replaced Soils

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MAFF FOREWORD

Standards of restoration of minerals and waste sites have steadily improved in recent years, with operators increasingly aware of their environmental responsibilities. The industry is putting forward more imaginative restoration concepts to a variety of afteruses, and is more aware than ever that it will be judged on the standard of that restoration, and the sustainability of the development.

Sustainable mineral development means balancing economic, environmental and social needs, whilst using resources wisely. The UK Strategy for Sustainable Development recognises the importance of safeguarding agricultural land to meet the needs of future generations, and minimising the loss of soils to new development*.

Improved restoration standards have sometimes enabled planning permission to be given for best and most versatile agricultural land to be worked for minerals, on the basis that it can be restored in a way that safeguards its long-term agricultural potential**. Inherent in these high standards of restoration is the requirement to handle soils in such a way that damage to their structure is minimised. It is the aim of this Guide to provide comprehensive advice on soil handling “Good Practice” to operators, soil moving contractors, consultants and planning authorities.

The Guide is in the form of 15 Sheets giving advice on soil stripping, the forming and taking down of soil storage mounds, and soil replacement operations using excavators, earth scrapers or bulldozers. There are also four Guidance Sheets on remedial works involving the removal of stones and damaging materials, and decompaction during the replacement operations.

This document should be cited as MAFF (2000), Good Practice Guide for Handling Soils (version 04/00). FRCA, Cambridge.

Any views expressed in the guidance are those of the consultant and do not necessarily represent the view of the Ministry of Agriculture, Fisheries and Food.

*(DETR, A Better Quality of Life, May 1999, paragraphs 6.66 and 8.50)

**MPG7 (November 1996, paragraph 3).

Acknowledgements

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SHEET 17 RELEASE & REMOVAL OF STONES AND DAMAGING MATERIAL FROM SCRAPER & BULLDOZER REPLACED SOILS

The purpose of this Guidance Sheet is to provide a model method for best practice where stones and/or potentially damaging materials are to be released from earthscraper and bulldozer replaced soils (see Sheets 8, 12 and 15). This Guidance Sheet comprises 4 pages of text and a user response form.

The model may need to be modified according to site conditions or requirements of the Planning Authority. Where this is the case, deviation from the model should be recorded with reasons. The guidance does not specify the type, size or model of equipment, but this should have been agreed as part of the planning conditions or as a reserved matter. The machines should be of a kind which will cause the minimum compaction whilst being operationally efficient (eg wide tracked), and must be well maintained at all times.

Persons involved in the handling of soils, overburden etc., and in the construction or removal of mounds or tips, must comply with the Health and Safety at Work Etc. Act 1974 and its relevant statutory provisions, and in particular those aspects which relate to the construction and removal of tips, mounds and similar structures. This requirement takes preference over any suggested practice in the Sheets.

The user of these guidelines is solely responsible for all liabilities that might arise. No liabilities are accepted for any losses of any kind arising from the use of this guidance.

This soil handling method uses bulldozer-drawn tines to remove stones and damaging materials (eg. wire rope, concrete blocks) from replaced layers of soil or treated basal layers.

The occurrence of stones and materials can affect the agricultural quality of the restoration, largely through interfering with cultivations.

The method requires unavoidable repeated trafficking over each layer of soil to complete the operation, particularly compared to the removal of stone or materials by hand or machine. This is likely to result in the recompaction of the ripped soils and consequently, for satisfactory restoration, there is a need for effective decompaction treatment following the removal of the materials (see Sheet 19).

There are a number of key operational points to minimise the degree and extent of severe soil deformation (compaction and smearing):

- the adoption of an 'in - out' only at the end of strips to minimise trafficking.
- the machines are only to work when ground conditions enable their maximum operating efficiency.
- the soils should have a moisture content 5% or greater below their lower plastic limit.

The Release & Removal Operation

17.1 Ripping with tines can be used to release large stones (>150mm) and damaging materials (wire rope, tree roots, drums, concrete lintels etc) from replaced soils and basal/formation layers. Where stones to be removed are less than 150mm but greater than 20mm, a specialist stone picking machine should be used. The use of such equipment is generally only applicable to the topsoil layer. The removal of these smaller stones should be part of the cultivation phase for cropping, and is outside the scope of this document.

- 17.2 Where large stones and materials damaging to aftercare operations (eg. cultivations, under-drainage installation) are to be removed, the equipment and practices set out in Sheet 19 can be used and integrated into the procedures listed in Sheets 8, 12 and 15.
- 17.3 On completion of each soil layer (or as required), the strip is ripped (with over-lapping passes) to release the stones (Figure 19.4, Sheet 19). Generally, effective release is only achieved by cultivating the upper 300mm of the soil/basal layer.
- 17.4 Bulldozers with closely spaced (0.3-0.5m) 'stub' tines (400mm from tip to tool bar base) are often more effective in releasing stones than deep ripping equipment designed to alleviate severe compaction. Alternatively, high powered rubber-tyred tractors pulling heavy duty multi-tine cultivators can be effective (depending on soil texture and moisture content).
- 17.5 The released stones are usually collected by hand and loaded into tractor-drawn trailers travelling and standing on the basal/formation layer.
- 17.6 Stone removal from the topsoil layer can be delayed until the whole area has been restored. A shallower ripping (300mm) of the topsoil will be needed to achieve the operation. If this option is adopted, trafficking of the topsoil layer will take place during the collection of the stones. In this situation, the final deep ripping of the topsoil must be delayed until the stone removal operation is complete.
- 17.7 Where artefacts are to be removed, straight legged tines without wings (see Sheet 19) are the most suitable equipment; particularly in the case of basal/formation materials.

- 17.8 On completion of each soil/basal layer, the practice is to rip the entire layer placed (or intermediate layers if the thickness exceeds the effective depth of the tine) on a strip by strip basis. The tines are used to release and lift the artefacts to the surface, and drag them to the edge of the strip for collection and disposal. Any equipment/machinery used for the latter is only to travel and stand on the basal/formation layer.

SHEET 17

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