Application | Method of Working

Ref:

Please see Annex AP7 for supporting information, and the “Introduction” for Health and Safety considerations and advice on the use of the guidance.

1. Method of working
How well do the proposals integrate mineral extraction, landfilling (where proposed), and restoration of the site? Consider:
   a. phasing arrangements
   b. arrangements for landfilling
   c. location of soil storage
   d. size of soil storage bunds and areas
   e. treatment of soil storage bunds
   f. do the proposals minimise the areas unrestored throughout the life of the working, and provide for the management of unworked areas
   g. responsibilities for work
   h. does the location of the plant site and mineral stockpiling areas take appropriate account of the phasing and restoration proposals
   i. does the location of the plant site and mineral processing areas allow for the efficient operation of the site

2. Phasing
Most sites are worked in phases to enable the minimum area of land to be disturbed at any one time. In this way, the development proceeds in a logical sequence through the site, normally depending upon the geology, starting and finishing near the site entrance with the plant/processing/storage areas. Consider:
   a. does the phasing reflect the different soil types
   b. the amount of mineral to be excavated and waste landfilled per year
   c. exceptions to phased restoration such as chalk and rock quarries

3. Flexibility of scheme
Despite pre-working site surveys, the quantity and type of mineral encountered when working the site may necessitate amendments to the working and phasing of the site. Consider:
   a. do the proposals allow for flexibility to meet the need for such changes
4. **Working life of site**  
Is the proposed working life of the site reasonable and realistic? Has proper account been taken of:  
   a. the need to submit restoration details for long-term sites and the effect of lower than predicted extraction rates on site restoration  
   b. the need to submit detailed schemes for landfill gas and leachate control infrastructure

5. **Are the requirements for haul roads appropriate to the site working proposals?**  
The number, siting and length of haul roads required will depend upon:  
   a. the location of the site working areas, soil stores and processing plant, and machinery used for hauling mineral/soil  
   b. areas of unworked or restored land which must not be trafficked by plant or machinery  
   c. the need for new access to parts of the site as working progresses

6. **How are the haul roads to be constructed, maintained and restored?**  
Plant and machinery must not be allowed to run on the soil layers or on soil-forming materials. Do the proposals for forming, maintaining and restoring haul roads adequately cover:  
   a. stripping of soil layers  
   b. providing a wearing course on “permanent” haul roads  
   c. drainage and maintenance  
   d. dust control  
   e. decompaction and restoration of the soil profile

7. **How are the haul roads to be marked on site?**  
Haul roads should be marked on site and provisions made to prevent plant and machinery straying onto unworked or restored land. Have the operators considered and made provisions for:  
   a. marking the layout and location of haul roads on plans in the site office  
   b. marking haul roads on site  
   c. preventing plant and machinery from straying off the haul roads

8. **Control of the water table**  
Where the proposals include mineral extraction or landfilling below the water table, the applicants should provide detailed assessments by appropriately qualified hydrologists/hydrogeologists of the impact of the development including:  
   a. the need for perpetual pumping to maintain the proposed after-use
**Application | Method of Working**

**AP7**

9. **Will the development affect the water environment of other land in the area**

Where mineral extraction or *landfilling* is to take place below the water table, the applicants should provide detailed assessments by appropriately qualified hydrologists/hydro-geologists of the impact of the development including:

a. **any detrimental effects on the water table/supplies of adjoining land**

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**COMMENTS**

**For more detailed information see:**
- The Reclamation of Mineral Workings to Agriculture (DoE 1996)
- Guidance on Good Practice for the Reclamation of Mineral Workings to Agriculture (DoE 1996)
- Low Level Restoration of Sand and Gravel Workings (DoE 1989)

**Cross references:**
- AP 1, 3, 5, 6, 8, 9, 10
- SW 3, 5, 6, 8, 9, 10
- RN 2, 4, 5, 6, 7, 8, 10
- AC 9
1. Method of working

The proposals should properly integrate the working and restoration of the site in a way that facilitates these processes. The following matters need to be considered and planned:

a. phasing arrangements
   Phasing should be designed to progress in a logical way through the site, minimising the need for double handling of materials and enabling restoration to follow on promptly. Double handling of soil increases both costs for the operator and the risks of soil losses, mixing and structural damage.

b. arrangements for landfilling
   Where restoration involves landfilling, do the proposals allow for the logical progressive restoration of the site? What provisions have the applicants made for restoring the site in the event of a shortage of waste being available when required?

c. location of soil storage
   Soil storage areas need to be located where they will not be trafficked, contaminated with other materials, flooded or moved during the period of storage. They should also be readily accessible for the restoration of the relevant areas, to reduce haulage distances and the need to cross undisturbed or restored land.

d. size of soil storage bunds and areas
   Soil storage areas need to be of sufficient size for the separate storage of different soil types without excessively high bunds (ideal max. 3 metres for topsoil and 5 metres for subsoil/soil-forming materials). Bunds should be constructed with the minimum compaction necessary to ensure stability, with slopes to prevent water ponding. The height and slope of bunds will also need to take account of their impact upon the landscape of the area. Slopes of between 25° and 45° will normally allow for management of the bunds, whilst ensuring stability and surface drainage. (Guidance on Good Practice for the Reclamation of Mineral Workings to Agriculture (DoE 1996) Part B). If the area available for soil storage is insufficient, there will be pressure to store soil higher than is ideal, or to leave insufficient space around individual bunds for their efficient formation and management etc.

e. treatment of soil storage bunds
   Soil storage areas and bunds which are to remain in place for 6 months or more, or over the winter period, should be grass seeded with an appropriate mixture (i.e. low growing and yielding). Maintenance will include cutting, probably at least twice a year, and controlling weeds using herbicides if necessary.
f. do the proposals minimise the areas unrestored throughout the life of the working, and provide for the management of unworked areas
   The working and restoration phasing should minimise the area of land not in cultivation, either pre-working or post restoration. This is important, as soil is best conserved by being farmed rather than stored where some deterioration may occur, or left uncultivated. Where land is being actively farmed, the likelihood of it becoming derelict or used for storage or being trafficked upon is reduced.

g. responsibilities for work
   The persons responsible for carrying out the different operations should be clearly identified, and have authority to stop work when conditions become unsuitable, for example during soil handling when wet weather ensues.

h. does the location of the plant site and mineral stockpiling areas take appropriate account of the phasing and restoration proposals
   The location of the plant site and mineral stockpiling areas must take account of the phasing and (progressive) restoration requirements of the site, such that the land is quarried in a logical sequence, with restoration following on behind. Inappropriate siting of these facilities may lead to more or longer haul roads, which may have implications for the site phasing and restoration, as well as the size and shape of restoration enclosures. In addition, there may be pressure to relocate the facilities to a more appropriate location, which may result in the disturbance of more land, and the interruption/amendment of phasing and restoration arrangements.

i. does the location of the plant site and mineral processing areas allow for the efficient operation of the site
   Linked to the above considerations is the need to locate plant and mineral stockpiling areas where they allow for the efficient operation of the site. Generally, this will be close to the site entrance/exit, in an area that can be readily screened whilst reducing the need for long haul roads suitable for road-going traffic. The location should also take account of the phasing and restoration arrangements, such that the land is worked and restored in a logical way. Whether the mineral is to be hauled to the processing area by dumptrucks or by conveyor will also influence the location and the need for semi-permanent and temporary haul roads. Relocating the plant site is, however, unlikely to be undertaken lightly by the operator due to the disruption to the quarrying/processing of mineral and the costs entailed.

2. Phasing
   This should be designed to proceed logically from opening up the site and locating the processing plant, storage areas and haul roads, through the site to finish with the restoration of these areas, minimising the length of time land is being worked/remaining unrestored. The phases should take account of:
a. **does the phasing reflect the different soil types**
   The different soil types identified in the ALC and Statement of Physical Characteristics Report may require separate handling. As far as is practical, phase boundaries should reflect the different soil types that need to be handled separately, for example sandy loam and clay loam topsoil.

b. **the amount of mineral to be excavated and waste landfilled per year**
   The size of phases normally relates to the amount of mineral likely to be excavated per year, which is linked to the borehole survey, and with the amount of waste that is likely to be available where landfilling is proposed, to enable progressive restoration of the site to proceed uninterrupted. Linking phase size to the annual excavation of mineral and landfilling, also allows soil stripping and restoration to be carried out once a year when the soil is at it's driest.

c. **exceptions to phased restoration such as chalk and rock quarries**
   Exceptions to progressive restoration occur particularly with chalk and rock quarries, which may be worked to a greater depth, sometimes in a series of benches. In these circumstances, soil from the working areas may be stripped and stored for many years prior to the restoration of the whole working area. In these cases, it is particularly important to maintain accurate records of the different soil types, their volumes and locations, and for the bunds to be well managed.

### 3. Flexibility of scheme

It may be necessary to amend the phasing once mineral extraction has begun. This may be due to barren areas, or variations in mineral type or quality not identified in the pre-working borehole survey. Consider whether:

a. **do the proposals allow for flexibility to meet the need for such changes**
   The schemes put forward by applicants should, where practical, recognise the possibility that variations may be required and set out the procedures for agreeing them. Borehole logs cannot always accurately predict the quality and quantity of mineral present across the site. When mineral extraction commences, the quality or quantity of mineral may vary such that amendments or complete changes to the phasing are requested by the operator. The operator may wish to work more than one phase at a time to enable different minerals to be extracted and then blended. This may have very significant impacts upon phased restoration, including potentially the restored soil profiles and landform. Where mineral deposits are in an area where they are known to be very variable, the applicants should, as a minimum requirement, set out their protocols for changing the phasing (and working and restoration schemes if necessary). Where restoration is to be achieved by landfilling, this may exacerbate the difficulties, requiring early discussions between the operator, EA, MPA and the agricultural advisers, to maximise the chances of achieving the agreed restoration objectives.
4. Working life of site

Whilst it is not possible to always predict factors affecting mineral demand accurately, it is important that the proposed working life of the site should be based upon realistic estimates of extraction rates and, where relevant, landfilling of wastes.

a. the need to submit restoration details for long-term sites and the effect of lower than predicted extraction rates on site restoration

The proposed working life of the site should be realistic, as significant delays may result in areas being left unrestored for long periods. This is particularly important where the proposals are based upon the importation of waste to achieve restoration, where the availability may have been over-estimated. Where applicants cite operations with long timescales as reasons for not providing details of restoration, this should be resisted. In these circumstances, applicants may seek not to provide detailed information on the grounds that industry “best practice” may have changed by the time restoration begins on site. Again, this should be resisted and applicants should put forward detailed proposals based upon current “best practice”, which can subsequently be amended (if agreed with the MPA), in the light of improvements in industry practice.

b. the need to submit detailed schemes for landfill gas and leachate control infrastructure

On sites where restoration relies on the importation of putrescible waste but where no restoration is to take place for a number of years, applicants may state that the detail of the landfill gas and leachate control infrastructure is a matter for the Waste Management Licence, and not included in the planning application. This is unacceptable, as it prevents a proper assessment being made of the impact upon the agricultural after-use of the landfill gas and leachate control infrastructure, which may be severe if arable cropping is proposed. However, some flexibility to change the detail of the proposals will be necessary to account for some eventualities, but any changes should be discussed as early as possible and include all interested parties, including the agricultural advisers (Landfill Gas and Leachate Control Applied to Arable After-use (MAFF November 1998 PR4869)).

5. Are the requirements for haul roads appropriate to the site working proposals

Haul roads should accord with the scheme for site working and restoration and their construction planned well in advance.

a. the location of the site working areas, soil stores and processing plant, and machinery used for hauling mineral/soil

Haul roads are required for hauling mineral and soil from the working areas to the processing plant or soil stores. Where landfilling is taking place, haul roads are required for transporting waste to the void and between the stores of daily cover and the area being landfilled. It is important that plant and machinery are able to
move around the site in an efficient and structured way and the layout of haul roads will, to some extent, be a compromise between taking the shortest route and not having more haul roads than necessary. Soil stripping may require temporary haul roads between the phase being worked and the soil store, whether using dumptrucks or motor-scrapers. The siting of haul roads should be well thought-out, thus reducing the likelihood of changes being required, which may impact upon restoration and aftercare. The use of conveyors for transporting mineral to the processing plant may reduce the length of haul roads required.

b. areas of unworked or restored land which must not be trafficked by plant or machinery
   The location of haul roads should minimise the interference with agricultural access to both unworked and restored land, with the progressive restoration and aftercare of the site, and prevent plant and machinery taking unauthorised short-cuts.

c. the need for new access to parts of the site as working progresses
   The siting of haul roads may continue to change as site working progresses. Temporary haul roads will be required between the different areas being stripped of soil and put into store. These must also be clearly marked, and measures taken to prevent plant and machinery straying onto adjacent land or taking unauthorised short-cuts.

6. How are the haul roads to be constructed, maintained and restored

Plant and machinery must not be allowed to run on soil layers or on soil-forming materials. The proposals should ensure that:

a. stripping of soil layers
   Haul roads will be stripped of soil down to the mineral or overburden, and the soil put into store for subsequent restoration.

b. providing a wearing course on “permanent” haul roads
   Consideration should be given to surfacing “permanent” haul roads with mineral to provide a wearing course, unless stripping the soil reveals suitable mineral, making this unnecessary.

c. drainage and maintenance
   Maintenance and drainage of the haul road surface is important to reduce the temptation for plant and machinery to divert off the road onto adjoining land, which can be a problem with poorly maintained and drained haul roads. Drainage is likely to be achieved by constructing and maintaining the surface of the haul roads with an appropriate camber to shed water to roadside French drains or soakaways.
**d. dust control**
Dust control may be necessary during dry periods to prevent contamination of nearby crops. This is particularly important for horticultural crops and fruit, which may be eaten unwashed, and for grass which may become unpalatable to livestock.

**e. decompaction and restoration of the soil profile**
Restoration of haul roads is likely to include the removal of any sub-base/wearing course, subsoiling to relieve compaction, and reinstating the original soil profile.

**7. How are the haul roads to be marked on site**

Operators should address the following matters:

- **a. marking the layout and location of haul roads on plans in the site office**
  Haul roads must be shown on the site plans to enable them to be accurately set out and constructed on the ground.

- **b. marking haul roads on site**
  Once constructed, their boundaries should be marked to reduce the chances of plant and machinery straying off them.

- **c. preventing plant and machinery from straying off the haul roads**
  Haul road boundaries should be formed/marked in such a way that plant and machinery cannot easily widen them or take short-cuts across corners etc. This may be particularly important when sub-contractors are employed to strip or restore soil.

**8. Control of the water table**

Where proposals include extraction of minerals from below the water table or landfilling of waste, it will normally be necessary to de-water the site, either during working or sometimes in perpetuity [(MPG7 The Reclamation of Mineral Workings) (DoE 1996) paragraphs A22-28]. The applicants should consider the following issues and provide detailed assessments of the impact of the development prepared by appropriately qualified hydrologists/hydro-geologists:

- **a. the need for perpetual pumping to maintain the proposed after-use**
  Where sites are to be worked below the water table, it will normally be necessary to de-water the site by pumping water off site via a sump. Where land is restored back to its original level by landfilling with inert waste, the water table will normally return to its original level once restoration and pumping ceases. Where restoration is to agriculture at a low level, it will be necessary to line the site with clay or an artificial liner to limit the ingress of water and install a drainage system with pumping in perpetuity. A balancing pond may also be necessary to cope with...
the expected variations in volume of drainage water. Perpetual pumping will require a legally enforceable agreement to safeguard the drainage of the land in the long-term (Low Level Restoration of Sand and Gravel Workings (DoE 1989) Chapters 3 and 4).

9. Will the development affect the water environment of other land in the area

Where proposals include extraction of minerals from below the water table or landfilling of waste, it will normally be necessary to de-water the site, either during working or sometimes in perpetuity (MPG7 The Reclamation of Mineral Workings (DoE 1996) paragraphs A22-28). The applicants should consider the following issues and provide detailed assessments of the impact of the development prepared by appropriately qualified hydrologists/hydro-geologists:

a. any detrimental effects on the water table/supplies of adjoining land

Applicants should provide detailed assessments, prepared by appropriately qualified hydrologists/hydro-geologists, of the impacts of their proposals on agricultural land in the area. This may be due to interference with water supplies and irrigation, “draw down” of the water table, as well as any changes in the water environment due to the restoration proposals. Details of any remedial works proposed should also be provided (Low Level Restoration of Sand and Gravel Workings (DoE 1989)). Where working is to take place below the water table and de-watering is carried out, this may have significant impacts on the water table of land in the area and potentially on irrigation supplies from boreholes. Generally, the water table of agricultural land should be at least 1 metre below ground level, and maintained at this level by an underdrainage scheme where necessary. But mineral extraction requiring de-watering may also lower the water table of neighbouring land significantly, leading to increased droughtiness, reduced crop yields and water available for irrigation from boreholes. Low level restoration of mineral sites may require lining of the void and perpetual pumping, which may interrupt the movement of groundwater, leading to the problems identified above (Low Level Restoration of Sand and Gravel Workings (DoE1989) Chapters 3 and 4).