

Soil science in soil handling and restoration



Background

Large amounts of soil are disturbed during the development of land for urban, industrial/retail and transport uses, for installation of energy networks and for the quarrying of aggregates and minerals. In addition, previously excavated soils are re-instated after mineral working and in the restoration of previously despoiled land to green after-use and to create parks, gardens and landscaped areas within the built environment. Professional soil science has an important role to play in ensuring a successful outcome. Professional competence in managing the restoration of land after soil disturbance builds upon foundation skills in field soil investigation, description and interpretation (BSSS PCSS Document 1). The competencies outlined in BSSS PCSS Documents 6 (Soil science in the establishment, management and/or conservation of natural habitats and ecosystems) and 8 (Soil science in landscape design and construction) will also be relevant depending on the intended after-use of a site.

Qualifications

Professional soil scientists and engineers with competence in soil handling and land restoration will have graduated in a relevant science subject. They will also have a second degree and/or a number

of years relevant field experience and will have or be adequately qualified for full membership of a relevant professional body such as the British Society of Soil Science (BSSS).

Minimum competencies

Skills and knowledge:

These are described under a number of sub-headings that relate to different tasks. A professionally-competent scientist or engineer should have the skills and knowledge identified under the **General heading** and **all other headings that are relevant** to the tasks required. Professional soil scientists and engineers working in this sector should be familiar with the Defra Construction Code of Practice for the Sustainable use of Soils on Construction Sites (Defra 2009).

General

- 1 The ability to investigate, sample, describe and interpret soils in the field in a consistent manner and to professional standards (BSSS PCSS Document 1)
- 2 The ability and knowledge required to interpret the results of any soil chemical, physical or microbiological analyses

Soil science in soil handling and restoration

- 3 Knowledge of relevant European and national regulations and policies, including national and local land use planning policy and guidance, and soil protection policy
- 4 A working knowledge of the industry being advised, whether quarrying, development, infrastructure installation or landscaping
- 5 The ability to effectively communicate soil information in a simple and relevant form to developers, planners, landscape architects and earthmoving contractors with clear statements as to the reliability and certainty of the results
- 6 The ability to write accurate reports and/or method statements, written in clear terms, that communicate the relevant information to site planners, site managers, site personnel and eventual users of restored land
- 7 An awareness of the importance of systems of quality assurance and control in all aspects of professional work

The characterisation of soil resources

- 1 The know-how to select appropriate survey and sampling densities to characterise *in situ* and stockpiled soil resources to required levels of certainty
- 2 Understanding of Health and Safety requirements on site and the ability to compile a risk assessment when requested
- 3 Familiarity with the use and limitations of GPS for determining sampling locations on site
- 4 Proficiency in fieldwork practices and procedures such as soil texturing, soil description and the delineation of soil resource units (see BSSS PCSS Document 1)

The provision of advice on soil handling

- 1 A knowledge of the machines used for handling soils, their capabilities and limitations
- 2 An awareness of methods of soil handling that minimise physical damage to soils and guidance¹ that describes such methods, including management of stockpiled soil
- 3 An understanding of soil hydrology and physical and engineering properties such as plastic limit, and their relevance to soil handling

- 4 The ability to calculate volumes of *in situ* soil layers to be moved as well as soil stored in stockpiles
- 5 A knowledge and understanding of waste management and/or contaminated land regulations that might restrict the export of soil materials off-site or their management within site
- 6 Familiarity with British Standards relevant to characterising soil materials already on site or being imported to site²
- 7 The ability to prepare a Soil Management Strategy/Soil Resource Plan³ and simple method statements for site personnel

The restoration of land

- 1 The ability to characterise existing substrates on site and make best use of them, including chemical or physical amelioration where necessary
- 2 Knowledge and experience of the uses of manufactured soils and the use of organic materials for soil creation where natural soils are in short supply
- 3 Understanding of the specific soil chemical and physical conditions (including the principles of soil engineering) necessary for various restored after uses and landforms, such as woodland, Best and Most Versatile agricultural land, wet meadow, species-rich grassland, commercial landscaping, etc.

The aftercare and assessment of restored land

- 1 The ability to prepare and/or interpret aftercare plans (for those restored land uses where one is required)¹
- 2 The ability to assess soil physical quality and make any recommendations for amelioration to create a 'fit-for-purpose' soil profile²
- 3 The ability to take representative soil samples for chemical analysis and to interpret the results to make recommendations for the use of fertilisers⁴, lime or other chemical ameliorants³

1 for example the MAFF (2000) Good Practice Guide for Handling Soils

2 e.g. BS3882:2007 Specification for Topsoil and Requirements for Use

3 Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites

4 Might necessitate a FACTS qualification where the use is agricultural; see BSSS PCSS Document 10 Soil science in crop and livestock production

Disclaimer: The BSSS Working With Soils Initiative provides generic advice on the skills and competencies required by persons carrying out work within the scope of each document. The publishers, authors and the organisations participating in this publication accept no liability whatsoever for any errors or omissions contained in this leaflet, or for any loss or damage arising from interpretation or use of the information, or reliance upon the views contained herein. Any such use must be made with due acknowledgment. © 2018, British Society of Soil Science.