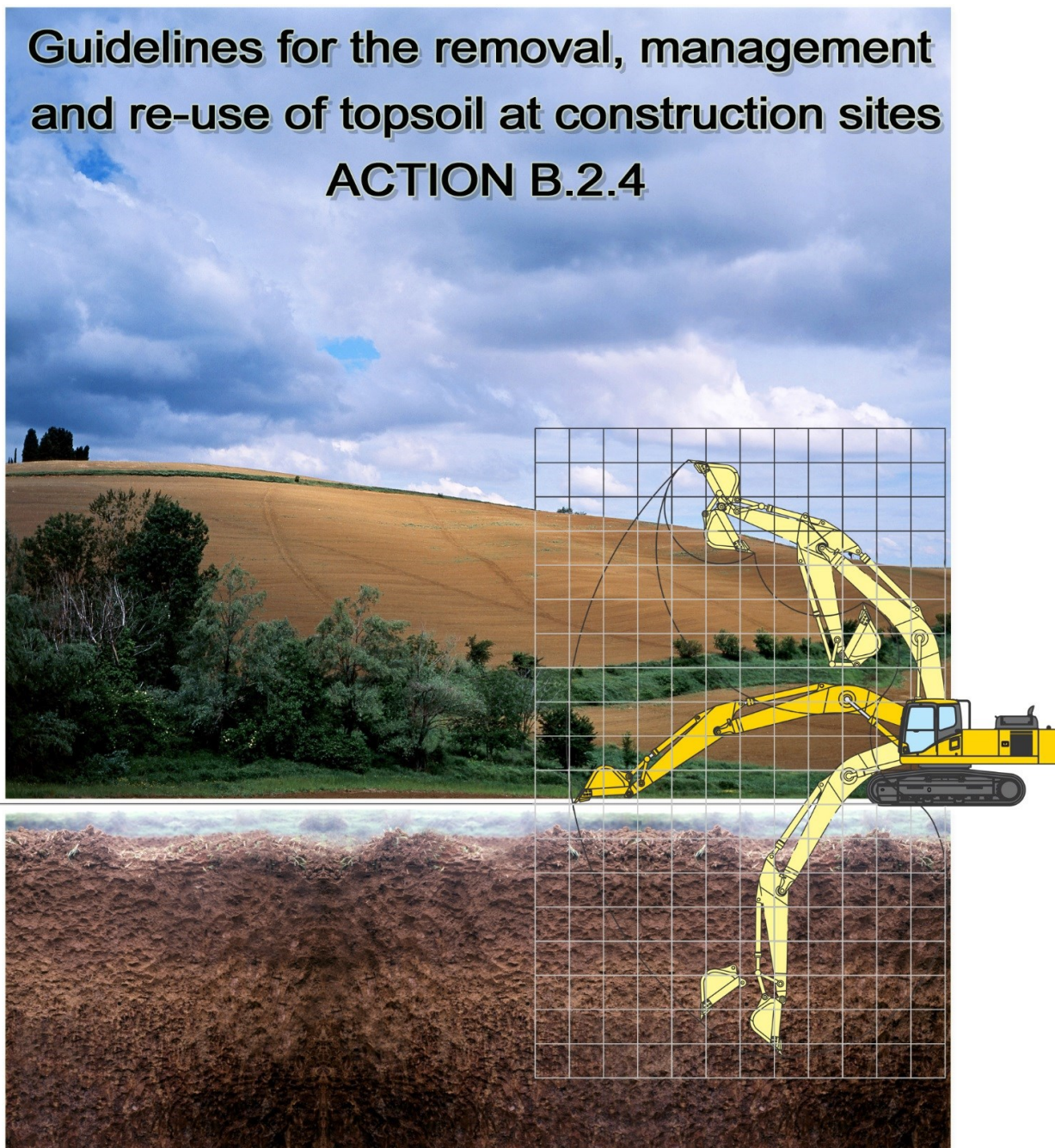


Guidelines for the removal, management and re-use of topsoil at construction sites **ACTION B.2.4**



VADE MECUM FOR SOIL PROTECTION AT CONSTRUCTION SITES

Vade mecum for soil protection at construction sites

Advice for proper planning and management

1. Why protect it

We walk on it, we run across it and it supports us. Soil is, at the same time, support and living space. A healthy soil provides nourishment and water to plants. Soil hosts many forms of life. Soil acts as filter and buffer. It controls the water cycle, provides clean drinking water and protection against flooding. Soil is a finite resource and needs protection; in fact nature needs more than 1000 years to build it. The reuse of natural soil allows the creation of a new soil where it is used, allows the use of less soil improvers to make it fertile, and reduces the waste of such a precious resource, favoring compensation for land take. Soil handling works - first and last phase of any construction project - are particularly demanding in terms of soil protection. In particular, when the soil is worked in moist conditions there is a risk of long lasting damage.

2. How to recognize it

Soil is composed of several superimposed layers, defined horizons in pedology i.e. the science that studies soils. These layers have different macroscopic characteristics such as color, presence of roots, microorganisms, and organic substance. Usually we identify the following layer:

Surface layer, A horizon, humus

Characteristics: contains humus, many roots, rich in organisms and nutrients, dark brown or darker than the underlying horizons

Thickness: approx. 15 - 50 cm

Lower layer, B horizon

Characteristics: with roots and organisms, clearer than the horizon above sometimes with accumulations of carbonate or iron-manganese nodules

Thickness: approx. 30 - 80 cm

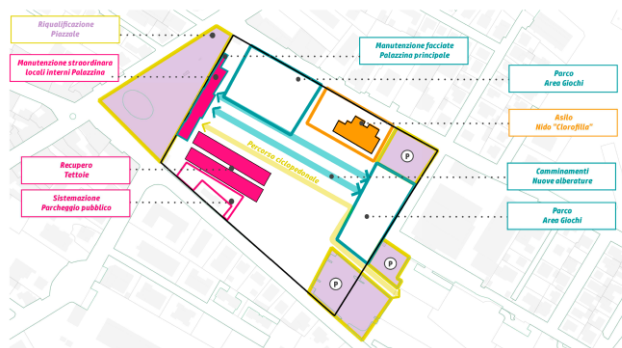
Excavation material, horizon C, parent material

Features: loose sediments or weathered rock.



*Figure 1. Soil profile and horizons
source: "Per una protezione del suolo
efficace in fase di cantiere – Direttive e
consigli per la pianificazione"
Confederazione Svizzera
Ufficio federale dell'ambiente UFAM*

3. Proper planning



Effective soil protection begins with a correct planning. Before starting work at the construction site, technicians must take preventive measures for soil protection. These measures must also be considered in the eventual call for tenders, considered during the procurement procedure and contained in a special document called "*Soil Management Plan*" which will include the following:

Work schedule and timing

Insert soil protection in the work schedule, trying to optimize the timing of soil removal with ongoing or planned urban regeneration interventions, not too far ahead in time.

Avoid any possible soil contamination with a proper and careful realization of works, so to avoid that a good quality soil loses its valuable characteristics becoming of poorer quality.

Assessment of soil quality

Detect soil characteristics.

Determine the thicknesses of the A and B horizons (upper and lower soil layer).

Programming soil reuse

Define surfaces and volumes of soil to be displaced, in order to identify the most suitable earthmoving and transport machinery, define the area to be used for soil storage on site or in the intermediate site, and eventually plan properly soil reuse according to the surfaces and the thickness of the soil to be used.

Designate temporary storage spaces inside or outside the construction site.

Removal intervention optimization

Plan timely, and minimize soil removal.

Develop working plans in case of adverse weather conditions.

Plan the road network inside the construction site (runways and storage areas).

Define the type of machinery, their optimal use and the working techniques.

Perform removal and temporary storage according to the soil horizons.

Provide access to temporary deposits.

Starting the re-use operations

Determine the purpose of re-use (thickness of horizons A and B).

Specify the timing and operating modes (dry soil conditions).

4. Suggestions for working phases



Carefully coordinated programming allows for the application of soil protection measures within the construction site quickly and smoothly. It is important that these protection measures are communicated and agreed upon timely with the company that will carry out the work.

Preparation of soil removal

Daily assessment of soil moisture and consequent adjustment of removal operations.
Immediate suspension of work in case of rain and of excessive soil moisture.

Use of appropriate machinery and techniques:

- evaluation of weight, pressure distribution and operational range of machinery;
- use of crawler machinery;
- removal and restoration of soil with the excavator;
- realization, where necessary, of handling tracks.

Soil removal

Remove soil exclusively from the area to be built.

Operate only in dry soil conditions.

Do not remove the soil under deposits, tracks and installation areas.

Treat polluted soils separately.

Remove soil in strips and separately the horizons A and B.

Do not transit on A and B horizons.

Temporary deposit

Set up the soil storage with an appropriate drainage system.

Store A and B horizons separately.

Respect maximum height of soil heaps.

Do not transit on the heaps.

Timely plant and take care of temporary storage.

Lay temporary soil heaps that must pass at least one winter on a non-woven geotextile.

Identify the heaps with signs, indicating the type, quantity, and indication of re-use.

Soil reuse

Do not use the B horizon as a filling material.

Reconstruct the sequence of soil layers (subsoil, B horizon and A horizon).

Avoid the passage of machinery on restored lower layer and soil.

Cultivate the superficial soil and green it up quickly.

Ensure adequate drainage.

5. Benefits



In many respects, soil protection is extremely convenient. The methods of planning and intervention here illustrated not only help to protect a very important resource, but allow the achievement of economic and qualitative advantages both in the short and long term.

Respect of the work schedule - cost savings

With careful, timely and flexible scheduling, deadlines can be met even under unfavorable weather conditions.

Applying the requirements for soil protection limits the risk of delays in carrying out the operations.

In situ soil reuse contributes to reducing the costs of the operation.

Safer buildings

Healthy restored soils prevent flooding and water logging.

Damage to buildings due to humidity is significantly reduced.

Using only the excavated soil material for filling, and removing and re-using the B horizon separately reduces compaction problems.

Pleasant environment - easy maintenance gardens

A healthy soil promotes the creation of lush and variously cultivated green areas.

Healthy soil allows better disposal of rainwater.

Sustainable and ecological green spaces offer a high contribution to environmental improvement.

Healthy soils & Nature protection

Proper soil re-use results in enhanced protection of the (non-renewable) soil.

Soil re-use contributes significantly to water infiltration, storage and retention.

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