



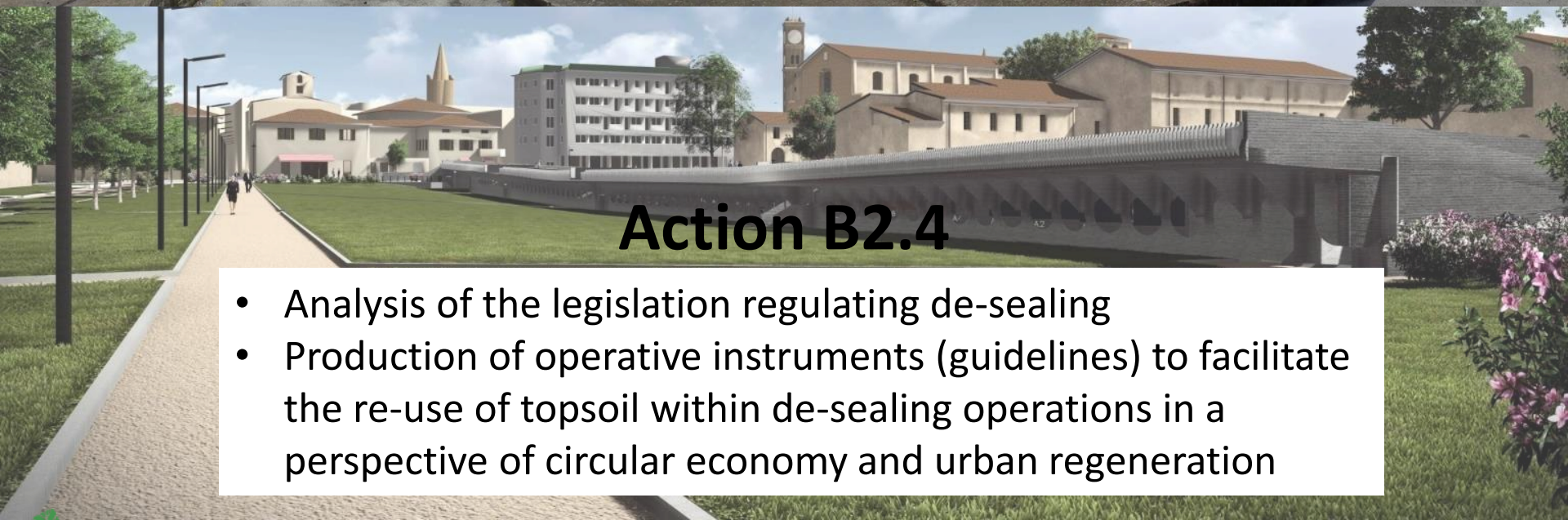
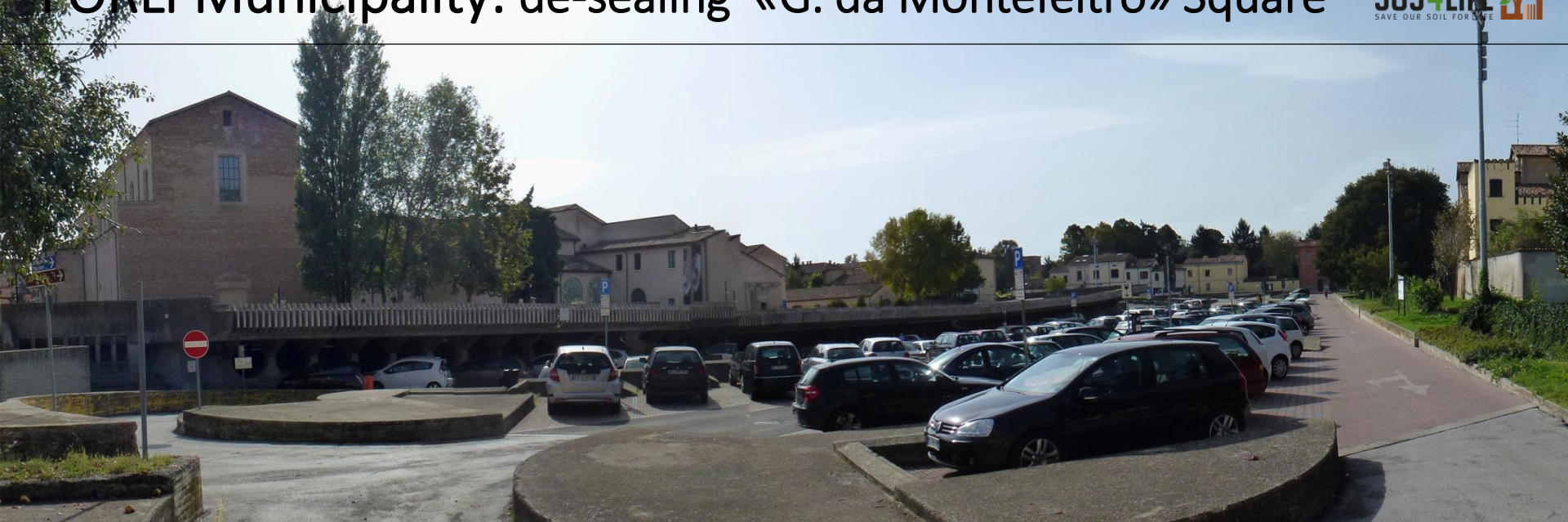
SOS4LIFE
SAVE OUR SOIL FOR LIFE

Guidelines for the removal, management and re-use of topsoil at construction sites

Action B2.4

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	Comune di Forlì (FC) – Coordinatore		Regione Emilia-Romagna
	Comune di Carpi (MO)		CNR Ibimet (Firenze e Bologna)
	Comune di San Lazzaro di Savena (BO)		Legambiente Emilia-Romagna
	Forlì Mobilità Integrata		ANCE Emilia-Romagna



Action B2.4

- Analysis of the legislation regulating de-sealing
- Production of operative instruments (guidelines) to facilitate the re-use of topsoil within de-sealing operations in a perspective of circular economy and urban regeneration

The Netherlands, Belgium/Flanders, United Kingdom, Germany, Switzerland...

United Kingdom:

British standard 3882:1994 (revised in 2007). *Specifications for Topsoil*
DEFRA, 2009. *Construction code of practice for the sustainable use of soils on construction sites*

Switzerland :

Federal Office for the Environment, Forests and Landscape (OFEF).

Environmental Guide n.10., 2001. Building Protecting soil

Environment-Execution, 2001. Examination and recycling of earthworks

FOEN, 2008. *For effective soil protection at construction site-directives and planning advice*

FOEN, 2015. *Soil and construction sites, state of technology and practice*

De-sealing

According to Italian legislation an area of de-sealing is contemporary a *site of production* of material and a *site of destination* for material

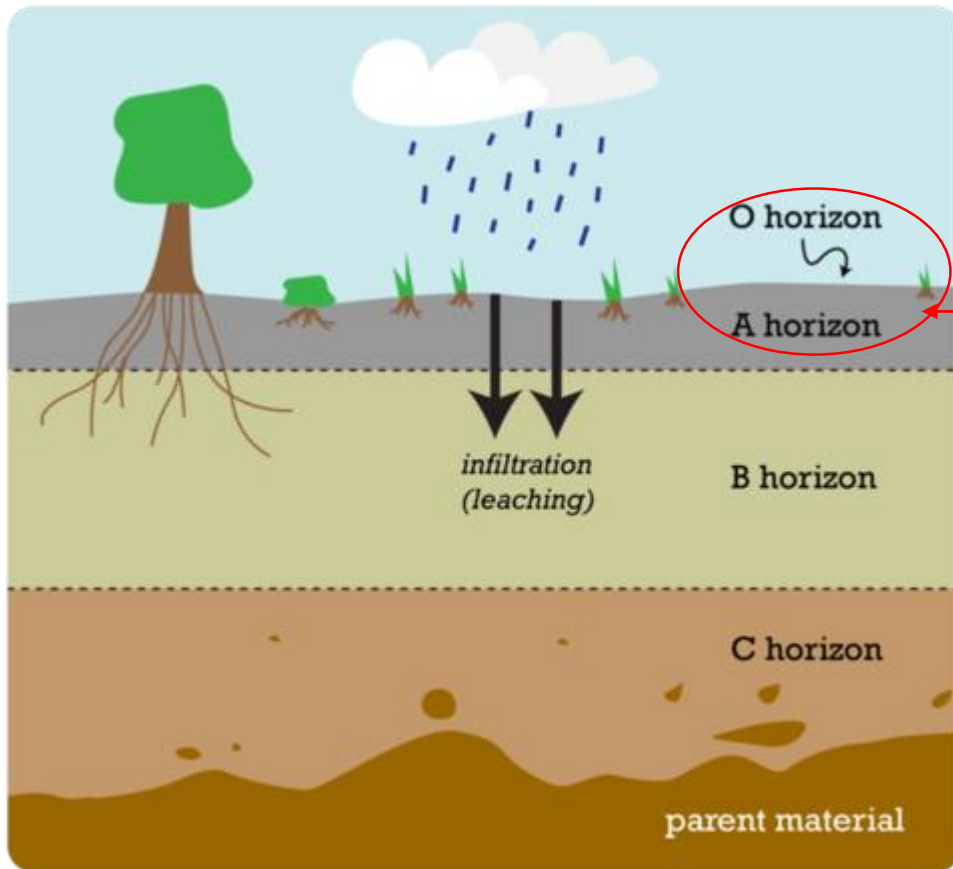
site of production



promote the re-use of natural topsoil from construction sites to cover de-sealing areas

site of production





Soil functions

- Support human activities
- Habitat and biodiversity
- Fluxes regulation
- C sequestration
- Storage H₂O
- Food and fibers
- Raw materials

Soil concept

For the engineer it is a rock or a sediment to take account for the operations of earthmoving, foundation and construction



For the quarrier it is that diaphragm of material to be removed before beginning the exploitation of the quarry.



For the botanist and the naturalist: it is the support for plant and animal life.



For the farmer portion of land surface susceptible to exploitation in view of an animal or vegetable production.



Soil concept

For the pedologist, soil is the product of alteration, of the change and organization of the upper layers of the earth's crust, under the action of life, of the atmosphere and of the exchanges of energy manifested therein (Giordano, 1990) .

It is a three-dimensional natural body, composed of mineral particles (sand, silt and clay), decomposed organic substances, living organisms, air and water. It is presented with thicknesses ranging from a few centimeters to a few meters, is organized in horizons or layers.



definition of soil in the legislation

Leg. Decree no.152/06	PRD no.120/17	RL no24/2017
Testo Unico Ambientale Parte seconda title I, item 5, par. 1, lett. v-quater	Normativa ambientale sulla gestione delle terre e rocce da scavo item.2 par1, lett. b)	Disciplina regionale sulla tutela e l'uso del territorio item. 1 par. 2 let. a)
The most superficial layer of the earth's crust located between the rocky substratum and the surface. The soil is made up of mineral components, organic matter, water, air and living organisms. For the sole purpose of applying the Third Part, the meaning of the term includes, in addition to the soil as previously defined, also the territory, the subsoil, the inhabited areas and infrastructures.	The most superficial layer of the earth's crust located between the rocky substratum and the surface. The soil is made up of mineral components, organic matter, water, air and living organisms, including the reporting materials matrix according to item 3, paragraph 1, of the decree-law of 25 January 2012, n. 2, converted, with amendments, by law March 24, 2012, n. 28.	Common good and non-renewable resource that performs functions and produces ecosystem services, also in relation to the prevention and mitigation of hydrogeological events and mitigation strategies and adaptation to climate change.

Soil legal nature in de-sealing legislation

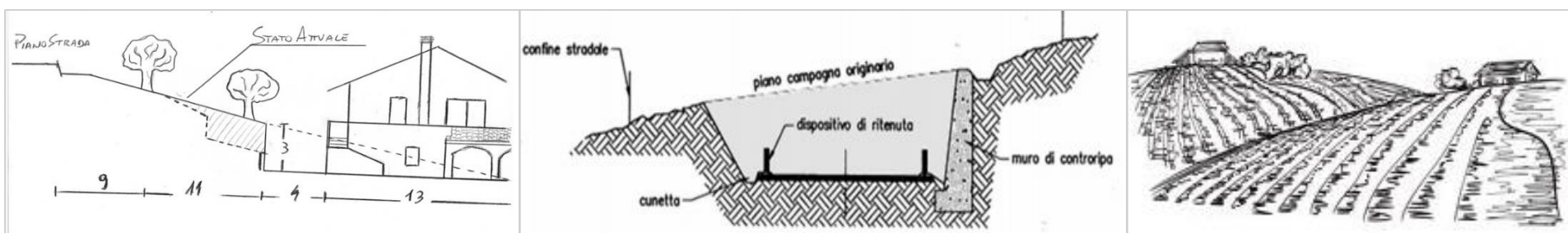
EU Waste Framework Directive 2008/98/CE, modified by DIR 2018/851/UE which in Italy are Environmental Legislative Decree No 156/2006 and Presidential Decree No 120/2017 → *waste or by-product?*

Regional Law No 24/2017 ,art.5,comma 3; art.9,comma1, artt.12, 15, 20, 21 → surface subject to planning → *urban rigeneration, no net land take by 2050* (COM(2011)571)

Definition according to PRD no.120/2017, Item 2, par.1, lett. c): «soil excavated within activities finalized to a construnction project»

which can be

- excavations in general (excavation, foundations, trenches);
- perforations, drilling, piling, consolidation;
- infrastructural works (tunnels, roads);
- removals and leveling of works on the ground



ENVIRONMENTAL PREREQUISITES

Pollutant concentration $<$ threshold values* or $<$ natural background values

* Leg.Decree no.152/2006

TIME OF STORAGE

«big building sites»(>6000 mc) subjected to IPPC/IED (Dir. 2010/75/UE) or EIA (Dir. 2014/52/UE) $\leq$ 2 years

«big building sites» not subjected to IPPC/IED or EIA $\leq$ 1,5 years

Intrinsic quality qualification B.S 3882:1994/Guidelines



Premium grade topsoil : natural topsoil with **high intrinsic fertility**, **loamy texture** and **good structure**. This high quality may be unnecessary for the majority of topsoil applications where the other grades may be entirely satisfactory. *NOTE: if mishandled or badly stored, premium grade topsoil can change to one of the other grades*

General purpose grade topsoil: general purpose grade includes natural topsoil with **lower intrinsic quality than a premium grade topsoil** or a **premium grade topsoil that has deteriorated due to poor handling**. *NOTE: general purpose grade topsoil may require improvement by lime and/or fertilizer treatment.*

Economic grade topsoil : This is derived from a topsoil of **lower intrinsic quality than general purpose grade topsoil** or a material, such as selected subsoil or friable mineral matter which is suitable for plant growth. *NOTE: Because of its possible origin, no minimum organic matter or plant nutrient status is specified for economy grade it will probably require fertilizing, manuring and careful husbandry (perhaps over a number of years) to achieve satisfactory productivity;*

Parameters- BS 3882:1994/ Guidelines

	Premium topsoil	General purpose grade topsoil	Economic grade topsoil	Determination
Textural classification	FLA (clay $\leq$ 27%), FA, FS, FAS, FL, F	SF, FS, F, FL, AS, FA, FLA (clay $\leq$ 35%), AL, A (silt MAX 50%)	SF, FS, F, FL, AS, FA, FLA (>35%), AL, A (silt MAX 50%)	D.M. 13/09/1999
Nutrient Content N (g/kg) P ₂ O ₅ (mg/kg) K ₂ O (mg/kg)	N >0,5% P ₂ O ₅ >23 mg/kg K ₂ O > 120 mg/kg	N >0,5% P ₂ O ₅ >23 mg/kg K ₂ O > 120 mg/kg	nd	D.M. 13/09/1999
Organic matter (CO*1,726)	$\geq$ 2,5%	$\geq$ 2%	< 2%	D.M. 13/09/1999

Map of the Land
Capability

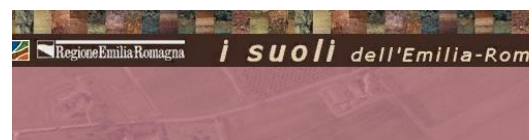
Topsoil Parameter	Map
Texture	x
NPK content	x
Soil organic matter content	x

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Documentation: soil maps (small construction sites)

Forlì Municipality
site of production



i suoli dell'Emilia-Romagna
Capacità d'uso - Livello di dettaglio 1:50.000

Classe
II

Limitazioni
s2 e3

Legenda classi

- I Suoli adatti all'agricoltura: presentano pochissimi fattori limitanti
- II Suoli adatti all'agricoltura: presentano moderate limitazioni

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- III Suoli adatti all'agricoltura: presentano severe limitazioni
- IV Suoli adatti all'agricoltura: presentano limitazioni molto severe
- V Suoli adatti al pascolo e alla riforestazione
- VI Suoli adatti al pascolo e alla riforestazione: presentano limitazioni severe
- VII Suoli adatti al pascolo e alla riforestazione: presentano limitazioni molto severe
- VIII Suoli inadatti ad utilizzazioni agro-silvo-pastorali.
- Non suolo: corsi d'acqua e laghi

Legenda limitazioni

- s1 profondità utile per le radici
- s2 lavorabilità
- s3 pietrosità superficiale
- s4 rocciosità
- s5 fertilità
- s6 salinità

Re-use

	Land Capability Map Classification	Quality class	Re-use in green urban areas	Re-use in green peri-urban, extra-urban and rural areas
Land Capability Map The "Land Capability Map" is a document evaluating the ability of the soils to produce normal crops and forest species for long periods of time, without the occurrence of soil degradation phenomena. Basic reference is the classification scheme Land Capability Classification of the U.S.D.A. (U.S., <u>Klingebiel</u> and <u>Montgomery</u> , 1961). https://datacatalog.regione.emilia-romagna.it/catalogCTA/ (portale minERva)	I; I/II; I/II/III; I/III; II ; II/I; II/I/III; II/III; II/III/IV; II/IV;	Premium topsoil	- orchards, gardens, nurseries, parks ; - urban flowerbeds; - Hanging gardens; - green industrial areas, crafts and fine green belts. Naturalistic and landscape works: - areas of absolute protection, respect and protection of water and water collection points (according to Legislative Decree 152/06 article 94) when the area is significant in terms of water flow and quality or areas of protection of waters with naturalistic purposes.	- agricultural areas with annual crops, gardens, nurseries, gardens, landscape restoration to recreational or natural areas with particularly demanding plants, or used for agricultural use with annual rotation; - green industrial areas, crafts and fine green belts. Naturalistic and landscape works: - areas of absolute protection, respect and protection of water and collection points (according to Legislative Decree 152/06 article 94) when the area is significant in terms of water flow and quality or areas of protection of waters with naturalistic purposes.



Soil management plan: site of production

- Flexible work calendar;
- Minimization of occupied areas and measures to reduce soil take-up;
- Preliminary grassing of the occupied surfaces;
- Choice of machines and take-out method;
- Accesses, runways and open spaces for temporary construction equipment;
- Temporary storage and the balance of materials removed

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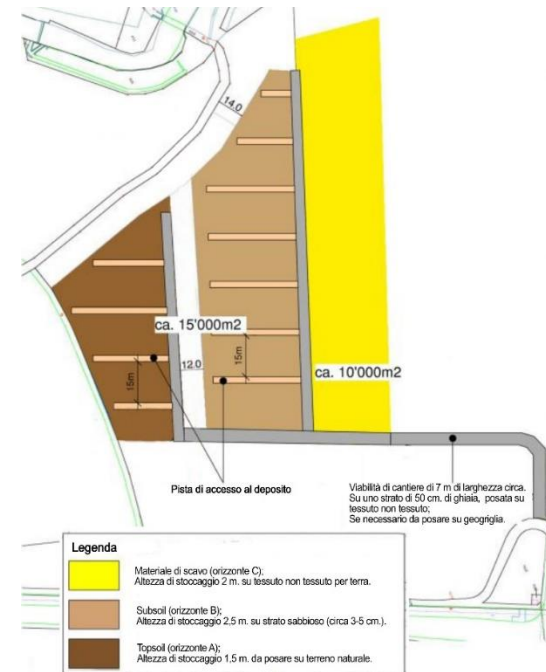
Soil management plan: site of storage

Storage areas, storage methods, height of topsoil / subsoil heaps to be stored and conditions for grassing and humidity control;

Heaps separated by horizons A and B, with adequate signs. Indication of type, quantity, origin, possible destination of use and date of deposit on the site;

Store topsoil in heaps not exceeding 2 m in height; for storages with a duration of more than 2 years, weeding grass is recommended;

Use only the road network of the deposit indicated in the site management plan



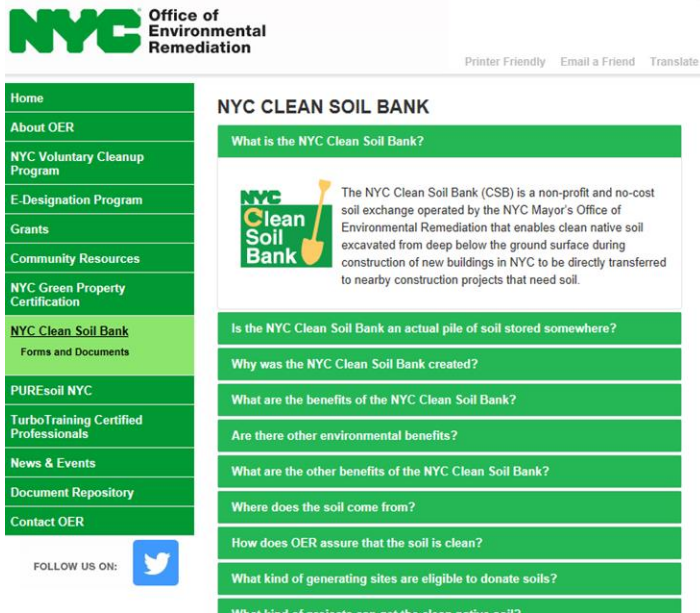
Example of Plan of the deposit areas

Soil management plan: site of destination

- Make sure that the receiving subsoil is loose, working it dry. Also ensure that there is adequate drainage of the receiving area, the continuity of the hydraulic conductivity at the base of the restored soil must always be guaranteed;
- Return the lower and upper layer by means of a tracked excavator all in one operation, in successive strips and in the direction of the slope. Transit of construction machinery is forbidden on the reclaimed soil;
- After spreading, cultivate the superficial soil removing any stone and green it immediately, for the grassing it is opportune to use plants with deep roots (alfalfa, purple clover) and it would be appropriate to plant for three consecutive years, without processing



Exchange platforms



NYC Office of Environmental Remediation

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NYC CLEAN SOIL BANK

What is the NYC Clean Soil Bank?

The NYC Clean Soil Bank (CSB) is a non-profit and no-cost soil exchange operated by the NYC Mayor's Office of Environmental Remediation that enables clean native soil excavated from deep below the ground surface during construction of new buildings in NYC to be directly transferred to nearby construction projects that need soil.

Is the NYC Clean Soil Bank an actual pile of soil stored somewhere?

Why was the NYC Clean Soil Bank created?

What are the benefits of the NYC Clean Soil Bank?

Are there other environmental benefits?

What are the other benefits of the NYC Clean Soil Bank?

Where does the soil come from?

How does OER assure that the soil is clean?

What kind of generating sites are eligible to donate soils?

What kind of projects can get the clean native soil?

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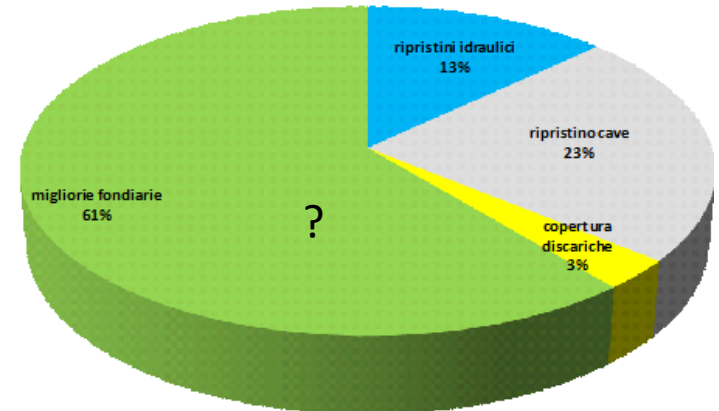
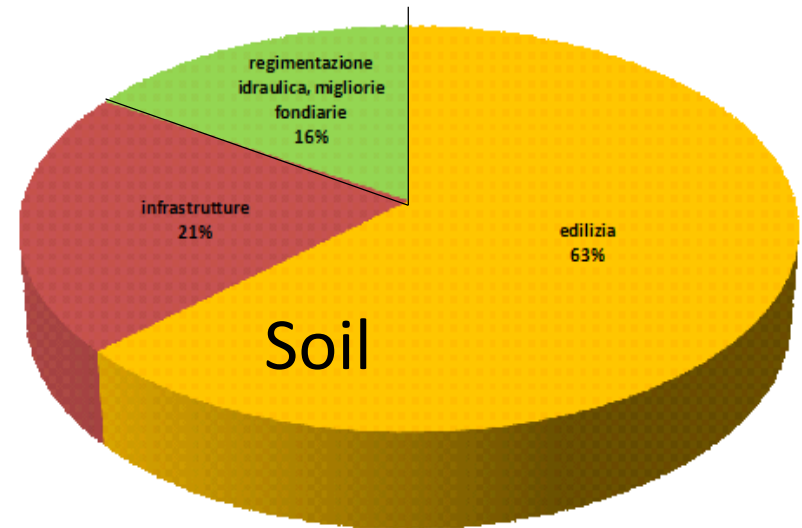
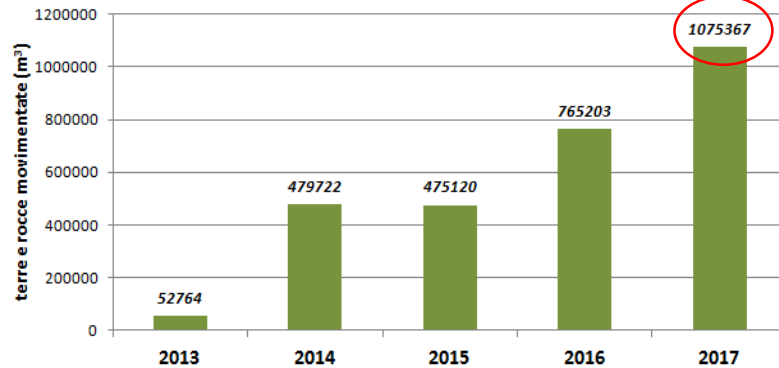
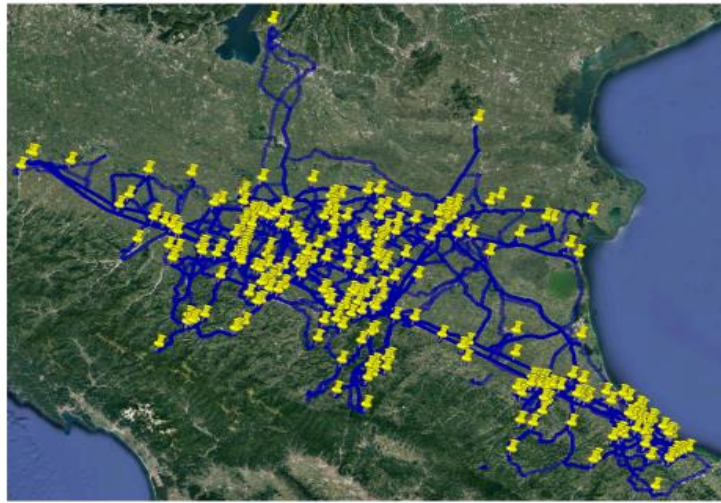
(<http://www.nyc.gov/html/oer/html/nyc-clean-soil-bank/nyc-clean-soil-bank.shtml>)

On a regional scale

it is proposed to integrate the platform of the areas available for urban regeneration that the Municipalities must prepare according to the new urban planning legislation (Regional Law no 24/2017). Within the platform, a register of de-sealing areas ready to receive soils should become available to the construction companies that therefore will be able to choose the destination sites on the basis of the specific characteristics of the soils produced.

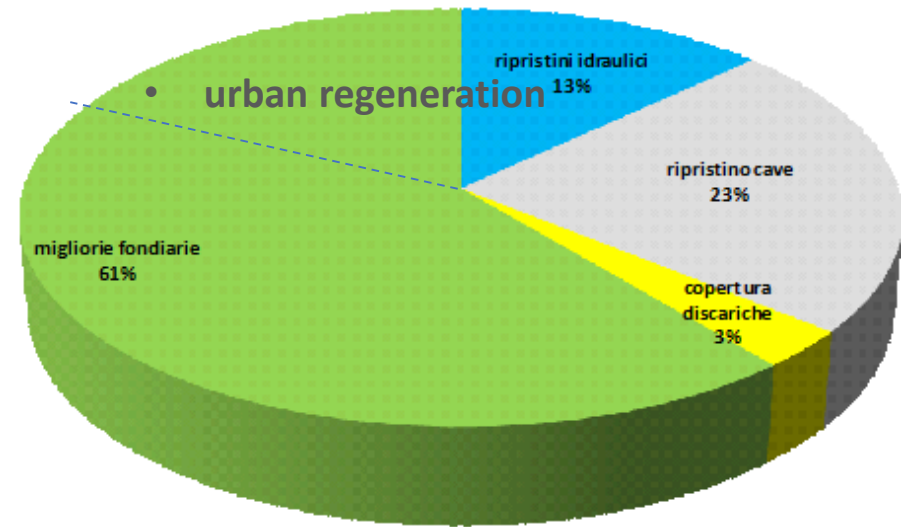
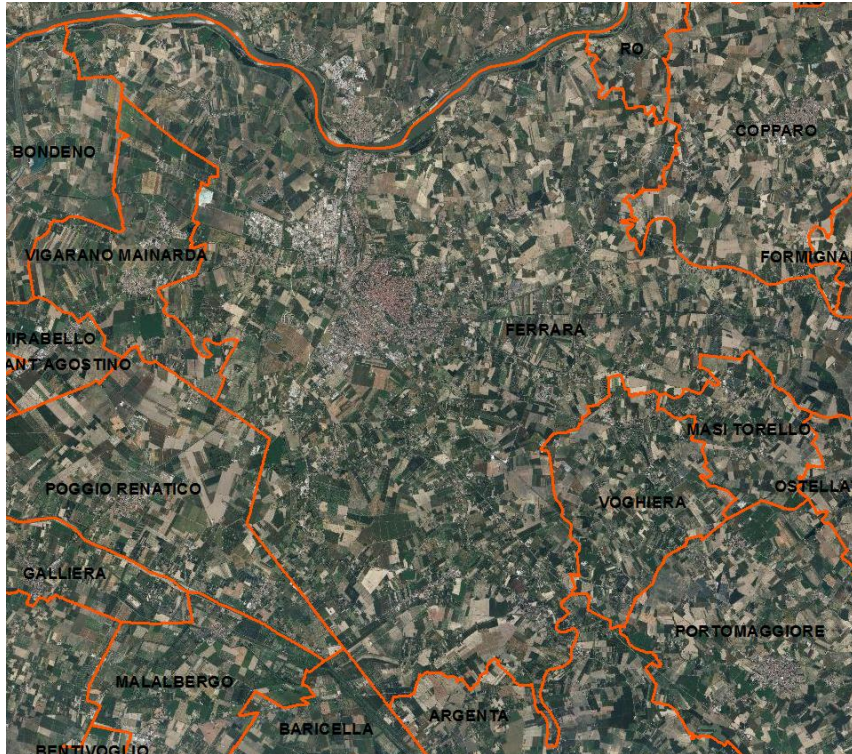
State of the art: regional scale

Impact evaluation



if timetable of storage is not respected soil that become waste (code 170504) and the cost for disposal is 20 € per ton in Emilia-Romagna Region

Future: municipal scale



- Traceability of the soil at municipal area
- Saving time and money for companies for the certainty of soil dislocation, eliminating the risk of having to dispose them in landfill with an increase in costs (20 € per ton)
- Lower environmental impact
- New soils with a restoration of ecosystem services

Thank you for your attention
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Regione Emilia-Romagna



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Legambiente Emilia-Romagna



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