



URBAN SMS Soil Management Strategy



Guidance for Soil in Strategic Environmental Assessment and Environmental Impact Assessment (SEA/EIA Guidance)

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URBAN SMS WP3 Action 3

Guidance for soil in SEA/EIA including

- **Collection of existing approaches for soil protection aspects in SEA and EIA,**
- **Analysis of best practice examples,**
- **Testing of the draft guidance for soil in SEA/EIA in the test sites of each partner**

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1 INTRODUCTION – OBJECTIVES AND METHODS IN ACTION 3

WP 3 focuses on guidance for municipalities and planning agencies how to integrate soil related issues in the urban planning process. Within the framework of the urban soil management system a SEA/EIA guideline focused on soil will be developed as this resource is often underestimated in the environmental assessment in spatial planning. Main objective is to support the consideration of soil within the SEA and EIA process by proper evaluation of this environmental media. Existing requirements, approaches, needs & gaps will be described in the guideline.

As a first step for Action 3, an inquiry amongst the project partners was carried out aiming at collection of existing approaches how to include soil protection aspects practically in SEA/EIA. For this purpose a questionnaire template was developed and an Analysis of best practice examples took place.

This questionnaire was based on the following structure and requested the following contents:

1. *National legal (if necessary transboundary) requirements (including legal requirements on subnational/federal level, if applicable) to include soil aspects in SEA/EIA*
 - a. *Name the act/law*
 - b. *Name the main approaches of soil protection and soil assessment in the referred act/law*
 - c. *Most urgent needs and gaps regarding soil protection*
2. *National (including subnational/federal levels) guidelines for SEA/EIA*
 - a. *Name the guideline*
 - b. *Name the main approaches of soil protection and soil assessment in the referred guideline*
 - c. *Most urgent needs and gaps regarding soil protection*
3. *Focus of SEA (level of plans and programmes - e.g. spatial planning and related plans and programmes, urban plans, city development plan, regional development plans, programmes for regional development) approaches related to soil aspects in urban and suburban development*
4. *Focus of EIA (level of projects - e.g. urban development sites, city construction projects, airport projects related to cities) approaches related to soil aspects in urban and suburban development*
5. *SEA/EIA approaches based on practical case studies/examples to include soil protection aspects*
 - a. *Name of programme or plan or project*
 - b. *Main soil aspects*
 - c. *Why did you choose this SEA as good example?*

The full questionnaire template can be found in Annex 1.

In a second step, based on the input of all partners, a compilation of draft guidance for soil in SEA/EIA took place. Based on WP5 results, a revision of draft guidance for soil in SEA/EIA

will be accomplished. The final output will be the “Guidance for soil in SEA/EIA”, including approaches, needs, requirements, gaps and risks of soil protection in SEA/EIA.

After the development of the first draft of this guidance, the experience on the test sites between Spring 2010 and Spring 2011 were assessed by three different questionnaires during Spring, Summer 2011. For details see Chapter 11 **Fehler! Verweisquelle konnte nicht gefunden werden.** and Annex 8-10.

2 GENERAL SOIL MANAGEMENT APPROACHES AND NEEDS BASED ON PREVIOUS ACTIONS

Due to diverse planning procedures in urban areas, the scarce resource soil is excessively consumed from a qualitative as well as quantitative point of view in the current situation. Therefore the optimisation of land use and its planning in urban areas by preserving the natural assets of the resource soil is crucial. In general the reduction of land use and urban sprawl is the aim of most land use plans. However, the impact is mostly limited to the **application of new plans or programme** (in the case of **SEA**) or **projects** (in the case of **EIA**).

A strengthening of the application of the land use plan would improve its effectiveness on soil sealing, land use and urban sprawls.

Therefore a strategic framework for soil management, giving guidance for municipalities and planning agencies on how to integrate soil related issues in the urban planning process is needed and will be provided by the URBAN SMS project.

In a first step a compendium of existing approaches and legislation related to urban planning (Action 3.1) was collected and served as the basis of the identification of soil management approaches and needs, which will build the framework for soil management (Action 3.2) at a later stage.

The **role of soil management approaches within urban planning procedures** and (legal) instruments of urban planning is a very crucial one. The gathered information strongly indicates that established **spatial planning instruments on local (municipal) level** are currently the **most important procedures to deliver soil conservation and sustainable soil management**. The vast majority of approaches are applied in or closely coordinated with Local Spatial (Urban) Development Concepts, Local Land Use Plans (Zoning Plans), and Local Building Regulation Plans (either in one, two or all of these instruments). The comparative analysis suggests that among the local instruments the **Local Land Use Plan** appears to be the most vital implementation procedure for soil management approaches. However, also **Regional Spatial Plans** (including plans on higher-ranking level) are in many cases suitable for implementing soil management approaches. Quite often, approaches focus on identification, decontamination and redevelopment of **brownfields**; these brownfield-centered strategies are usually carried out in close relation to local urban planning procedures.

Only a low number of before mentioned approaches is suitable to be applied within EIA and / or SEA.

2.1 RESULTS SWOT–ANALYSIS

In the “**SWOT–Analysis**” of Task 3.1.2, both instruments, EIA and SEA were analysed in depth, regarding their Strengths, Weaknesses, Opportunities and Threats. The main findings are integrated into the separate chapters of this draft report.

It can be stated that in the assessment of plans and programmes through a SEA as well as in the assessment of large scale projects through an EIA, the impacts on various functions of soil have to be checked systematically. These assessments enable the administrations conducting EIAs respectively SEAs to counter-check potential impact on soil via an interdisciplinary approach and can earmark measures to prevent potential negative effects.

However, usually, soil is not the core issue of a SEA or an EIA. Furthermore, qualitative thresholds according to land consumption or soil sealing are often missing, whereas e.g. exact and even European wide similar thresholds concerning air quality do exist already.

2.2 SOIL MANAGEMENT APPROACHES

The following key soil management approaches were identified in prior analysis (for details see Task 3.2.1):

- **Delineation and preservation of high quality soils:**
Strategies target at preservation of high quality soils, in particular such of agricultural land. The implementation procedures and their relationship towards spatial planning can differ quite strongly between countries. In some countries, the practice is to designate priority areas for agriculture in Regional Spatial Plans in order to prevent them from being built up. However, there are also examples where integration into spatial planning procedures is poorly or not at all developed.
- **Rehabilitation and redevelopment of brownfields:**
Approaches dedicated to identifying, decontaminating and redeveloping abandoned sites were also identified. Implementation may often, but must not necessarily, be closely coordinated with Local Spatial Planning.
- **Protection of open and green spaces in urban areas:**
Approaches focused on preserving, restoring or upgrading existing unsealed spaces in urban areas (such as greenery in residential areas, recreation areas, parks, playgrounds etc.) exist in three of the partner territories. Here, soil conservation occurs more or less as a side effect of approaches to improve the quality of life for citizens in an urban environment.
- **Soil databases and soil maps:**
Although explicitly mentioned only by three partners, implicitly information and monitoring instruments such as soil databases and maps are a prerequisite for many of the identified approaches and thus highly important. Sufficient knowledge of soil qualities is also a major basis for the Stuttgart Soil Protection Concept.

2.3 SOIL MANAGEMENT NEEDS

Four types of soil management needs were identified in earlier reports (for details see Task 3.2.3):

- **General needs:**
Planners and stakeholders need to be aware of the importance, quality and quantity of soil for urban planning processes. This provides at a later stage a higher acceptance of the environmental good soil. All decisions need to be based on existing soil data as much as possible, but monitoring of soil serves the necessity to know about future soil conditions. An evaluation can validate these monitoring assumptions and indicators for the impacts of soil quality in urban development can be developed and applied in future planning decisions.
- **Conservation needs:**
Highlight possibilities to protect good quality soil and specific functions of soil. This can be achieved via diverse sectors like agriculture, water or nature conservation giving the priority to protect these areas and thus avoid soil consumption. On the one hand, the quality of life of urban citizens (e.g. ecosystem and recreation functions via protected and green areas, reduction of wind erosion and improved air quality) and the supply of agricultural products from short distances can be improved and assured. On the other hand soil can be protected and secured in a long-term perspective. Also within urban

areas, areas for play grounds, green fields and water retention need to be conserved. If subsurface construction has ceased, there is the need to set it back to the original state of soil.

- **Evaluation needs:**

Environmental quality assessment and delineation are seen as very important. Also the loss of soil, including the sealing rate and alternative uses of brownfields need to be evaluated. Based on this evaluation and the estimated demand of compensation, which is seen as an important evaluation need from diverse partners, potential areas of urban development and growth shall be identified, especially areas of low soil quality. As not only the soil itself is affected by change of land uses also the impacts on other environmental compartments is recommended to be assessed. The quantification of impacts of soil quality on local climate, air and water means a transdisciplinary approach, looking at interactions between several environmental matters.

- **Action needs:**

Should be based on the previous needs. Through the consideration of these conservation and evaluation needs in zoning plans the available area for construction can be defined and priority can be given to undissected, low soil quality areas. Also looking at the economic and social cost related to works impacting soil is needed. Finally the expansion of a city shall, as already stated in the evaluation needs, depend on the suitability and quality of soil.

For the fulfilment of these needs, several proposals for implementation were given. Beside legislative framework conditions the development of computer tools are regarded as helpful for practical implementation. Regarding the proposed needs, tools for the evaluation of quality and functions of soil under different land use and impacts on other environmental compartments will be helpful. Also tools to assess the loss of soil resources, in particular by soil sealing, seem to be necessary. Furthermore for collecting and compiling soil data from different sources, tools should be developed. Such tools should be made accessible via internet.

2.4 APPLICATION FOR SEA/EIA

This precursor analysis, mentioned above, serves as umbrella of draft guidance for soil in SEA/EIA. These guidelines will clearly state the **practical requirements** for soil protection aspects in SEA/EIA and aim at giving soil, as a subject of protection in both planning tools, more weight in planning procedures and development decisions in urban areas.

As already stated in the “Collection of (policy) instruments influencing the use and protection of soil” (Task 3.1.1), legal EIA requirements were analysed.

Environmental assessment¹ is a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made.

In principle, environmental assessment can be undertaken for **individual projects** such as a dam, motorway, airport or factory (**‘Environmental Impact Assessment’**) or for **plans, programmes** and policies (**‘Strategic Environmental Assessment’**).

The process involves an analysis of the likely effects on the environment, recording those effects in specific SEA or EIA reports, undertaking a public consultation exercise on the report, taking into account the comments and the report when making the final decision and informing the public about that decision afterwards.

¹ <http://ec.europa.eu/environment/eia/home.htm>

The environmental report for SEA has to document the identification, description, and evaluation of likely significant effects on the environment. For EIA projects the impacts on the environment have to be documented in the Environmental Impact Study - EIS. This comprises the assessment of all negative impacts on the environment listing soil explicitly. The report includes also measures for avoiding, minimizing or compensating negative impacts.

For this report both EU Directives for SEA and EIA were analysed. SEA acts as well as EIA acts for all URBAN SMS partners were briefly specified.

3 STRATEGIC ENVIRONMENTAL ASSESSMENT – SEA

Strategic Environmental Assessment (SEA)² is a systematic process for evaluating the environmental consequences of proposed plan or programme initiatives in order to ensure that they are fully included and appropriately addressed at the earliest stage of decision-making, on a par with economic and social considerations³.

SEA is intended to integrate the environment into strategic decision-making, as distinct from Environmental Impact Assessment (EIA), which is directed at projects. SEA can be seen as an extension of EIA into the strategic arena towards it being used in the early stages of formulation of plans and programmes.

As SEA operates at a strategic level in a variety of operational circumstances, and stresses process rather than detailed technical analysis, the nature of the tool, and the practical steps involved, vary from context to context. SEA is by nature more open-ended, consultative and iterative. It does not in general demand sophisticated and expensive data gathering and modelling capacity. The process that delivers the final product is important, with inter-institutional cooperation and public participation both being key determinants of success.

The intended output is more sustainable plans and programmes. The process of working through the SEA brings together the various institutions involved in the formulation of plans and programmes to work through an agenda that explicitly addresses the sustainability aspects of the proposed actions. By operating at a strategic level it addresses some of the limitations of project-based EIAs which cannot, for instance, capture adequately the cumulative effect of an overall investment programme, or see these effects being evaluated only after the programme is in place.

One of the purposes of the SEA is to identify the significant environmental effects of a plan or programmes and identify reasonable alternative ways of meeting the same objectives. The explicit consideration of alternative routes to the same outcome is integral to the approach. The SEA process is thus intended to improve decision-making by identifying:

- Positive and negative environmental effects of a plan or programme, and
- Means to accentuate the positive effects, and reduce or avoid the negative ones.

The SEA model applied in the EU also puts an emphasis on promotion of public participation in policy-making – with open access to the draft plan and SEA report being a key part of the process.

SEA is in principle applicable to all plans and programmes where there is a prospect of significant environmental impact. The public should at least be consulted about the draft of the plan or programme and the environmental report.

The SEA should focus on impacts that are identified as priority concerns by the population concerned. It should also address national and transboundary/global issues, and involve transboundary consultation when transboundary impacts are possible.

The SEA Directive (2001/42/EC) requires systematic environmental assessment be considered for plans and programmes prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annex I and II to the EIA Directive (85/337/EEC) or which, in

² [Standard SEA literature](#)

³ Sadler and Verheem (1996)

view of the likely effect of sites, require an assessment under Article 6 or 7 of the Habitats Directive (92/43/EEC).

The strength of SEA lies in its potential to avoid downstream costs (and delays) by developing more sustainable plans and programmes. The benefits are delivered through the way in which SEA influences the formulation of the plan and the decision-making process, rather than through a discrete product (the report). The SEA tool cannot be readily divorced from the process and institutional context it was designed for.

Possible benefits:

- A systematic review of the relevant environmental issues (including soil);
- A better understanding of the environmental effects of the plan or programme;
- A better balance between environmental, social and economic factors in the final plan or programme;
- Enhanced transparency in the decision-making process, helping to win public support;
- Guidance on mitigation proposals;
- Avoidance of subsequent delays in implementation;
- Simplifying later project EIAs;
- Possible comparison with other suitable alternatives within a plan or programme, unlikely like EIA, where a certain project is already defined.

Possible limitations:

- Where policy-making has been traditionally beyond the public domain a change in culture may be needed before SEA can help catalyse attitudes towards integrating environmental concerns.
- In practical terms it can be very hard to predict environmental effects at the most strategic level and difficult to develop quantifiable targets. It is often enough to estimate the effects.
- Achieving integration of environmental aspects into plans and programmes is difficult, if there is an ineffective tiering system by which formal links are established to programmes or plans above, and projects (EIA) below the level at which the SEA takes place.
- Administration has only a short lasting experience in implementing SEA.

4 LEGAL REQUIREMENTS – SEA

4.1 EU AND UNECE

The **SEA Directive**⁴, states that “The information to be provided ... is the following: the likely significant effects (1) on the environment, including on issues such as ... **soil**”.

Additionally the UNECE **protocol on strategic environmental assessment to the convention on environmental impact assessment in a transboundary context**⁵ states that “Environmental, including health, effect means any **effect on the environment, including** human health, flora, fauna, biodiversity, **soil**, climate, air, water, landscape, natural sites, material assets, cultural heritage and the interaction among these factors”.

The gap between SEA- and EIA-level is bridged in Article 2 of the UNECE SEA protocol - field of application concerning plans and programmes – which states that “ A **strategic environmental assessment** shall be carried out for plans and programmes which are prepared for agriculture, forestry, fisheries, energy, industry including mining, transport, **regional development**, waste management, water management, telecommunications, tourism, **town and country planning** or land use, and which set the framework for future development consent for projects that requires an environmental impact assessment under national legislation”⁶.

4.2 SUMMARY AND RESUME OF COUNTRY SPECIFIC LEGAL REQUIREMENTS

Detailed information on partner country specific acts can be found in Annex 2.

4.2.1 General conclusions

In general, SEA is a dependent part of administrative procedures for the establishment or revision of plans and programs, be adopted by an authority, government or through a legislative procedure.

Within all partner countries certain acts, dealing with SEA exist. The implementation takes place at different levels (e.g. national, sub-national and regional). Within the focus of URBAN SMS project, the focus is on the regional level.

In general instruments like land use plans, development plans or development programmes require SEA and are adequate to influence the use of land and consequently sealing. They also contribute to the reduction of land use and urban sprawls.

4.2.2 Soil protection and soil assessment

SEA of certain plans is a good possibility to include soil protection in the earliest possible stadium – the planning stadium. E.g. Land Use Plans, Spatial Plans or Building Plans can determine directly soil consumption respectively sealing. One advantage is that its results have to be implemented in further plan adoption procedure and also serves as basis for project-related EIA.

⁴ Directive 2001/42/EC of the European parliament and of the council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment

<http://ec.europa.eu/environment/eia/home.htm>

⁵ <http://www.unece.org/env/eia/documents/legaltexts/protocolenglish.pdf>

⁶ In bold the most relevant sectors for these guidelines.

The effects on the environment and soil as a subject of protection need to be comprehensively determined, described, assessed/evaluated and taken into account at an early stage in the framework of impact assessment (SEA and EIA). All negative impacts from a plan/programme that can serve as basis for a construction project have to be documented, also including measures for avoiding, minimizing and compensating negative impacts. The plan or programme can only be approved on condition of minimizing the negative impacts.

The objects of the assessment are strategic documents like programmes or plans potentially having impact on the environment at two levels: national; and regional (local.) Soil assessment is a part of the obligatory evaluation.

General goals and aims state to:

- Conserve and protect nature and landscape – including soil – as future base of life in sufficient quality and quantity;
- Protect agricultural land resources and forest soils,
- Promote the sustainable use of natural resources,
- Use the ground – especially building land – in a sparing and sustainable way;
- Use soil as economically and ecological compatibly as possible - soil considered as exhaustible resource,
- Reduce sealing,
- Prevent and reduce environment and soil pollution,
- Eliminate the consequences of environmental pollution (including soil) to improve the demolished ecological balance and re-establish its regeneration capacities,
- Preserve soil functions in land management, nature and landscape protection or from a water preservation point of view

Later at the project level, EIA incorporates the **direct and indirect effects** of projects, inter alia **on soil**. The project solicitor needs to provide all necessary documents to the authority.

4.2.3 Gaps

There are no regulations concerning soil that go beyond the EU SEA Directive or the UNECE SEA protocol. There is no precise soil protection objective mentioned and no references to soil related regulation or policy.

The legal fundamentals are often universal and bylaws regarding soil issues are still missing. Approaches of soil protection and soil assessment are mentioned only in general and are delegated to e.g. regional development plans for specific approaches. In some regulations the word “soil” does not appear. There are no soil protection approaches described and forced by the regulation. Requirement for assessment of impact on land surface is too broad.

Usually soil is only mentioned as one of the 12 subjects of protection, which have to be dealt with in SEA.

In some countries effects on soil are only considered in terms of potential impacts due to pollution. Compaction and soil sealing are hardly taken into account.

4.2.4 Needs

A strengthening of the application of e.g. the land use plan would improve its effectiveness on minimizing soil sealing.

The main gaps are not in the legal foundations, but there are organizational difficulties in the integration of soil conservation authorities and the acceptance of their demands into the decision making process.

The potential impacts on soil functions should be included and considered in the process of assessment. Furthermore the current and future availability of soil in a certain quality in the area and surrounding parts should be assessed.

5 GUIDELINES – SEA

5.1 EU AND UNECE

The SEA guidance on EU-level - Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment⁷ state that “the likely **significant effects on** the environment, including on issues such as biodiversity, population, human health, fauna, flora, **soil**, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors” **shall be considered**. “These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.”

5.2 SUMMARY AND RESUME OF COUNTRY SPECIFIC GUIDELINES

Detailed information on partner country specific guidelines can be found in Annex 3.

5.2.1 General conclusions

In the partner countries a number of guidelines on national and regional level to support SEA implementation exist. Transboundary regulations like the Alpine Convention are just indirectly linked to SEA by the soil protection goals which are defined on a very general level.

On national and regional level guidelines and handbooks are more specific for application. Some are strongly related to spatial, regional or transport planning. Also soil status reports as part of the regional plan can be considered as guideline for SEA. Sometimes, there is no explicit reference to the soil as an environmental medium, in practice only sealing and the overall open soil consumption are considered.

5.2.2 Soil protection and soil assessment

The following goals for soil protection are quoted in the guidelines:

- Safeguarding of soil (quality, quantity, minimisation of land consumption), flora and fauna;
- Economical and considerate exploitation of land, in particular economic treatment of building land and soil consumption (especially agricultural land);
- Reduction of pollution and soil loss/degradation by reason of erosion and compaction;
- Conservation of productivity and other functions of soils;
- Favouring contaminated sites, potentially contaminated areas and abandoned industrial site, using brownfield remediation approaches for building purposes;
- Active soil policy in municipalities.

The SEA process includes the analysis of potential impacts on the environment, inter alia soil, recording those effects in the environmental report, public consultation with residents on this report (public hearing). Comments are taken into account in the final decision making process.

Depending on the level of the plan, the level of description and assessment of soil issues is different. For national programmes soil indicators can be used due to available data source and existing evaluations on that level. For SEA on regional or local level more detailed information is available and used for soil evaluation.

⁷ http://ec.europa.eu/environment/eia/pdf/030923_sea_guidance.pdf

When assessing the spatial and environmental compatibility of large-scale projects (mostly EIA) in the fields of trade and industry, construction and infrastructure, especially in the transport, energy and tourism sectors, soil conservation and the scarcity of space in the Alpine region shall be taken into account. However, the frame on the strategic level is set by SEA.

The Alpine convention states that conservation of soil functions in quality and quantity, setting measures against soil erosion, compaction and contamination, preservation of diversity of typical soils in the Alps is very important. If there is a risk of serious and sustained damage to the functionality of soils, protection shall, as a matter of principle, be given priority over utilisation.

It is necessary to describe within SEA, especially on the regional and local level, the following issues related to soil:

- Soil functions;
- Soil maps (e.g. Categories of soil) and how to use them;
- Soil contamination;
- Basics for soil protection in the planning process – goals, indicators and best practice.

Additional, soils as well as subsoil⁸ have to be considered in their function as:

- Habitat for animals, plants and other organisms;
- Part of natural balance, including in particular the water and nutrient cycles;
- Decomposition, neutralisation and accumulation media;
- Area used, e.g., for settlements, transport, recreation, sports, tourism, agriculture and forestry, horticulture;
- Groundwater storage;
- Filter and buffer for contaminants and nutrients;
- Deposits of raw materials.

Concerning soil protection, mainly impacts related to the use of soil, especially related to constantly populated areas, its deposit in the region and the degree of sealing, have to be assessed.

5.2.3 Gaps

In SEA the approaches for soil quality preservation and the sustainable use of soils are usually not described in detail.

Only a few national guidelines for SEA are developed in the partner countries and none of them focuses purely on soil or soil protection. The guidance on regional level is also fragmented, soil is not defined as environmental medium and in practice only sealing and overall open soil consumption is considered, thus not taking into account ecosystem functions in its performance. For e.g. Poland currently no guidance exists at all.

In some guidelines, the effects on soil are considered only in terms of potential impact due to pollution. Compaction, soil sealing or soil functions are rarely considered.

In some cases high quality soils mainly for agricultural use were already zoned for urban development and other urban functions due to earlier planning decisions, before guidelines were developed.

The Alpine Protocol “soil protection” goals are mostly not included into the assessment.

⁸ Including soil structure and type, ecological and physico-chemical characteristics, quality, geological and geomorphologic aspects (e.g. relief, slope inclination and erosion risk).

5.2.4 Needs

Impact assessment matrix in which the effects on soil, namely on soil quality are mentioned shall be provided.

A framework to integrate qualitative goals for sustainable soil use (e.g. guidelines focussed on soil issues) needs to be developed.

The need to further concretise the framework development of goals of the Alpine Convention, enforce its implementation and application was highlighted.

All relevant soil aspects according to the level of the plan or programme need to be considered and assessed during the SEA process.

Relevant and up to date soil data and evaluations for assessment (e.g. monitoring systems) need to be provided.

6 PRACTICAL CASE STUDIES AND EXAMPLES – SEA

Good practice examples are used to document the kind of soil protection aspects that are taken into account in SEA from a practical point of view. They are meant to document all impact that plans and programmes have on soil protection aspects in terms of changes to goals, strategies, actions and outcomes.

6.1 SUMMARY AND RESUME OF COUNTRY SPECIFIC EXAMPLES

Detailed information on partner country specific case studies and examples can be found in Annex 4.

6.1.1 General conclusions

The consultation process between environmental authorities during all stages, especially during the early stages of SEA, facilitates the possibility to take all available soil data and information into account. This procedure further provides a framework for constructive communication and the inclusion of soil related issues within SEA.

6.1.2 Soil protection and soil assessment

The following ideal process, to include all necessary and relevant soil information, data and indicators in the SEA process (environmental report), has to be seen as a maximum list, which is based on case studies and examples. It generally reflects state-of-the-art and partly best practice of soil protection and assessment of partner countries.

Screening whether SEA is needed for the plan or programme:

Description and assessment of reversible and irreversible effects during the construction and operating phase.

Description of current state of soil:

- Soil types,
- Soil mapping and description of current land use,
- Soil fertility (soil index),
 - Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture,
 - Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders),
- Soil functions,
 - Primarily natural soil functions,
- Soil pollution / contaminant loads/ contaminated sites,
- Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection).

Description and analysis of impacts/effects on soil:

- Envisaged possible intentions for plans and programmes,
- Soil consumption and sealing (sealing rate),
 - Soil sealing rates for each programme model,
- Changes of soil quality and soil functions,
- Soil pollution (assessment of pollutant emission and deposits on soil),
- Evaluates only square meters of soil consumed, not soil quality change,
- Assessment of exploitability of soil (e.g. agriculture, forestry, urban development).

Applied soil assessment methods

- Using soil indicators e.g. on national not on local level (e.g. according to sustainability strategy) for assessment,
- Assessment of soil functions.

Description of measures to avoid, minimize or compensate impacts/effects on soil:

Avoid:

- Protection of environment and resources foresees stewardship of available resources,
- Sustainable usage of soil as a non augmentable good,
- Areas with high soil value have to be protected,
 - E.g. plan can only be realised with substantial additional requirements (construction recommendations),
- Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities),
- Soil procurement and mobilisation via budget and laws,
- Reuse of contaminated sites,
- Use of areas with lower soil quality.

Minimize:

- Construction supervision on soil issues to assure proper measurement implementation

Compensate:

- Obligation of measures to protect soil and its functions
 - E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way.

7 ENVIRONMENTAL IMPACT ASSESSMENT – EIA

Environmental Impact Assessment (EIA)⁹ serves to describe and assess all possible impacts - positive or negative - that a proposed project may have on the environment, combining natural, social and economic aspects.

The purpose of EIA is to perform the assessment of environmental effects of those projects which are likely to have significant effects on the environment and to ensure that decision makers consider the ensuing environmental impacts. The EIA procedure ensures that environmental consequences of projects are identified, properly described and assessed before authorisation is given. The public is involved in the process of approval and all results are taken into account in the authorisation procedure of the project.

The International Association for Impact Assessment (IAIA)¹⁰ defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made."

EIA is a clear quality improvement over previous project licensing instruments, and is thus an important step towards precautionary and integrative environmental protection with the following objectives:

- Prevent environmental damage beforehand, according to the precautionary principle;
- Regard/assess environmental effects from an integrative and comprehensive point of view, and not just section-wise (e.g. interrelations);
- Achieve improved project planning and approval procedures;
- Integrate environmental concerns into the evaluation and decision-making procedure, giving them the same amount of attention as any other concerns;
- Make the project approval procedure more transparent and explicit by involving the public.

EIA process ensures that at an early stage, before the authorisation of certain projects is given, possible environmental impacts on soil have to be comprehensively determined, described, assessed and evaluated. Measures to avoid, minimize or compensate the impact on the environment have to be included. On the basis of the assessment of environmental impacts, authorisation is obtained.

Possible benefits:

- Assessment of impact of planned projects for all aspects of soil protection,
 - compaction, sealing, pollution, loss of organic matter, erosion,
- Possibility to improve the project in order to reduce the impact on soil by setting up measures that:
 - Avoid, mitigate or compensate harmful, disturbing or adverse effects of a project,
- Clear quality improvement over previous project licensing instruments, and is thus an important step towards precautionary and integrative environmental protection,
- Administration has already a quite long lasting experience in implementing EIA.

⁹ http://en.wikipedia.org/wiki/Environmental_impact_assessment;
<http://www.umwelt.net.at/article/articleview/40677/1/7400>

¹⁰ <http://www.iaia.org/>

Possible limitations:

- No technical standard for assessments of the impact on soil are legally defined, only guidelines exist,
 - E.g. Percentage of sealed surface is not assessed,
 - Functions of soil are not evaluated,
- Missing evaluation of the soil status and security of evidences,
- Measures do not have to be implemented obligatorily, so the assessment does not necessarily deliver practical results,
- Only one project scenario is turned in and assessed. No comparison with other suitable projects is possible like in the SEA process,
- Impact is limited to those projects for which an authorisation is required.

8 LEGAL REQUIREMENTS – EIA

8.1 EU LEVEL

The **EIA-Directive**¹¹ (Directive 85/337/EEC) on **Environmental Impact Assessment** was first introduced in 1985 and amended in 1997. Following the signature of the Aarhus Convention by the Community on 25 June 1998, the Community adopted in May 2003 Directive 2003/35/EC. This Directive intends to align the provisions on public participation in accordance with the Aarhus Convention on public participation in decision-making and access to justice in environmental matters.

The EIA Directive outlines which project categories shall be made subject to an EIA, which procedure shall be followed and the content of the assessment. The Directive states that “The environmental impact assessment shall identify, describe and assess in an appropriate manner, ..., the direct and indirect effects of a project on the following factors:

- Human beings, fauna and flora;
- **Soil**, water, air, climate and the landscape;
- Material assets and the cultural heritage;
- Interaction between the factors mentioned in the first, second and third indents.”

Requested information of an Environmental impact statement (EIS), elaborated by the project solicitor, as demanded by the EIA Directive:

- Description of the project, including in particular:
 - A description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases,
 - A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used,
 - An estimate, by type and quantity, of expected residues and emissions (water, air and **soil pollution**, noise, vibration, light, heat, radiation, etc.) Resulting from the operation of the proposed project.
- Description of the **aspects of the environment likely to be significantly affected** by the proposed project, including, in particular, population, fauna, flora, **soil**, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.

8.2 SUMMARY AND RESUME OF COUNTRY SPECIFIC LEGAL REQUIREMENTS

Detailed information on partner country specific acts can be found in Annex 5.

8.2.1 General Conclusions

Within all partner countries certain acts, dealing with EIA, exist. The implementation takes place for different projects, based on certain thresholds or production capacities. Within the framework of the URBAN SMS project, the focus is on regional level developments.

On the one hand the following benefits of EIA in general and particularly on soil can be stated:

- Assessment of impact of planned projects for all aspects of soil protection,
 - compaction, sealing, pollution, loss of organic matter, erosion,

¹¹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1985L0337:20030625:EN:PDF>

- Possibility to improve the project in order to reduce the impact on soil by setting up measures that:
 - Avoid, mitigate or compensate harmful, disturbing or adverse effects of a project,
- Clear quality improvement over previous project licensing instruments, and is thus an important step towards precautionary and integrative environmental protection,
- Administration has already a quite long lasting experience in implementing EIA.

On the other hand also limitations of this tool exist:

- No technical standard for assessments of the impact on soil are legally defined, only guidelines exist,
 - E.g. Percentage of sealed surface is not assessed,
 - Functions of soil are not evaluated,
- Missing evaluation of the soil status and security of evidences,
- Measures do not have to be implemented obligatorily, so the assessment does not necessarily deliver practical results,
- Only one project scenario is turned in and assessed. No comparison with other suitable projects is possible like in the SEA process,
- Impact is limited to those projects for which an authorisation is required.

Soil protection is often not defined, so in practice only sealing and overall open soil consumption are considered, thus not taking into account ecosystem functions in its performance.

8.2.2 Soil protection and soil assessment

Compared to SEA, soil protection concerns and implementation of specific measures to reduce negative effects have a higher intent in EIA.

General planning goals:

- Preservation of mainly natural soil functions: Basis of livelihood for humans, animals, plants, ecosystem functioning with its water cycle and cycles of matters, and genetic resources, especially when implementing projects in undeveloped areas:
 - Habitat for organisms,
 - filtering & buffering and transformation,
 - regulation of water/nutrient/pollutant cycles,
 - production for agriculture and forestry,
 - genetic pool and archive for physical and cultural heritage,
- Conserve of soils in their laminar spreading and diversity,
- Preserve the productivity of soils,
- Prevent soil consumption,
- Take into account the sensitivity of soil and soil use,
- Limitation of laminar soil destruction and soil sealing towards the indispensable necessary degree,
- Soil should be dealt with economically and carefully,
- Brownfield redevelopment to avoid consumption of further soil resources.

8.2.3 Gaps

All laws and decisions refer to general effects on environmental media, among whom soil is specifically quoted but not defined. The sparingly, carefully and economically handling of soil is in most cases an indefinite legal term. Therefore in practice the effectiveness of these requirements is low. Particularly regarding the building legislation the influence of the administration for soil protection is restricted, because mostly the municipalities are the competent planning authority. Many specific soil protection measures are in their responsibility.

The impact is limited to those projects, which require EIA before authorisation.

EIA is less effective for avoiding soil erosion and soil compaction as it does not restrict directly intensive agriculture.

8.2.4 Needs

The main gaps are not in the legal foundations. Due to organizational difficulties, demands of soil conservation authorities and their acceptance for the decision making process are not sufficiently integrated. Every region should have a preventive and integrated approach to communicate direct and indirect environmental impacts (especially for soil and subsoil) in EIA process, every activity about EIA measures should follow these approaches.

In a few partner countries, impact assessment is only performed on sealing and overall land consumption; impact assessment on soil functions is urgently needed and should be linked to legal requirements for obligatory application in EIA.

Measures to promote the inner urban development have to be implemented.

Measures to avoid and compensate substantial interventions have to be considered (e.g. intervention regulation according to nature protection act).

9 GUIDELINES – EIA

9.1 EU

The EIA - Guidance on Scoping - 2001¹² describes the likely impacts of the project considering the following factors (soil protection and assessment):

- Impacts on people, human health, fauna and flora, **soils**, land use, material assets, water quality, ...
 - Soils – e.g. quantities, depths, humidity, stability of soils and
 - Acidification of soils.

So far no specific guideline on EU level focuses on soil or soil protection.

9.2 SUMMARY AND RESUME OF COUNTRY SPECIFIC GUIDELINES

Detailed information on partner country specific guidelines can be found in Annex 6.

9.2.1 General Conclusions

The main users of such EIA guidelines are planning offices of regional authorities or municipalities, administrative units, contributing institutions, environmental associations, other initiators of EIA projects and project solicitors. Guidelines are not legally binding, so their consideration depends on the competent authority, document originator and/or project solicitor.

9.2.2 Soil protection and soil assessment

Soil can be affected from a quantitative as well as a qualitative point of view by projects for which EIA is obligatory. The variations that the proposed project can cause on the evolution of geodynamic processes - both exogenous and endogenous need to be identified. All possible impacts on soil of proposed projects need to be documented and assessed as well as measures which avoid, minimize or compensate these impacts.

Analysis on soil and subsoil therefore is carried out in a clearly defined project area and timeframe according to the type of project and for the current status of the affected environment, through:

- Characterization of soils in the project area, with a specific focus on physical and chemical descriptions of soil, to its biotic components and to their interactions, as well as to the genesis, to the evolution and to the capacity (yield) of the soil,
- Geo-chemical characterization of solid (minerals, organic matter) and fluid (water, gases) phases in soil and subsoil, with a specific focus on elements and natural compounds of nutritional and toxicological relevance (status of soils concerning contamination).

Additionally the interaction processes between water, soil, flora and fauna, etc. need to be estimated.

¹² <http://ec.europa.eu/environment/eia/eia-support.htm>

The different guidelines state that the following soil aspects have to be described:

- Basic soil descriptions – status quo,
- Function as:
 - Habitat for animals, plants and other organisms (biodiversity),
 - Component of the ecosystem, especially with its water- and nutrient cycles,
 - Degradation/decomposition-, compensation- and composition- medium,
 - Ground water reservoir,
 - Deposit for raw materials/resources,
 - Filter and buffer of nutrients and pollutants,
- Characteristics for soil quality and quantity description:
 - Land use,
 - Soil type and soil texture,
 - Degree of vulnerability on mechanical and chemical degradation,
 - Quality and degree of soil contamination;
 - Depth,
 - Humidity,
 - Stability,
 - Acidification,
 - Erosion,
 - Dimension of project area,
 - Soil/land consumption within project.

Description of likely potential impacts of a project on soil:

- Soil sealing areas and total consumption (description of predicted temporary and permanent land use/soil consumption),
- Functional soil losses on the basis of soil evaluation:
 - Current land use and overall loss of naturalness in involved areas,
 - Contamination caused by e.g. storage of materials containing dangerous substances, or emission,
 - Direct or indirect soil erosion following the reduction of transportation of solid matter by waterways,
 - Changes in current soil structure and consequent losses of overall ecosystem functionality, etc.,
- Encroachments, e.g. sealing, excavation,
- Compaction caused by e.g. construction damage,
- Type and amount of intended emissions into the soil.

Description and determination of measures and compensation:

- Compensation requirements:
 - Creation of new elements helping recover ecosystem equilibrium in areas suffering present ecological damages (improvement),
- Compensation measures and calculation of the compensation effect,
- Reduction of existing risk (e.g. hydro-geological damage through actions connected to the project),
- Recultivation and restoration of fertile soils, appropriate recultivation,
- Remediation of contaminated areas.

9.2.3 Gaps

There are hardly any guidelines focussing especially on soil or soil protection in EIA in the partner countries. Usually no guideline is legally binding. In the majority of the analysed guidelines, only soil sealing and overall land/soil consumption are mentioned. Soil functions are referred to roughly or marginally.

The reason why effects on soil remain mostly on this general level of description is that no special regulations, limit values (except e.g. soil contamination with heavy metals) or other legislation exist, which would give more detailed instructions and state indicators how soil quantity in connection with quality should be evaluated.

Compensation measures on the legal base of e.g. the nature protection act usually compensate other environmental compartments and not soil per se. Deficits might be compensated by relatively small payments.

9.2.4 Needs

Proposals that could be implemented in planning processes and EIA:

- Protection of soils with a very high performance regarding soil functions,
 - E.g. protection against land consumption by economical instrument (e.g. certain payment per m²),
- Steering soil consumption on soils with low quality,
- Steering soil consumption by a compensation regulation,
- Minimization of land consumption by inner urban development,
- Taking guidelines on soil into legal regulations,
- Providing standards reference values and soil indicators for soil quality and quality evaluation (e.g. functions, land consumption).

10 PRACTICAL CASE STUDIES AND EXAMPLES – EIA

Good practice examples are used to document the kind of soil protection aspects that are taken into account in EIA from a practical point of view. They are meant to document all impact that projects have on soil protection aspects in terms of changes to goals, strategies, actions and outcomes.

10.1 SUMMARY AND RESUME OF COUNTRY SPECIFIC EXAMPLES

Detailed information on partner country specific guidelines can be found in Annex 7.

10.1.1 General Conclusions

First of all soil is considered in the authorisation process that requires EIA. Especially measures to avoid, minimize or compensate the project's negative effects on soil issues, are of high importance. Usually each subject of protection is specified, as well as the interactions between them. Therefore all impacts on the interactions between soil and other subjects of protection (e.g. air, water) are included.

Soil, as a subject of protection is examined in detail during the consultation process with other authorities - input and comments of all participating players are possible. Early involvement of all players is necessary and projects are likely to be modified during the EIA process, regarding e.g. measures to avoid or minimize negative effects.

10.1.2 Soil protection and soil assessment

The following ideal process, to include all necessary and relevant soil information and data in the EIA process (environmental impact study), has to be seen as a maximum list, which is based on case studies and examples and reflects state-of-the-art of soil protection and assessment of partner countries.

Screening whether EIA is needed for the project:

Description and estimation of reversible and irreversible effects on soil during the construction and operating phase - definition of investigation area and framework for soil assessment.

Description of current state of soil:

- Soil functions - mainly natural functions,
- Soil quality – e.g. nutrients, soil physics, CEC, acidity, organic carbon,
- Soil erosion risk,
- Contaminant loads – tackling of soil contamination issues (organic and inorganic pollutants),
- Current land use,
- Productivity, soil index.

Description and analysis of impacts/effects on:

- Loss of soils, sealing, soil/land consumption, (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area), changes of land use,
- soil functions (loss), including soil degradation, rearrangement and compaction,
- Soil erosion and potential negative effects on the groundwater,
- Immission of contaminants on sites due to construction activities,

- Immission load of contaminants (considering relevant pollutants from fuel provided emissions and their effects on soil),
 - NO₂, SO₂, respirable dust, heavy metals, benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL etc.,
- Comprising evaluation of deposition and emission,
- Changes in ground level,
- Ecological soil quality,
- Soil productivity,
- Interactions between soil and other subjects of protection.

Description of relevant measures to avoid, minimize or compensate impacts/effects on soil:

Avoid:

- Economical and spare handling with land and soil in operating and construction phase,
 - e.g. project area was chosen due to low soil quality or difficult accessibility for agricultural machinery,
- Goals referring to soil protection (legal) requirements in the project area,
- Reuse of contaminated sites or brownfields, decontamination and revitalisation to decrease land consumption,
- Reduction of immission on soil via, e.g. modern technical standards.

Minimize:

- Obligatory application of guidelines for e.g. professional recultivation,
- Soil scientific construction supervision – consulting and guarantee of professional measurement implementation,
- Save handling of soil in construction phase:
 - Storage of humus layers,
 - Assessment notice for soil storage,
 - Professional treatment of excavated soil, e.g. open soil is recultivated immediately to minimize wind-erosion, contaminated soil is treated according to waste demands, emissions of particulate matter have to be reduced by moistening of the road surfaces,
 - Avoidance of leaching/infiltration of chemicals, oil or fuel in construction area,
 - Measures to balance and minimize soil compaction e.g. mats, coverage, no pass of wet soils, using light machines
 - Measures to preserve soil functions e.g. professional recultivation to preserve productivity for agricultural production, preserve soil quality during storage
- Preservation of evidence (soil assessment) for follow-up care and accompanying monitoring,
- Implementation of monitoring e.g. of contaminants in soil using periodic random sampling or bio-indicators (e.g. phytoindicators) for conservation of soil and forage quality & soil functions mainly for agricultural purposes, to avoid exceeding of critical values of pollutants,
- Supervisory right/right to monitor of the authority at all times e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection,
- Fertilizing plan, verification of used pesticides according to licences and legal requirements for use,
- Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination,
- Annual evaluation of compensation measures to reduce particle immission, evaluation of traffic related emissions (diffuse contamination).

Compensate:

- Obligation of measures to protect soil and its functions, e.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way,
- Amelioration of contaminated soils and soil functions,
- Recovery and recultivation e.g. after exploitation of underground,
- Compensation charge of certain amount of money.

11 GUIDANCE FOR SOIL IN SEA/EIA

This guidance on soil provides practical proposals on how soil should be considered in SEA or EIA processes. The key messages and outcomes of partner consultation are included in this guidance. Existing guidance is summarised in Chapter 11.3 for SEA and Chapter 11.5 for EIA. Examples used within the guidance are drawn from a broad range of partner countries types of projects, plans and programmes; mostly those that most typically consider the effects on soil (e.g. agriculture, town and land planning).

This draft guidance is structured in four parts:

PART A – Soil aspect in urban and suburban environments

PART B – General recommendations for SEA and EIA

PART C – Guidance for soil in SEA, including a checklist

PART D – Guidance for soil in EIA, including a checklist

11.1 PART A - SOIL ASPECTS IN URBAN AND SUBURBAN ENVIRONMENTS

Soil is defined as the top layer of the earth's crust. It is comprised of mineral particles, organic matter, water, air and living organisms. It is an extremely complex, variable and living medium which acts as the interface between earth, air and water. It is formed as a result of physical, chemical and biological weathering processes of the underlying rocks and sediments and influenced by climate, topography, organisms and time. A number of soil properties are determined by the parent material including texture and chemical composition.

Soil is one of the most diverse habitats on earth and contains one of the most diverse assemblages of living organisms. It is one of nature's most complex ecosystems, containing thousands of different organisms which interact and contribute to the life support systems (i.e. global cycles that make all life possible). Soil organisms have important effects not only on soil properties but also on the functioning of the ecosystem.

Soil has a socio-economic and environmental role as a habitat and gene pool, a platform for human activities, landscape and heritage and as a provider of raw materials.

Based on the definition above, soils do neither always fit neatly into the plan level of SEA, nor into the site-based EIA framework. Soil and its interactions with other subject of protection should be assessed and considered in environmental assessment, both SEA and EIA. The function of soils being an interface between geo-sphere, biosphere and hydrosphere further compounds this, as they cannot be easily compartmentalised.

Soils also play an important part in biodiversity conservation. So it is vitally important that soil aspects are included as an integral part of the environmental assessment process. Not only because changes to soils can have subsequent effects on other parts of ecosystems, such as vegetation composition and watercourses, but also because of the intrinsic value of soil as limited and living resource in its own right.

Soil evaluation is an essential element of the Environmental Assessment process and any significant impacts on soils should be included in an Environmental Statement.

Different soil types have their own typical characteristics which affect the significance and magnitude of impacts. Some soils are relatively robust and are able to support a wide range of potential land uses, whereas others can only be used in more limited ways because of their sensitivity. Within any defined area, there is likely a variety of soils to occur, which can pose planning problems, often leading to some soils being exploited due to improper use.

Further complexities are introduced by the fact that, unlike geological exposures or landforms, which occupy distinct areas of the landscape and are generally fairly easy, to assess, soils form a continuous pattern over the land surface and are for the most part hidden from view. Changes in soils and soil functions or degradation mostly do not show up at first sight. Degradation or sealing is hardly reversible and soil genesis or redevelopment takes ages. All of these factors combine to create very specific requirements for environmental assessment of soils.

Soil plays an increasing role in evaluation of issues on climate, biomass energy and natural hazards (e.g. flooding). Regarding the still increasing rates of land and soil consumption soil protection has to be a main future issue dealing with different conflicts of interest. On the one hand **high quality soil** like agricultural land needs to be delineated and **preserved**. On the other hand soil – especially in urban and suburban areas - is **exposed to a strong pressure** e.g. urban development to fulfil ecological, social and health functions.

11.2 PART B - GENERAL RECOMMENDATIONS FOR SEA AND EIA

Quality soils like agricultural land were intended for urban development and other uses already in earlier planning decisions and before guidelines were developed. The focus of this guidance is placed on upcoming planning processes and decisions.

11.2.1 Recommendation 1 – Clear soil related goals, approach and strategy

The sparingly, carefully and economically handling of **soil is an indefinite legal term** and in practice the effectiveness of these requirements is low. Also **qualitative goals for a sustainable soil use are not described in detail**. Further **compensation measures** on the legal basis usually **compensate** other environmental compartments and **not primary soil and its loss**.

A **preventive and integrated approach** about direct and indirect environmental impacts, especially **for soil and subsoil is needed** in urban and suburban environments. SEA and EIA measures should follow these approaches.

Comprehensive strategies on how sustainable soil conditions should be achieved have to be specified.

For example the BOKS - Soil Protection Concept of Stuttgart - ensures this by controlling the point loss in the "soil contingent" by two consumption approaches:

- First approach "inner urban development" concentrates on brownfield redevelopment. Sustainable land use area management Stuttgart (NBS) supports the main strategy and goals by providing settlement areas for reuse and aggregation;
- Second approach "degressive rationing" aims at a yearly minimization of the soil consumption until the planning activities will be completely covered by inner urban development.

The German examples in Chapter 19.3 show that the assessment based on BOKS is used and accepted. With BOKS the affected soils can be determined by a "soil indication" according to their quantity (= area size) and quality (= soil function). The change can be evaluated. This "soil indication" is supported by the "Planning Map - Soil Quality", which covers the entire Stuttgart city area. This figure indicates the soil quality as the sum of the soil functions to be protected specified by the Federal Soil Protection Act of 1998. Also anthropogenic influences as pollution and cultivation/sealing are considered. As a result the quality of soils is characterized by 6 levels (0 to 5). "Soil Index Points" are calculated in BOKS by the dimension of a planning area and the respective soil quality levels given in the planning map. This area-specific value will be reduced with every further demand on the soil in relation to the regional quality loss (= loss of soil functions).

Consequently **clear goals and aims for soil quality and sustainability need to be formulated** (e.g. (national) sustainability strategy) and **indicators** (e.g. certain sealing rate), as assessment criterion, have to be **developed**. Additionally the **appropriate measures**, which are obligatory, need to be implemented **for each individual programme, plan and project**.

The Alpine Protocol "soil protection" goals, its application and implementation are seen as chance to include soil issues better in decision making.

Especially brownfields and contaminated sites need to be identified, rehabilitated or redeveloped. Sufficient **open space** and **green space areas** need to be **protected**,

preserved, restored, and upgraded. Soil conservation and improved quality of life for urban citizen would be a positive side effect.

11.2.2 Recommendation 2 – Superior planning

Laws and decisions refer to general effects on environmental media, among them soil is specifically quoted, but not defined. Especially soil protection is often not defined in detail, so in practice only sealing and soil consumption are considered, thus not taking into account soil functions and their performance. The impact on soil protection is limited to EIA projects requiring an authorisation and the project area is usually fixed.

Superior planning (level of policies and plans or programmes – SEA) needs to be steered on low quality soils. Soils with a very high and high quality regarding soil functions have to be protected. Soil consumption and sealing need to be steered and land consumption minimised by inner urban development. Deficits in compensation measures may be supported by economical instruments like e.g. appropriate payments per m² as in the Polish system, where compensation funds are dedicated to soil restoration and improvement. **Impact assessment on soil functions based on clear criteria is urgently needed** and will be very helpful.

11.2.3 Recommendation 3 – Communication

The main gaps are not in the legal foundations, regarding **soil protection**. Due to **organizational difficulties, demands of soil conservation authorities** and their **acceptance for the decision making process** are not sufficiently integrated into plan, programme (SEA) and project (EIA). Besides that, soil is only mentioned as one of the 12 subjects of protection, which have to be dealt with.

There are **semantic differences for soil related terms used by spatial planners and soil experts**; spatial planners consider soil in general as land consumption, whereas soil experts consider the qualitative and quantitative loss of soil.

Therefore a **Common strategy** between city planners and soil experts in the regional authority and the exchange between experts **is a necessity**. This can be achieved by implementing a **platform for experts** on soil and spatial planning via **teaming up these two separate fields** for planning purposes.

Only **communication within administrative units at an early stage in both processes** is seen as nucleus to **ensure adequate consideration of comprising soil protection**.

11.2.4 Recommendation 4 – Improving guidance

Hardly any guidance focuses **solely on soil and soil protection** in the URBAN SMS partner countries. The few **existing ones** are **legally not binding**. In the majority of the partner countries guidance, only soil sealing and overall land/soil consumption are mentioned. Soil functions are referred to marginally. In many partner countries, no special regulations, limit values (except e.g. soil contamination with heavy metals) or other legislation exist, which would give more detailed instructions and state indicators how soil quantity in connection with quality should be evaluated.

Only a few national **guidelines** are developed and only one of them in all partner countries focuses solely on soil. If guidance is available on the regional or local level, it is often fragmented. Often the effects on soil are only considered in terms of potential impact due to pollution. Compaction and soil sealing or soil functions are not considered.

The more concrete soil focused and detailed a guidance is (a legal basis would be best), especially guidance for recultivation of soil and monitoring, **the better**. Improvement is necessary. **Soil** and the related **effects** due to plans and programmes **need to be assessed in more detail based on soil focused guidelines** on different levels.

No regulations concerning soil go beyond the EU SEA Directive or the UNECE SEA protocol. There is no precise soil protection objective mentioned and no references to soil related regulations or polices are given. The legal fundamentals are often universal and bylaws regarding soil topic are still missing. Approaches for soil protection and soil assessments are mentioned only in general and are delegated to e.g. regional development plans for specific approaches.

Approaches for soil protection and assessment need to be clarified in detail and have to be **integrated in legal requirements**.

11.2.5 Recommendation 5 – Basics for evaluation

Despite of many demands in different planning levels and instruments - the requirements are not substantial enough regarding soil inventory and sustainable handling of soil. There is still a **lack of measurement methods and monitoring**.

Therefore **basic ground work**, basic and frontier **research, data collection, inventories** and sufficient **monitoring** as well as evaluation of monitoring results is **needed to improve evaluation schemes and method or indicator development**. Additional a data platform (e.g. databases or maps) for all useful soil data is necessary to gain sufficient knowledge of inter alia soil quality and describe the current state of soil. Impact assessment matrices in which the effects on soil, namely on soil quality are mentioned can be an adequate support tool.

11.3 PART C - GUIDANCE FOR SOIL IN SEA

In general instruments like land use plans, spatial plan, development plans or development programmes require SEA and are adequate to influence the use of land and consequently sealing. They also contribute to the reduction of land consumption and urban sprawls.

The objects of assessment are strategic documents like programmes or plans potentially having impact on the environment at two levels: national and regional (local). Soil assessment is a part of the obligatory evaluation.

All table within this section are based on - "Strategic Environmental Assessment Practical Guidance for Practitioners on How to Take Account of Soil" by Sniffer, March 2009¹³ - and are modified and adapted according to partner countries legal requirements, guidance and practical experience.

11.3.1 SEA process

SEA process is designed to mainstream the environmental - including soil - issues into strategic decisions, unlike the EIA, which is focused on the project level. SEA can be seen as extension of EIA on environmental objectives and is used in the early stages of preparation of plans and programmes.

The effects on the environment and soil as a subject of protection need to be comprehensively determined, described, assessed/evaluated and taken into account at an early stage in the framework of impact assessment. All negative impacts from a plan or programme that can serve as basis for a construction project have to be documented in the environmental report, public consultation with residents on this report (public hearing), also including measures to avoid, minimise and compensate negative impacts. The plan or programme can only be approved on condition of minimizing the negative impacts.

Later at the project level, EIA incorporates the **direct and indirect effects** of projects, inter alia **on soil**. The project solicitor needs to provide all necessary documents to the authority.

11.3.2 Screening – How to consider soil

In a first step is it necessary to screen whether SEA is needed via a description and assessment of reversible and irreversible effects during the construction and operating phase.

Consideration of SEA topics at the screening stage involves determining whether the plan or programme is likely to have no, minimal or significant effects on any or all of the SEA topics. The relevant government body should be contacted to advise and assist responsible authorities in the process of identification of which plans require to undertake screening for SEA.

¹³ <http://www.seaguidance.org.uk/1/Homepage.aspx>

Table 1: Potential for significant effects provides an example of potential for significant effects on soil.

| Score | Positive | Negative | Description of effect |
|------------------------------|-----------|----------|---|
| High | O | X | Potential to cause major changes in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter (e.g. causes major changes in concentrations of contaminants in soil leading to exceedance of values at a regional or local scale). Activities identified in Table 4 as potential sources of a particular effect on soil will be included under this category. |
| Low | o | x | Unlikely to cause a major change in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter by itself, but could have a minor effect or add marginally to a sum of other causes (e.g. cumulative effects) or have a very localised effect (e.g. soil erosion caused by mountain biking in rural areas). |
| Uncertain | ? | | Potential for significant effects is uncertain. |
| No significant effect | Blank box | | Is unlikely to lead to any significant changes in soil quality/ soil pollution/ soil erosion/ soil sealing/ structural damage/ loss of soil organic. |

Table 1: Potential for significant effects

It may be useful at the screening stage, to begin the process of identifying which SEA sub-topics for soil (see Table 3: Example soil sub-topics) are likely to be significantly affected by the plan. This helps to focus the scope of the SEA.

In different partner countries, there is a wider range of plans which are subject to SEA.

The city of Vienna has developed a SEA Screening guide. This document has been discussed with the local planners and will be applied in Vienna for upcoming projects. The results of the questionnaire are presented in Chapter 12.2.2 and the draft guidance on SEA Screening for Vienna is available in Annex 4.

11.3.3 Developing SEA objectives

The level of detail appropriate for the SEA objectives will depend on the characteristics of the plan being assessed and the potential significance of the environmental effects it may give rise to. Where appropriate, SEA objectives can be broken down into sub-objectives or assessment criteria.

Table 2: Examples of typical SEA objectives and assessment criteria for soil, provides advice for defining SEA objectives for soil to suit a particular SEA. SEA objectives can also be drawn from previous SEAs.

At this stage it may also be possible to start identifying indicators and targets, which are relevant to each SEA objective and/or assessment criteria. The six sub-topics; **soil quality, soil contamination, soil sealing/ loss, soil erosion, and soil structural degradation and compaction and loss of soil organic matter** are described in detail in Table 3: Example soil sub-topics.

| SEA topic | SEA objective | |
|---|--|---|
| Soil | To maintain or improve soil quality and prevent any further degradation of soils | |
| SEA Sub-Topic | SEA sub-objective | Example assessment criteria Will the Plan ... |
| Soil Quality | To improve soil quality | <ul style="list-style-type: none"> • ... maintain or improve organic matter content of soils? • ... maintain or improve pH levels of soils? • ... reduce levels of acidification of soils? • ... maintain appropriate nutrient levels in soils? • ... reduce pollution levels in soil? • ... promote good/ best land management practices? |
| Soil Contamination | To reduce levels of soil Contamination | <ul style="list-style-type: none"> • ... prevent input of pollutants to soils? • ... promote the remediation of contaminated soils? • ... reduce use of pesticides & fertilisers or persistence of chemicals in soils? • ... reduce contamination of soils with heavy metals, persistent organic and other pollutants? • ... promote restoration of contaminated soils in e.g. mining and former industrial areas? • ... promote good/ best land management practices? |
| Soil sealing/ removal | To reduce soil sealing and soil loss | <ul style="list-style-type: none"> • ... reduce levels of soil sealing? • ... reduce loss of soils to mineral workings? • ... promote the development of brownfield sites? • ... reduce the sealing of good quality soils? • ... promote re-use of soils removed for development? • ... mitigate effects of soil sealing by using construction techniques that preserve soil functions? • ... promote good/ best land management practices? |
| Soil erosion | To reduce soil erosion (including landslides) | <ul style="list-style-type: none"> • ... reduce soil erosion caused through action of water or wind? • ... reduce soil erosion in fragile systems (e.g. mountainous areas)? • ... reduce erosion of productive soils? • ... ensure the use of suitable soils (depending on use)? • ... promote water infiltration? • ... promote protective vegetation cover and/ or organic debris cover? • ... reduce the risk of landslides? • ... promote good/ best land management practices? |
| Soil structural degradation & compaction | To reduce soil structural degradation and compaction of soils | <ul style="list-style-type: none"> • ... reduce structural degradation and compaction of soils? • ... promote good/ best land management practices? |
| Soil organic matter | To conserve, or reduce loss of, organic matter | <ul style="list-style-type: none"> • ... maintain or increase soil organic matter in soils? • ... prevent potentially harmful agricultural practices? • ... promote organic agriculture? • ... promote good/ best land management practices? |

Table 2: Examples of typical SEA objectives and assessment criteria for soil

11.3.4 Environmental Report

Soils should be included in an Environmental Report and throughout the Environmental Assessment process wherever the effects of a variant are likely to be significant. If they are not included the soil authority shall request the Competent Authority to require the information before they grant any consent for the plan.

It is necessary to identify the environmental characteristics of the area for which the plan or programme is being prepared and to summarise any environmental problems/issues experienced and related to soil in the area which may affect or be affected by the plan or programme. This should include identification of the relevant soil data to be used and possible data gaps.

The level of detail of information to be used will need to reflect the scale and nature of the plan or programme being assessed, and the likely significant environmental effects. When certain data or information are not available, it may be necessary to exploit other sources of information e.g. soil experts rather than soil data. National defined indicators can be used (e.g. according to national sustainability strategy) or evaluation of agri-environmental programme appliance.

For assessment purposes, **soils current state** has to be described in its:

- Soil function (mainly natural functions) as,
 - Habitat for animals, plants and other organisms,
 - Component of the ecosystem, including in particular the water and nutrient cycles,
 - Filter and buffer,
 - Decomposition, neutralisation and accumulation media,
 - Production of agricultural goods, resources for forestry and horticulture,
 - Groundwater reservoir,
- Deposits of raw materials,
- Soil quality including soil erosion risk,
- Validity of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. close to the city production),
- Soil pollution and contamination,
- Contaminant loads/ contaminated sites,
- Soil landscapes (e.g. categories of soil, soil types),
- Bases for soil protection in the planning process – goals, indicators and best practice,
- Soil and its dynamics of development,
- Relation and adequate handling according to relevant protocols (e.g. Alpine Convention).

Based on the assessment of soil above, in this guidance soil is split into **six sub-topics; soil quality, soil contamination, soil sealing/ loss, soil erosion, and soil structural degradation and compaction and loss of soil organic matter** as described in Table 3: Example soil sub-topics below.

Within the examples used in this guidance, one or more of these sub-topics are used to illustrate how they can support consideration of soil and the current status assessment. Different ways of categorising soil can be used to consider soil for different SEA tasks or types of plan.

| SEA Subtopic | Including, for example... | Notes |
|---|---|---|
| Soil Quality | <ul style="list-style-type: none"> Organic matter content, pH value, Texture, Water-holding capacity, Soil nutrients (e.g. phosphorus, nitrogen, potassium and magnesium), Soil pollutants (incl. heavy metals, persistent organic pollutants), Microbial biomass. | <p>Soil quality refers to the characteristics of a certain kind of soil, reflecting its ability to carry out a particular service or function. This sub-topic has been categorised by the physical/ chemical parameters that govern soil quality.</p> |
| Soil contamination (by source) | <ul style="list-style-type: none"> Deposition of atmospheric pollutants, Use of pesticides/ fertilisers, Direct contamination with e.g. heavy metals, persistent organic pollutants, Past industrial activity. | <p>Soil contamination refers to sources of contamination affecting soils which could lead to detrimental effects on e.g. human health, fauna and flora, material assets, water environment, cultural heritage</p> |
| Soil sealing/loss | <ul style="list-style-type: none"> Loss to development (e.g. buildings, roads, excavations, mining), Loss of cultural soils and buried archaeology. | <p>Soil sealing refers to the removal or covering with an impermeable surface of existing soil due to built development (e.g. roads, housing, industry, mineral workings). This often results in a reduction in the range of functions that soils perform, but does not necessarily result in complete loss of function as the disturbed soil may either be removed and used elsewhere or built upon.</p> |
| Soil erosion | <ul style="list-style-type: none"> Wind and water erosion, Loss of nutrients, Stability issues and mass movements such as landslides. | <p>Soil erosion is a naturally-occurring process through which soil particles are removed (usually from the soil surface) by wind or water. Soil erosion occurs in all soils to some extent, but can be accelerated by human activities.</p> <p>Soil erosion occurs due to frictional processes caused by wind, water, animals, people and traffic (including landslides). Erosion is more likely to occur when soil becomes exposed (e.g. when vegetation is removed).</p> |
| Soil structural degradation & compaction | <ul style="list-style-type: none"> Structural degradation, Compaction, Surface capping, Natural variation. | <p>Soil structure relates to the organisation of soil particles. It is a fundamental property of all soils, but is highly influenced by land management (e.g. poaching by grazing animals and trafficking by farm machinery).</p> |
| Soil organic matter | <ul style="list-style-type: none"> Spreading of slurry/ manure, Compost and vegetated matter, Leaf litter. | <p>Soil organic matter is the accumulation of partially decayed plant and animal residues. The soil organic matter content is a fundamental soil property as it determines the soils capacity to carry out many of its other functions, including storing, retaining and transforming water, nutrients and contaminants as well as sustaining biodiversity and storing carbon.</p> |

Table 3: Example soil sub-topics

11.3.5 Predicting impacts on soils

The following Table 4: Potential effects on soil of plans from city and country planning, shows an example of typical sources of potential effects on soil.

The symbol X means highly negative and x lower negative, whereas the symbols O and o mean highly positive and lower positive effects. The symbols are clarified in detail in Table 1: Potential for significant effects.

| Examples of typical sources of potential effects (i.e. areas requiring plan-development) | Sub-topics | | | |
|--|--------------------|--------------------|---------------------------------|--|
| | Soil contamination | Soil sealing/ loss | Soil erosion (incl. landslides) | Soil structural degradation & compaction |
| Construction (including maintenance and demolition) of new urban environments | X | X | X | X |
| Operation/ management of existing built environment | O/X | O/X | O/X | O/X |
| Development and management of landscape, land use and natural resources | o/x | O/X | O/X | O/X |
| Generation, disposal and storage of waste | X | X | ? | ? |
| Vehicle movements | X | X | X | X |
| City and Country Planning/ land use Change in land cover/ land use | O/X | O/X | O/X | O/X |

Table 4: Potential effects on soil of plans from city and country planning

Impacts/effects of the plan **on soil have** to be described, analysed and shall include:

- The use of soil especially related to constantly populated areas and possible deposits in the region and
 - Envisaged possible regional developments,
 - Soil consumption and sealing (sealing rate) and soil quality change e.g. soil sealing rates for each alternative,
- Soil pollution (simple assessment of pollutant emission and fallout on soil),
- Assessment of exploitability of soil (e.g. agriculture, forestry, urban development),
- Reuse of contaminated sites.

The Alpine Convention states that conservation of soil functions in quality and quantity, setting measures against soil erosion, compaction and contamination, preservation of diversity of typical soils in the Alps is very important. If there is a risk of serious and sustained damage to the functionality of soils, protection shall, as a matter of principle, be given priority over utilisation.

When assessing the spatial and environmental compatibility of large-scale projects (mostly EIA) in the fields of trade and industry, construction and infrastructure, especially in the transport, energy and tourism sectors, soil conservation and the scarcity of space in the Alpine region shall be taken into account. However, the frame on the strategic level is set by SEA.

11.3.6 Interrelation between soil and other SEA topics

During the SEA process, soil needs to be considered in terms of its inter-relationships with other SEA topics. For example, soil contamination has the potential to produce adverse impacts on human health, as well as potential damage to ecosystems and water quality from activities such as waste disposal.

Some aspects of soil may be relevant to other SEA topics, and would be better addressed under those SEA topics. For example, the visual impacts of land use are not covered in this guidance as these are more appropriately covered under landscape issues. Table 5: Consideration of soil in other SEA topics, provides an overview of inter-relationships with other areas.

| SEA Topic | Areas where soil may be considered within other SEA topics |
|------------------------------------|--|
| Material assets | <ul style="list-style-type: none"> • Mining, • Waste application to land (e.g. landfill), • Soil resource e.g. <ul style="list-style-type: none"> • Biomass or peat used as fuel, • Agricultural productivity, • Topsoil used for landscaping, horticulture etc. |
| Climatic factors | <ul style="list-style-type: none"> • Soil as a carbon pool/ sink, • Soil as a source of greenhouse gases e.g. methane, nitrous oxide, carbon dioxide, • Changes in soil (e.g. soil stability, subsidence, erosion) related to effects of climate change. |
| Population and human health | <ul style="list-style-type: none"> • Effects of pollution and soil contamination on human health, • Effects of waste application to land (e.g. landfill or sludge spreading) on human health. |
| Water | <ul style="list-style-type: none"> • Effects of soil contamination leading to water pollution, • Effects of natural toxic substances or nutrients in soils leading to water pollution, • Changes in soil properties/ sealing leading to flooding and/ or hydro morphological changes. |
| Biodiversity | <ul style="list-style-type: none"> • Soil as a habitat and biodiversity within the soil habitat, • Soil as support to specific habitats (e.g. blanket bog, limestone pavements), • Effect of contaminated run-off (e.g. nutritionally rich) on aquatic habitat/ species, • Physical changes of habitat affecting soil, • Invasive alien species in soils. |
| Air | <ul style="list-style-type: none"> • Atmospheric processes leading to deposition of pollutants on soil, • Effects of gaseous emissions from soils (e.g. ammonia, greenhouse gases). |
| Landscape | <ul style="list-style-type: none"> • Visual impact of land use, • Influence of geology/ soil type over landscape features. |
| Cultural heritage | <ul style="list-style-type: none"> • Conservation of cultural heritage sites, • Soil sealing/ removal, erosion, dewatering, quality, organic matter, etc. resulting in loss of archaeological or cultural heritage |

Table 5: Consideration of soil in other SEA topics

11.3.7 Soil measures to avoid, minimize or compensate soil impacts

By matching as far as possible particular developments with appropriate soils, the consequences of many of these impacts can be restricted. In this context, environmental assessment involves the consideration of key soil properties and characteristics (six sub-topics; soil quality, soil contamination, soil sealing/ loss, soil erosion, and soil structural degradation and compaction and loss of soil organic matter like mentioned in Table 3: Example soil sub-topics) in relation to the proposed development or change of land use.

Some of the relevant measures to avoid, minimize or compensate impacts/effects on soil that should be considered are:

- Protection of environment and resources foresees stewardship of available resources, sustainable usage of soil as a limited resource,
- Areas with high soil value and productivity have to be protected e.g. a plan can only be realised with substantial additional requirements (construction recommendations, construction supervision on soil issues, obligation of measures),
- Active urban soil policy should be implemented to ensure soil oriented spatial development (e.g. area safeguarding, area acquisition of public authorities),
- Reuse and recultivation of sealed areas and brownfields, taking into account ecological as well as planning issues - the recycling of building land has priority to sealing of undeveloped areas,
- Soil procurement and mobilisation via budget and laws,
- Compensation charge.

11.3.8 Monitoring Effects of Implementation

Monitoring, as part of an SEA, is focused on the potential significant effects on the environment of implementing the plan. The applicability of monitoring data from existing monitoring regimes (e.g. by authorities) to a particular plan is closely linked to the scale at which the data is collected and the scale of the plan. For example, a national soil strategy is more likely to require monitoring information at a national level that indicates broad trends, rather than information at site specific level.

Table 6: Examples of useful indicators for monitoring effects on soil within the plan area, provides some examples which can be used to select and modify for a specific SEA. Other, more contextual, indicators should be identified to monitor for unexpected effects and consider the effectiveness of mitigation and compensation measures.

| SEA Sub-Objective | Example indicators |
|--|--|
| To reduce soil sealing and soil loss | <ul style="list-style-type: none"> • Surface area of land sealed (e.g. hectares/year), • Surface area of soils lost to mineral workings (e.g. hectares/ year). |
| To reduce levels of soil contamination | <ul style="list-style-type: none"> • Area of contaminated land (e.g. hectares), • Surface area of soils affected by acidification associated with deposition of air pollutants (e.g. hectares), • Concentration of organic contaminants or heavy metal pollutants (e.g. mg/kg). |
| To reduce soil erosion (including landslides) | <ul style="list-style-type: none"> • Topsoil losses due to erosion (e.g. tonnes/ year), • Surface area affected by subsidence/ instability, • Number of landslides (occurrences/ year). |
| To reduce structural degradation and compaction of soils | <ul style="list-style-type: none"> • Bulk density of soils (e.g. g/cm³), • Air porosity of soils (particularly agricultural land). |
| To conserve, or reduce loss of, soil organic matter | <ul style="list-style-type: none"> • Surface area affected by loss of soil organic matter (e.g. hectares), • Rate of soil organic matter lost (e.g. tonnes/ year), • Area of peat (e.g. hectares). |

Table 6: Examples of useful indicators for monitoring effects on soil

11.4 CHECKLIST FOR CONSIDERING SOIL ASPECTS IN SEA

This checklist is based on the Draft guidance for soil in SEA/EIA (Leitner M, Tulipan M., April 2010). Due to URBAN SMS partners recommendation the key issues related to soil in the guidance have been extracted and are represented in this checklist that shall support planners and practitioners dealing with SEA on the plan and program level.

11.4.1 Screening

In a first step is it necessary to screen whether SEA is needed via a description and assessment of reversible and irreversible effects during the construction and operating phase.

Consideration of SEA topics at the screening stage involves determining whether the plan or programme is likely to have no, minimal or significant effects on any or all of the SEA topics. The relevant government body should be contacted to advise and assist responsible authorities in the process of identification of which plans require to undertake screening for SEA.

Table 1: Potential for significant effects provides an example of potential for significant effects on soil.

| Score | Positive | Negative | Description of effect |
|-----------------------|-----------|----------|---|
| High | O | X | Potential to cause major changes in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter (e.g. causes major changes in concentrations of contaminants in soil leading to exceedance of values at a regional or local scale). |
| Low | o | x | Unlikely to cause a major change in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter by itself, but could have a minor effect or add marginally to a sum of other causes (e.g. cumulative effects) or have a very localised effect (e.g. soil erosion caused by mountain biking in rural areas). |
| Uncertain | ? | | Potential for significant effects is uncertain. |
| No significant effect | Blank box | | Is unlikely to lead to any significant changes in soil quality/ soil pollution/ soil erosion/ soil sealing/ structural damage/ loss of soil organic. |

Table 7: Potential for significant effects

It may be useful at the screening stage, to begin the process of identifying which SEA sub-topics for soil are likely to be significantly affected by the plan. This helps to focus the scope of the SEA.

11.4.2 Objectives SEA

It is of urgent importance to set out the objectives of SEA. The level of detail appropriate for the SEA objectives will depend on the characteristics of the plan being assessed and the potential significance of the environmental effects it may give rise to. Where appropriate, SEA objectives can be broken down into sub-objectives or assessment criteria.

Table 8: Examples of typical SEA objectives and assessment criteria for soil, provides advice for defining SEA objectives for soil to suit a particular SEA. SEA objectives can also be drawn from previous SEAs.

| SEA topic | SEA objective | |
|--------------------------|--|--|
| Soil | To maintain or improve soil quality and prevent any further degradation of soils | |
| SEA Sub-Topic | SEA sub-objective | Example assessment criteria Will the Plan ... |
| Soil Quality | To improve soil quality | <ul style="list-style-type: none"> • ... maintain or improve organic matter content of soils? • ... maintain or improve pH levels of soils? • ... reduce levels of acidification of soils? • ... maintain appropriate nutrient levels in soils? • ... reduce pollution levels in soil? • ... promote good/ best land management practices? |
| Soil Contamination | To reduce levels of soil Contamination | <ul style="list-style-type: none"> • ... prevent input of pollutants to soils? • ... promote the remediation of contaminated soils? • ... reduce use of pesticides & fertilisers or persistence of chemicals in soils? • ... reduce contamination of soils with heavy metals, persistent organic and other pollutants? • ... promote restoration of contaminated soils in e.g. mining and former industrial areas? • ... promote good/ best land management practices? |
| Soil sealing/ removal | To reduce soil sealing and soil loss | <ul style="list-style-type: none"> • ... reduce levels of soil sealing? • ... reduce loss of soils to mineral workings? • ... promote the development of brownfield sites? • ... reduce the sealing of good quality soils? • ... promote re-use of soils removed for development? • ... mitigate effects of soil sealing by using construction techniques that preserve soil functions? • ... promote good/ best land management practices? |
| Soil erosion | To reduce soil erosion (including landslides) | <ul style="list-style-type: none"> • ... reduce soil erosion caused through action of water or wind? • ... reduce soil erosion in fragile systems (e.g. mountainous areas)? |

| SEA topic | SEA objective | |
|---|---|--|
| | | <ul style="list-style-type: none"> • ... reduce erosion of productive soils? • ... ensure the use of suitable soils (depending on use)? • ... promote water infiltration? • ... promote protective vegetation cover and/ or organic debris cover? • ... reduce the risk of landslides? • ... promote good/ best land management practices? |
| Soil structural degradation & compaction | To reduce soil structural degradation and compaction of soils | <ul style="list-style-type: none"> • ... reduce structural degradation and compaction of soils? • ... promote good/ best land management practices? |
| Soil organic matter | To conserve, or reduce loss of, organic matter | <ul style="list-style-type: none"> • ... maintain or increase soil organic matter in soils? • ... prevent potentially harmful agricultural practices? • ... promote organic agriculture? • ... promote good/ best land management practices? |

Table 8: Examples of typical SEA objectives and assessment criteria for soil

11.4.3 State of soil, impacts/effects and measures to avoid, minimize and compensate

Based on the experience with SEA from different project partners in pilot areas, the following maximum checklist (Table 9: Checklist to assess the state of soil, impacts/effects and measures to avoid, minimize and compensate) has been developed.

Depending on the type of the pilot case it should be decided, which criteria of the SEA Guidance are relevant in the specific SEA case. In case a criterion is relevant, it should be indicated to which degree it was considered in the respective SEA. Comments on the method how a criterion was considered and in relation to which local/regional/national regulation it was done will be helpful.

| SEA Soil topic | Criteria SEA Guidance | Relevant | | Level of consideration ¹⁴ | | | Comments |
|---|---|----------|---|--------------------------------------|---|---|----------|
| | | Y | N | C | S | I | |
| Description of current state of soil | Soil types | | | | | | |
| | Soil mapping and description of current land use | | | | | | |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | | | | | | |
| | Soil functions, primarily natural soil functions | | | | | | |
| | Soil pollution / contaminant loads/ contaminated sites | | | | | | |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | | | | | | |
| | Envisaged possible intentions for plans and programmes | | | | | | |
| Description and analysis of impacts/effects on soil | Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | | | | | | |
| | Changes of soil quality and soil functions | | | | | | |
| | Soil pollution (assessment of pollutant emission and deposits on soil) | | | | | | |
| | Evaluation of consumed square meters of soil | | | | | | |
| | Assessment of exploitability of soil (e.g. | | | | | | |

¹⁴ Explanation of acronyms: Y: Yes, N: no; C: complete, S: sufficient, I: insufficient

| SEA Soil topic | | Criteria SEA Guidance | Relevant | | Level of consideration ¹⁴ | | | Comments |
|--|-------------|--|----------|---|--------------------------------------|---|---|----------|
| | | | Y | N | C | S | I | |
| | | agriculture, forestry, urban development) | | | | | | |
| Description of measures to avoid, minimize or compensate impacts/effects on soil | avoid | Protection of environment and resources foresees stewardship of available resources | | | | | | |
| | | Sustainable usage of soil as a non augmentable good | | | | | | |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | | | | | | |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | | | | | | |
| | | Soil procurement and mobilisation via budget and laws | | | | | | |
| | | Reuse of contaminated sites | | | | | | |
| | | Use of areas with lower soil quality | | | | | | |
| | Minimize | Construction supervision on soil issues to assure proper measurement implementation | | | | | | |
| | Compen sate | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way. | | | | | | |

Table 9: Checklist to assess the state of soil, impacts/effects and measures to avoid, minimize and compensate

11.4.4 Monitoring

Monitoring, as part of a SEA, is focused on the potential significant effects on the environment of implementing the plan. The applicability of monitoring data from existing monitoring regimes (e.g. by authorities) to a particular plan is closely linked to the scale at which the data is collected and the scale of the plan. For example, a national soil strategy is more likely to require monitoring information at a national level that indicates broad trends, rather than information at site specific level.

Table 10: Examples of useful indicators for monitoring effects on soil within the plan area, provides some examples which can be used to select for a specific SEA. Other, more contextual, indicators should be identified to monitor for unexpected effects and consider the effectiveness of mitigation and compensation measures.

| SEA Sub-Objective | Example indicators |
|--|--|
| To reduce soil sealing and soil loss | <ul style="list-style-type: none"> • Surface area of land sealed (e.g. hectares/year), • Surface area of soils lost to mineral workings (e.g. hectares/ year). |
| To reduce levels of soil contamination | <ul style="list-style-type: none"> • Area of contaminated land (e.g. hectares), • Surface area of soils affected by acidification associated with deposition of air pollutants (e.g. hectares), • Concentration of organic contaminants or heavy metal pollutants (e.g. mg/kg). |
| To reduce soil erosion (including landslides) | <ul style="list-style-type: none"> • Topsoil losses due to erosion (e.g. tonnes/ year), • Surface area affected by subsidence/ instability, • Number of landslides (occurrences/ year). |
| To reduce structural degradation and compaction of soils | <ul style="list-style-type: none"> • Bulk density of soils (e.g. g/cm³), • Air porosity of soils (particularly agricultural land). |
| To conserve, or reduce loss of, soil organic matter | <ul style="list-style-type: none"> • Surface area affected by loss of soil organic matter (e.g. hectares), • Rate of soil organic matter lost (e.g. tonnes/ year), • Area of peat (e.g. hectares). |

Table 10: Examples of useful indicators for monitoring effects on soil

11.5 PART D – GUIDANCE FOR SOIL IN EIA

The legal requirements specify the types of projects for which EIA is mandatory and those where EIA has to be made; if a certain e.g. threshold is reached.

The main objective of EIA legislation is the **assessment of direct and indirect effects** of proposed activities/projects on the environment, inter alia **on soil**, including determination of **measures to prevent** environment deterioration or contamination. The project solicitor needs to provide all necessary documents to the authority for project authorisation.

11.5.1 EIA process

EIA is a process which ensures that in the early stage, before the authorisation of certain projects is given, possible environmental impacts on soil need to be comprehensively determined, described, assessed and evaluated. Measures to improve the project and reduce the impact on the environment have to be included. On the basis of the assessment of environmental impacts, authorisation is obtained.

Usually each subject of protection is specified, as well as the interactions between them. Therefore all impacts on interactions between soil and other environmental media (e.g. air, water) have to be included.

Soil as a subject of protection is examined in detail during the consultation process with other authorities - input and comments of all participating players are possible. Early involvement is necessary and projects are likely to be modified during the EIA process, regarding e.g. measures to avoid, minimise and compensate impacts on soil.

11.5.2 Screening - Deciding whether EIA is required

It is the responsibility of the competent authority to ensure that all relevant applications are "screened" to establish whether EIA is required. In a planning authority, this will normally be carried out by the officer dealing with the planning application.

Table 11: Potential for significant effects provides an example of potential for significant effects on soil.

| Score | Positive | Negative | Description of effect |
|-----------------------|-----------|----------|---|
| High | ○ | X | Potential to cause major changes in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter (e.g. causes major changes in concentrations of contaminants in soil leading to exceedance of values at a regional or local scale). |
| Low | o | x | Unlikely to cause a major change in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter by itself, but could have a minor effect or add marginally to a sum of other causes (e.g. cumulative effects) or have a very localised effect (e.g. soil erosion caused by mountain biking in rural areas). |
| Uncertain | ? | | Potential for significant effects is uncertain. |
| No significant effect | Blank box | | Is unlikely to lead to any significant changes in soil quality/ soil pollution/ soil erosion/ soil sealing/ structural damage/ loss of soil organic. |

Table 11: Potential for significant effects

11.5.3 Environmental Impact Statement – EIS

Soils must be included in an Environmental Impact Statement (EIS) and throughout the Environmental Assessment process wherever the effects of a proposed project are likely to be significant. If they are not included the soil authority shall request the Competent Authority to require the project solicitor to submit the information before they grant any consent for the project.

An EIS must include a description of the aspects of the environment likely to be significantly affected by the development, including, inter alia, air, soil and water and the interrelationship between them and all other aspects of the environment.

Where significant adverse effects are identified the EIS must include a description of measures to avoid, mitigate and compensate.

EIS may include, by way of explanation or amplification, information on, inter alia,

- The project, including in particular:
 - A description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases,
 - A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used,
 - An estimate, by type and quantity, of expected residues and emissions (e.g. water, air and **soil pollution**, noise, vibration, light, heat, radiation) resulting from the operation of the proposed project.
- The **aspects of the environment likely to be significantly affected** by the proposed project, including, in particular, population, fauna, flora, **soil**, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.

11.5.4 Source of Information

In order for informed decisions to be made, an adequate source of data is a necessity (e.g. soil maps).

This data needs to be sufficient in detail for the assessment of soil with reference to broad categories of land use. There is a particular scarcity of soil data in urban and sub-urban areas, as soil surveys have traditionally been carried out almost solely for agricultural purposes. As most environmental assessments are made at the more site specific level, it is essential that the authorities involved seek appropriate advice where it is evident that soil issues will be integral to the assessment. The scoping stage is of particular importance here, as the opportunity to raise the issue of effects on soils at an early stage. Therefore the exchange with soil experts within the authority is essential.

Analysis of soil and subsoil is therefore carried on, in a proper territorial domain and timeframe for the kind of project and for the current status of the affected environment, through:

- Characterization of soils in the area affected by the proposed project, with a specific focus on physical and chemical characteristics of soil, to its biotic components and to their interactions, as well as to the genesis, to the evolution and to the capacity (yield) of soil,
- Geo-chemical characterization of solid (minerals, organic matter) and fluid (water, gases) phases in soil and subsoil, with a specific focus on elements and natural compounds of nutritional and toxicological relevance.

For assessment purposes, **soils current state** has to be described and its sensitivity assessed:

- Characteristics:
 - Land use,
 - Soil type,
 - Soil texture and land evaluation,
 - Degree of vulnerability on mechanical and chemical degradation,
 - Quality and degree of soil contamination,
- Quality as well as size of the area,
 - Quantities,
 - Depths,
 - Humidity,
 - Stability,
 - Acidification,
- Contaminant loads – tackling of soil contamination issues, organic pollutants.

In order to compare the current state of soil with the possible impacts, the sensitivity of the project area needs to be described.

Table 12: Example of scale of soil sensitivity, gives an example of the sensitivity of the soils current state in the project area.

| | |
|---------------------------|--|
| High Sensitivity | Key characteristics and features, identified by systematic soil assessment, which contribute significantly to the distinctiveness and character of soil type. |
| Medium Sensitivity | Other characteristics or features of soil that contribute to the character of soil locally. |
| Low Sensitivity | Soil characteristics and features that do not make a significant contribution to soil character or distinctiveness locally, or which are untypical or uncharacteristic of the soil type. |

Table 12: Example of scale of soil sensitivity

Additionally, the interaction processes between e.g. water, soil, flora and fauna need to be estimated. Table 13: Example of interaction processes between soil, flora, fauna and water, provides an example for possible interaction processes.

| | Effect by soil | Effect on soil |
|--------------|--|--|
| Flora | Habitat | Fertilisation, Compaction, Liberalisation, Soil genesis (soil fauna). |
| Fauna | Habitat, Nutrient supply, Source of pollutant. | Root penetration, Erosion protection, Nutrient removal, Pollutant removal, Soil genesis. |
| Water | Element input, Diffusion/ turbidity, Sedimentation, Pollutant filtration, | Mass transfer, Erosion, Wet deposition, Influence on type of soil and soil structure. |

Table 13: Example of interaction processes between soil, flora, fauna and water

11.5.5 Predicting impacts on soil

Some of the main project types likely to give rise to impacts on soils in environmental assessment (see Table 1 below) and which can be directly relevant to the functional capacity, sensitivity, vulnerability and general condition of soils include:

- Location for developments (e.g. sewage works, hazardous facilities & installations, landfill sites),
- Other industrial developments,
- Urban and infrastructure development,
- Reclamation of contaminated areas ,
- Slope stability (e.g. landslides),
- Land drainage,
- Mineral extraction,
- Archaeological excavations,
- Recreation (e.g. footpaths, sports facilities).

As a first step the magnitude of the impact needs to be clarified. Table 14: Example of scale of magnitude of changes to soil helps to classify the impact of the proposed development or change of land use.

| | |
|-------------------------|---|
| High magnitude | Significant changes, over a significant area, to key characteristics or features or to the soil quality and/ or quantity. |
| Medium magnitude | Noticeable but not significant change over a significant area, to key characteristics or features or to soils quality and/ or quantity. |
| Low magnitude | Marginal or barely discernible changes for any length of time. |
| No change | No predicted changes |

Table 14: Example of scale of magnitude of changes to soil

Table 15: Example of a matrix showing impact significance related to sensitivity and magnitude of change can be used for proposed development or change of land use.

| Significance of impact | Sensitivity of soil | Magnitude of change |
|-------------------------------|----------------------------|----------------------------|
| High | High | High |
| | High | Medium |
| | Medium | High |
| Medium | High | Low |
| | Medium | Medium |
| | Low | High |
| Low | Medium | Low |
| | Low | Medium |
| | Low | Low |
| No Change | High Medium or Low | No Change |

Table 15: Example of a matrix showing impact significance related to sensitivity and magnitude of change

Impacts/effects of the project **on soil**, based on the corner of soil sensitivity and magnitude of change, have to be described, analysed and shall include:

Impacts on soil quantity

- Soil sealing areas (hectare) and total consumption (description of predicted temporary and permanent land use/soil consumption),
- Soil consumption (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area),

Impacts on soil functions

- Loss of soil functions, including soil degradation and compaction,
- Functional soil losses on the basis of soil evaluation of long-term monitoring,
 - Type of land use and overall loss of naturalness in project area,
 - Contamination caused by e.g. storage of materials containing dangerous substances, potential effects on the groundwater,
 - Direct or indirect soil erosion following the reduction of transportation of solid matter by waterways.

Impacts on soil quality due to construction and operation

- Changes of physical and chemical characteristics (e.g. due to topsoil stripping and storage),
 - Changes in pH,
 - Loss of organic matter,
 - Decline in fertility,
- Site contamination and possible mobilisation of pollutants due to construction activities (e.g. heavy metals, organic compounds, industrial wastes, fertilisers, pesticides),
- Immission of contaminants (considering relevant pollutants from e.g. fuel provided emissions and their effects on soil)
 - NO₂, SO₂, respirable dust, heavy metals, Benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCl,
- Deposition and emission,
- Encroachments, e.g. Sealing, excavation,
- Deterioration of soil structure,
- Compaction caused by e.g. construction damage,
- Loss of natural soil layers and characteristic horizons, homogenisation,
- Soil degradation due to recultivation,
- Loss of or reduction in biodiversity,
- Changes to soil water regime and changes in ground water level,
- Soil productivity,
- Interactions between soil and other subjects of protection (e.g. water, flora and fauna).

Table 16: Examples of pressures and their impacts on soils¹⁵ below can be seen as an example for users, summarising the main pressures on soil and examples of the various types of on-site and off-site impacts they may cause.

| Examples of pressures and their impacts on soils | | |
|---|--|--|
| Pressure | On-site impacts | Off-site impacts |
| Renaturalisation of contaminated land | Disposal of contaminants. Changes in chemistry. Lack of high quality soils. | Leakage of contaminants to watercourses. |
| Location of developments | Soil loss; Contamination; Structural damage; Changes to soil water regime; Disposal of wastes; Effects on soil biota, loss of soil quality | Leakage of contaminants to watercourses; Groundwater contamination; Effects of waste products on vegetation and agrarian products. |
| Urban and infrastructure development | Soil loss or sealing; Contamination; Structural damage. | Ground and surface water contamination. |
| Soil stability | Shrinkage/swelling of clays; Compaction; Erosion. | Landslides, avalanches |
| Land drainage | Oxidation of organic matter; Physical damage; Soil water changes; Effects on acidity. | Sedimentation of water courses. Changes to water chemistry. |
| Mineral extraction | Loss of soil; Physical damage; Effects on biota; Contamination; Soil stripping and storage, recultivation degradation of soil quality. | Contamination of water courses. Changes to sediment load. |
| Archaeological excavations | Damage to palaeosols. | |
| Land redevelopment | Problems associated with reinstatement of previous soil conditions. | Changes to water chemistry. |
| Recreation | Erosion; Compaction; Loss of organic matter. | |
| Forestry | Erosion; Changes to pH; Changes to soil structure; Changes to soil water; Effects on soil biota. | Increased sediment yield. Changes to run-off. Changes in water chemistry. |
| Agriculture | Loss of organic matter; Erosion; Changes to nutrient status; Compaction; Structural damage; Effects on biodiversity; pH changes; Homogenisation. | Pollution of groundwater. Pollution of surface water. Increased sediment yield. |

Table 16: Examples of pressures and their impacts on soils

¹⁵ <http://www.snh.org.uk/publications/on-line/heritagemanagement/EIA/appendix4.shtml>

11.5.6 Soil measures to avoid, minimize or compensate soil impacts

By matching as far as possible particular local/regional developments with appropriate soils, the consequences of many of these impacts could be minimised. In this context, environmental assessment involves the consideration of key soil properties (e.g. soil density, soil fertility, soil organisms) and soil characteristics (e.g. proportion of nutrients, organic pollutants) in relation to the proposed development or change of land use.

Some of the relevant measures to avoid, minimize or compensate impacts/effects on soil that should be considered are:

Conservation of soil resources

- Economical and spare handling of soil,
 - e.g. project area was chosen due to the low soil quality or difficult accessibility for agricultural machinery,
- Goals referring to soil protection in the planning area,
- Protection of soil and forage quality and soil functions mainly for agricultural purposes,
- Reduction of risks (e.g. contamination, stability),
- Reclamation and restoration of fertile soils and its functions

Improvement of processes and basics

- Obligatory application of guidelines for e.g. recultivation;
- Soil scientific construction supervision – guarantee of implementation;
- Supervisory right/right to monitor of the authority at all times,
 - e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection
- Implementation of improved compensation measures like calculation of compensation effect (e.g. compensation charges),
 - Creation of new landscape elements helping recover ecosystem equilibrium in areas suffering present ecological damages or an equivalent area can be made available to the public,
- Preservation of evidence (e.g. soil sample) and monitoring of real impacts during construction and operating phase;
- Annual evaluation of compensation measures.

Conservation of soil quality

- Save handling of soil mainly during construction phase;
 - Minimisation of soil compaction,
 - Assessment notice for soil storage,
 - Contaminated excavated soil – treatment according to legal requirements,
 - Conservation of soil functions mainly during restoration processes,
 - Measures to balance soil compaction (e.g. mats, coverage)
 - Measures to preserve soil functions (e.g. productivity for agricultural production)
 - Excavated soil is recultivated immediately to minimize wind-erosion and loss of soil quality,
- Fertilizing plan – verification of used pesticides;
- Reduction of (particle) emission and deposition on soil:
 - via modern technical standards,
 - for construction phase e.g. moistening of the road surfaces,
 - via evaluation of traffic related emissions (diffuse contamination),

- Contaminated soil or brownfields will be decontaminated and revitalized – minimises consumption of “natural soil resources” - Amelioration of present contaminated or polluted soils and their functions,
- Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination,
- Monitoring of contaminants in soil using e.g. bio-indicators (Phytoindicators) or periodic random sampling.

11.6 CHECKLIST FOR CONSIDERING SOIL ASPECTS IN EIA

This checklist is based on the Draft guidance for soil in SEA/EIA (Leitner M, Tulipan M., April 2010). Due to URBAN SMS partners recommendation the key issues related to soil in the guidance have been extracted and are represented in this checklist that shall support planners and practitioners dealing with EIA projects.

11.6.1 Screening

It is the responsibility of the competent authority to ensure that all relevant applications are "screened" to establish whether EIA is required. In a planning authority, this will normally be carried out by the officer dealing with the planning application.

Table 17: Potential for significant effects provides an example of potential for significant effects on soil.

| Score | Positive | Negative | Description of effect |
|-----------------------|-----------|----------|---|
| High | O | X | Potential to cause major changes in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter (e.g. causes major changes in concentrations of contaminants in soil leading to exceedance of values at a regional or local scale). |
| Low | o | x | Unlikely to cause a major change in soil quality or sources of soil contamination/ erosion/ sealing/ structural degradation and compaction/ loss of soil organic matter by itself, but could have a minor effect or add marginally to a sum of other causes (e.g. cumulative effects) or have a very localised effect (e.g. soil erosion caused by mountain biking in rural areas). |
| Uncertain | ? | | Potential for significant effects is uncertain. |
| No significant effect | Blank box | | Is unlikely to lead to any significant changes in soil quality/ soil pollution/ soil erosion/ soil sealing/ structural damage/ loss of soil organic. |

Table 17: Potential for significant effects

11.6.2 State of soil

For assessment purposes, **soils current state** has to be described and its sensitivity assessed:

- Characteristics:
 - Land use,
 - Soil type,
 - Soil texture and land evaluation,
 - Degree of vulnerability on mechanical and chemical degradation,
 - Quality and degree of soil contamination,
- Quality as well as quantity (size of the area, m²)
 - m²,
 - Depths,
 - Humidity,
 - Stability,
 - Acidification,
- Contaminant loads – tackling of soil contamination issues, organic pollutants.

In order to compare the current state of soil with the possible impacts, the sensitivity of the project area needs to be described.

Table 18: Example of scale of soil sensitivity, gives advice to assess the sensitivity of the soils current state in the project area.

| | |
|---------------------------|--|
| High Sensitivity | Key characteristics and features, identified by systematic soil assessment, which contribute significantly to the distinctiveness and character of soil type. |
| Medium Sensitivity | Other characteristics or features of soil that contribute to the character of soil locally. |
| Low Sensitivity | Soil characteristics and features that do not make a significant contribution to soil character or distinctiveness locally, or which are untypical or uncharacteristic of the soil type. |

Table 18: Example of scale of soil sensitivity

Additionally, the interaction processes between e.g. water, soil, flora and fauna need to be estimated. Table 19: Example of interaction processes between soil, flora, fauna and water, provides an example for possible interaction processes.

| | Effect by soil | Effect on soil |
|--------------|--|--|
| Flora | Habitat | Fertilisation, Compaction, Liberalisation, Soil genesis (soil fauna) |
| Fauna | Habitat, Nutrient supply, Source of pollutant. | Root penetration, Erosion protection, Nutrient removal, Pollutant removal, Soil genesis. |
| Water | Element input, Diffusion/ turbidity, Sedimentation, Pollutant filtration | Mass transfer, Erosion, Wet deposition, Influence on type of soil and soil structure |

Table 19: Example of interaction processes between soil, flora, fauna and water

11.6.3 Impacts/Effects

Some of the main project types likely to give rise to impacts on soils in environmental assessment and which can be directly relevant to the functional capacity, sensitivity, vulnerability and general condition of soils include:

- Location for developments (e.g. sewage works, hazardous facilities & installations, landfill sites),
- Other industrial developments,
- Urban and infrastructure development,
- Reclamation of contaminated areas ,
- Slope stability (e.g. landslides),
- Land drainage,
- Mineral extraction,
- Archaeological excavations,
- Recreation (e.g. footpaths, sports facilities).

As a first step the magnitude of the impact needs to be clarified. Table 20: Example of scale of magnitude of changes to soil helps to classify the impact of the proposed development or change of land use.

| Magnitude | Change over area |
|------------------|---|
| High magnitude | Significant changes, over a significant area, to key characteristics or features or to the soil quality and/ or quantity. |
| Medium magnitude | Noticeable but not significant change over a significant area, to key characteristics or features or to soils quality and/ or quantity. |
| Low magnitude | Marginal or barely discernible changes for any length of time. |
| No change | No predicted changes |

Table 20: Example of scale of magnitude of changes to soil

Table 21: Example of a matrix showing impact significance related to sensitivity and magnitude of change can be used for proposed development or change of land use.

| Significance of impact | Sensitivity of soil | Magnitude of change |
|------------------------|---------------------|---------------------|
| High | High | High |
| | High | Medium |
| | Medium | High |
| Medium | High | Low |
| | Medium | Medium |
| | Low | High |
| Low | Medium | Low |
| | Low | Medium |
| | Low | Low |
| No Change | High Medium or Low | No Change |

Table 21: Example of a matrix showing impact significance related to sensitivity and magnitude of change

Impacts/effects of the project **on soil**, based on the corner of soil sensitivity and magnitude of change, have to be described, analysed and shall include:

Impacts on soil quantity

- Soil sealing areas (hectare) and total consumption (description of predicted temporary and permanent land use/soil consumption),
- Soil consumption (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area),

Impacts on soil functions

- Loss of soil functions,
- Functional soil losses considering
 - Type of land use and overall loss of naturalness in project area,
 - Contamination caused by e.g. storage of materials containing dangerous substances, potential effects on the groundwater,
 - Direct or indirect soil erosion following the reduction of transportation of solid matter by waterways,
 - Soil degradation and compaction.

Impacts on soil quality due to construction and operation

- Changes of physical and chemical characteristics (e.g. due to topsoil stripping and storage),
 - Changes in pH,

- Loss of organic matter,
 - Decline in fertility,
- Site contamination and possible mobilisation of pollutants due to construction activities (e.g. heavy metals, organic compounds, industrial wastes, fertilisers, pesticides),
- Immission of contaminants (considering relevant pollutants from e.g. fuel provided emissions and their effects on soil)
 - NO₂, SO₂, respirable dust, heavy metals, Benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCl,
- Deposition and emission,
- Encroachments, e.g. Sealing, excavation,
- Deterioration of soil structure,
- Compaction caused by e.g. construction damage,
- Loss of natural soil layers and characteristic horizons, homogenisation,
- Soil degradation due to recultivation,
- Loss of or reduction in biodiversity,
- Changes to soil water regime and changes in ground water level,
- Soil productivity,
- Interactions between soil and other subjects of protection (e.g. water, flora and fauna).

Table 22: Examples of pressures and their impacts on soils¹⁶ below can be seen as an example for users, summarising the main pressures on soil and examples of the various types of on-site and off-site impacts they may cause.

| Examples of pressures and their impacts on soils | | |
|--|--|--|
| Pressure | On-site impacts | Off-site impacts |
| Renaturalisation of contaminated land | Disposal of contaminants. Changes in chemistry. Lack of high quality soils. | Leakage of contaminants to watercourses. |
| Location of developments | Soil loss; Contamination; Structural damage; Changes to soil water regime; Disposal of wastes; Effects on soil biota, loss of soil quality | Leakage of contaminants to watercourses; Groundwater contamination; Effects of waste products on vegetation and agrarian products. |
| Urban and infrastructure development | Soil loss or sealing; Contamination; Structural damage. | Ground and surface water contamination. |
| Soil stability | Shrinkage/swelling of clays; Compaction; Erosion. | Landslides, avalanches |
| Land drainage | Oxidation of organic matter; Physical damage; Soil water changes; Effects on acidity. | Sedimentation of water courses. Changes to water chemistry. |
| Mineral extraction | Loss of soil; Physical damage; Effects on biota; Contamination; Soil stripping and storage, recultivation degradation of soil quality. | Contamination of water courses. Changes to sediment load. |
| Archaeological excavations | Damage to palaeosols. | |
| Land redevelopment | Problems associated with reinstatement of previous soil conditions. | Changes to water chemistry. |
| Recreation | Erosion; Compaction; Loss of organic matter. | |
| Forestry | Erosion; Changes to pH; Changes to soil structure; Changes to soil water; Effects on soil biota. | Increased sediment yield. Changes to run-off. Changes in water chemistry. |
| Agriculture | Loss of organic matter; Erosion; Changes to nutrient status; Compaction; Structural damage; Effects on biodiversity; pH changes; Homogenisation. | Pollution of groundwater. Pollution of surface water. Increased sediment yield. |

Table 22: Examples of pressures and their impacts on soils

11.6.4 Measures to avoid, minimize and compensate

By matching as far as possible particular local/regional developments with appropriate soils, the consequences of many of these impacts could be minimised. In this context, environmental assessment involves the consideration of key soil properties (e.g. soil density, soil fertility, soil organisms) and soil characteristics (e.g. proportion of nutrients, organic pollutants) in relation to the proposed development or change of land use.

Some of the relevant measures to avoid, minimize or compensate impacts/effects on soil that should be considered are:

¹⁶ <http://www.snh.org.uk/publications/on-line/heritagemanagement/EIA/appendix4.shtml>

Conservation of soil resources

- Economical and spare handling of soil,
 - e.g. project area was chosen due to the low soil quality or difficult accessibility for agricultural machinery,
- Goals referring to soil protection in the planning area,
- Protection of soil and forage quality and soil functions mainly for agricultural purposes,
- Reduction of risks (e.g. contamination, stability),
- Reclamation and restoration of fertile soils and its functions

Improvement of processes and basics

- Obligatory application of guidelines for e.g. recultivation;
- Soil scientific construction supervision – guarantee of implementation;
- Supervisory right/right to monitor of the authority at all times,
 - e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection
- Implementation of improved compensation measures like calculation of compensation effect (e.g. compensation charges),
 - Creation of new landscape elements helping recover ecosystem equilibrium in areas suffering present ecological damages or an equivalent area can be made available to the public,
- Preservation of evidence (e.g. soil sample) and monitoring of real impacts during construction and operating phase;
- Annual evaluation of compensation measures.

Conservation of soil quality

- Save handling of soil mainly during construction phase;
 - Minimisation of soil compaction,
 - Assessment notice for soil storage,
 - Contaminated excavated soil – treatment according to legal requirements,
 - Conservation of soil functions mainly during restoration processes,
 - Measures to balance soil compaction (e.g. mats, coverage)
 - Measures to preserve soil functions (e.g. productivity for agricultural production)
 - Excavated soil is recultivated immediately to minimize wind-erosion and loss of soil quality,
- Fertilizing plan – verification of used pesticides;
- Reduction of (particle) emission and deposition on soil:
 - via modern technical standards,
 - for construction phase e.g. moistening of the road surfaces,
 - via evaluation of traffic related emissions (diffuse contamination),

- Contaminated soil or brownfields will be decontaminated and revitalized – minimises consumption of “natural soil resources” - Amelioration of present contaminated or polluted soils and their functions,
- Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination,
- Monitoring of contaminants in soil using e.g. bio-indicators (Phytoindicators) or periodic random sampling.

Based on the experience with EIA from different partners, the following maximum checklist (Table 23: Checklist to assess the state of soil, impacts/effects and measures to avoid, minimize and compensate) has been developed. Depending on the type of the pilot case it should be decided which criteria of the EIA Guidance are relevant in the specific EIA case. In case a criterion is relevant, it should be indicated to which degree it was considered in the respective EIA. Comments on the method how a criterion was considered and in relation to which local/regional/national regulation it was done will be helpful.

| EIA Soil topic | Criteria EIA Guidance | Relevant | | Level of consideration ¹⁷ | | | Comments |
|---|---|----------|---|--------------------------------------|---|---|----------|
| | | Y | N | C | S | I | |
| Description of current state of soil | Soil functions - mainly natural functions | | | | | | |
| | Soil quality – e.g. nutrients, soil physics, CEC, acidity, organic carbon | | | | | | |
| | Soil erosion risk | | | | | | |
| | Contaminant loads – tackling of soil contamination issues (organic and inorganic pollutants) | | | | | | |
| | Current land use | | | | | | |
| | Productivity, soil index | | | | | | |
| | Additional to EIA procedure: | | | | | | |
| Description and analysis of impacts/effects on soil | Loss of soils, sealing, soil/land consumption, (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area), changes of land use | | | | | | |
| | soil functions (loss), including soil degradation, rearrangement and compaction | | | | | | |
| | Soil erosion and potential negative effects on the groundwater | | | | | | |
| | Immission of contaminants on sites due to construction activities | | | | | | |
| | Immission load of contaminants (considering relevant pollutants from fuel provided emissions and their effects on soil) – e.g. NO ₂ , SO ₂ , respirable dust, heavy metals, | | | | | | |

¹⁷ Explanation of acronyms: Y: Yes, N: no; C: complete, S: sufficient, I: insufficient

| EIA Soil topic | | Criteria EIA Guidance | Relevant | | Level of consideration ¹⁷ | | | Comments |
|--|----------|--|----------|---|--------------------------------------|---|---|----------|
| | | | Y | N | C | S | I | |
| | | benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL etc | | | | | | |
| | | Comprising evaluation of deposition and emission | | | | | | |
| | | Changes in ground level | | | | | | |
| | | Ecological soil quality | | | | | | |
| | | Soil productivity | | | | | | |
| | | Interactions between soil and other subjects of protection | | | | | | |
| | | Additional to EIA procedure: | | | | | | |
| Description of measures to avoid, minimize or compensate impacts/effects on soil | avoid | Economical and spare handling with land and soil in operating and construction phase, e.g. project area was chosen due to low soil quality or difficult accessibility for agricultural machinery | | | | | | |
| | | Goals referring to soil protection (legal) requirements in the project area, | | | | | | |
| | | Reuse of contaminated sites or brownfields, decontamination and revitalisation to decrease land consumption | | | | | | |
| | | Reduction of immission on soil via, e.g. modern technical standards | | | | | | |
| | | Additional to EIA procedure: | | | | | | |
| | Minimize | Obligatory application of guidelines for e.g. professional recultivation | | | | | | |
| | | Soil scientific construction supervision – consulting and guarantee of professional measurement implementation | | | | | | |
| | | Save handling of soil in construction phase: <ul style="list-style-type: none"> Storage of humus layers, Assessment notice for soil storage, Professional treatment of excavated soil, e.g. open soil is recultivated immediately to minimize wind-erosion, contaminated soil is treated according to waste demands, emissions of particulate matter have to be reduced by moistening of the road surfaces, Avoidance of leaching/infiltration of chemicals, oil or fuel in construction area, Measures to balance and minimize soil compaction | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| EIA Soil topic | | Criteria EIA Guidance | Relevant | | Level of consideration ¹⁷ | | | Comments |
|----------------|-------------------|---|----------|---|--------------------------------------|---|---|----------|
| | | | Y | N | C | S | I | |
| | | e.g. mats, coverage, no pass of wet soils, using light machines | | | | | | |
| | | <ul style="list-style-type: none"> Measures to preserve soil functions e.g. professional recultivation to preserve productivity for agricultural production, preserve soil quality during storage | | | | | | |
| | | Preservation of evidence (soil assessment) for follow-up care and accompanying monitoring | | | | | | |
| | | Implementation of monitoring e.g. of contaminants in soil using periodic random sampling or bio-indicators (e.g. phytoindicators) for conservation of soil and forage quality & soil functions mainly for agricultural purposes, to avoid exceeding of critical values of pollutants | | | | | | |
| | | Supervisory right/right to monitor of the authority at all times e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection | | | | | | |
| | | Fertilizing plan, verification of used pesticides according to licences and legal requirements for use | | | | | | |
| | | Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination | | | | | | |
| | | Annual evaluation of compensation measures to reduce particle immission, evaluation of traffic related emissions (diffuse contamination) | | | | | | |
| | | Additional to EIA procedure: | | | | | | |
| | Compensate | Obligation of measures to protect soil and its functions, e.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way | | | | | | |

| EIA Soil topic | | Criteria EIA Guidance | Relevant | | Level of consideration ¹⁷ | | | Comments |
|----------------|--|---|----------|---|--------------------------------------|---|---|----------|
| | | | Y | N | C | S | I | |
| | | Amelioration of contaminated soils and soil functions | | | | | | |
| | | Recovery and recultivation e.g. after exploitation of underground | | | | | | |
| | | Compensation charge of certain amount of money | | | | | | |
| | | Additional to EIA procedure: | | | | | | |

Table 23: Checklist to assess the state of soil, impacts/effects and measures to avoid, minimize and compensate

12 TESTING OF USABILITY OF THE GUIDANCE

After the development of the draft guidance on how to include soil protection aspects practically in EIA/SEA, the guidance has been tested in local pilots where possible. Due to experience gained between spring 2010 and spring 2011 in the test sites, we expected that some SEA and EIA processes are currently running or have recently be finalized. So improvements in the two planning processes based on project results and mainly on the guidance itself, could be identified and integrated into the guidance. Methods and results of this testing are described below. The outcomes and recommendations have been included in the compilation of this final guidance for soil in EIA/SEA.

12.1 METHOD

All partners were requested to assess if SEA or EIA were performed in their test site areas and if the draft guidance on soil has been used/of use.

Questionnaires (see Annex 8-10) have been developed and distributed among the partners to request their input.

Some aspects have to be considered for result interpretation:

The guidance has not really been integrated or used generally for any current process of SEA/EIA because of the narrow time frame and challenging framework. But elements of the guidance have been used successfully as encouragement for soil protection in some cases and are seen as a basis with high potential to improve soil assessment in spatial planning.

The results of the questionnaire were gained by comparing selected processes in the test sites to the requirements for SEA/EIA defined in the guidance.

All SEAs and EIAs have been ongoing before and/or during the guidance development. The environmental statements were compared with the guidance. Both, the guidance and the developed questionnaire would raise the quality of the consideration of soil aspects in SEA as well as in EIA.

Additionally a session at a Meeting in Wroclaw (June 9th, 2011) has contributed to improve the questionnaires. Recommendations were made to evaluate the usability of the guidance related closer to planners needs.

12.1.1 Questionnaires

Three different questionnaires were developed to comprise practical experience in the test sites:

- One general template on the usability of the guidance (see Annex 8)
- One template on the EIA process (Annex 9)
- One template on the SEA process (Annex 10), both focusing on the relevance of the identified maximum criteria within the guidance.

The templates were sent out to the partners to collect their experiences.

12.1.2 Meeting

During the Meeting in Wroclaw, Poland on June 8.-9, 2011, the SEA-EIA Guidance and its related questionnaires were discussed.

The following points were brought up during this Meeting in order to reshape the guidance in a more practical and useable format for planners and practitioners on city and municipal level:

- **Provision of a soil checklist for SEA and EIA: an extract of the guidance, focussed on terms and useful tables for planners in the format of a “checklist” is considered as very important – separation into EIA and SEA is necessary**
- Sometimes the separation between SEA and EIA is hard and the implementation of EU directive requirements in regional regulations is challenging
- SEA is seen as the more relevant level to consider soil in an early phase of planning, due to its level on the program and plan level (more flexibility with regard to the exact site)
- The guidance is seen as a maximum list, the legal requirements are often more narrow

These recommendations and results have now been integrated into the final guidance.

12.2 RESULTS OF QUESTIONNAIRES IN TEST SITES

12.2.1 General questionnaire on the guidance

The results of the general SEA/EIA questionnaire are subsumed and described below:

- **Setting out goals, approaches and a strategy for consideration of soil in spatial planning is the important nucleus** for adequate soil consideration and later assessment. It is necessary to define policy goals for soil protection in spatial planning as well as the framework of assessment.
- **The steering of superior planning on low quality soils and the consideration of soil functions in plans and programmes is given in very few cases but recommendations and the assessment are usually very general and not traceable enough.**

It is needed to consider possible solutions like

- **implementing an area wide assessment of soil quality based on natural soil functions**
- a mapping of inner urban potential for building areas,
- economic payments for high-quality land take, update of older soil maps
- Soil assessment on SEA level and a short comprehensive guidance for planners is seen as the key to provide an adequate basis to assess the quality of used land properly. Soil functions are often not considered particularly at SEA level due to a lack of adequate data.
- Communication between planners, soil experts and policy makers is of high importance (the soil concept of Stuttgart is a very good example).The ongoing activities and gained knowledge within URBAN SMS leads to more communication, **raises awareness** and **fosters acceptance**. The “slim” guidance for planners will improve/enforce this process.

- There is a need to improve effectiveness of compensation measures, because destroyed soil is very difficult to reconstruct, and it is a non-renewable resource. The quality of the implementation of compensation measures plays an important role (binding character, expert supervision).
- The definition of goals and aims as well as indicators (like for water or air) for soil quality and sustainability would be needed. Only in some cases this is done (e.g. enforce inner-urban development).
- The guidance has not been directly used for an ongoing EIA/SEA process (see 12.1.). Generally the full guidance document is complex and comprising and not targeted on planners, therefore a slim guidance (see above) is recommended. But the guidance can be used within the administrative levels.

12.2.2 Questionnaire on SEA

The results from the partners of the SEA questionnaire are subsumed and described below:

- The consideration of soil in planning processes generally is established, so the contents / recommendations of the guidance will be useful and can be applied in SEA framework of most programs and especially plans. In Vienna, e.g. the guidance influenced the communication between soil experts and planners in the planning phase in a positive way. The example of the City of Vienna, (Annex 4, 16.1.1) shows that the development of a “slim” guidance for planners (out of the guidance in cooperation with planners) can improve soil consideration on SEA level – this particular guidance will be provided to the local planners and considered for future projects. A distribution and discussion on that document on national level has been started.

It is seen that using the guidance will improve the quality of the whole SEA process, because of a clear definition of steps and recommendations, which can be demanded in assessment.

However it is of course no guarantee that the weighing of decision maker/policy has no negative impacts on soil and the implementation of these requirements in legal frameworks for more binding character is a challenging task.

- Especially at the SEA level, soil data is scarcely available for proper assessment (e.g. soil functions, maps, databases, limit values, degree of pollution). So assessment in environmental reports mostly remains on a “meta” – level and decision processes/interpretation lacks traceability (e.g. only general statement that there is an impact on soil, no real evaluation of single impacts, no discussion/assessment of compensation measures, soil is more often seen as a used resource, which will be used/sealed).

Also the inner-urban development is not well covered yet and further efforts need to be devoted to data collection. The quantification of all guidance criteria would facilitate soil assessment.

12.2.3 Questionnaire on EIA

The results from the partners of the EIA questionnaire are subsumed and described below:

- Data availability for soil assessment, especially on soil functions (rather soil properties and productivity) has to be improved. Assessment cannot be demanded by guidance if there is a lack of data or methods.

- The guidance can be seen as a solid maximum list of soil issues that need to be taken into account in the EIA procedure, especially in the Environmental Impact Statement (EIS).
- Not the whole guidance will be helpful in all cases, but some parts, especially a condensed version for easy application would be of added value.
- Generally the permission decision is not based on soil. Other regulations like, nature conservation acts influence indirectly soil issues – but this is considered as not sufficient. In general, soil is used and parts are restored in the state-of-the-art manner. In neither of the evaluated EIAs soil has been the key issue of environmental protection. As a good practice example it is regarded that in Stuttgart finally the calculation of soil loss with soil index points is implemented by planning department in every EIA.

12.3 USABILITY OF GUIDANCE

Generally the guidance is considered as very useful giving a comprehensive overview (maximum list) of relevant soil issues to be considered. Any application would be of added value for soil protection in the planning process. Nevertheless, the guidance is too comprising and complex for planners to be applied directly. The guideline should be an operational document providing a basis for proper strategic or environmental assessment.

To improve the application it is recommended that

- ⇒ **An easy guidance in the format of a practical checklist targeted on planners is needed**

12.4 NEEDS/PROBLEMS

- ⇒ Simplification of recommendations: Checklist, which is more comprehensive for planners to apply – separate in SEA (Annex 12) and EIA (Annex 11)
- ⇒ Concrete suggestions how to consider soil in urban planning, e.g. level of relevance (difficult for SEA due to the plan/program level, very difficult for EIA due to the uniqueness and conditions of each site)
- ⇒ Definition of soil indicators: There is still a lack of soil indicators (e.g. like for water or air), which would help to quantify the quality and quantity of affected soil.
- ⇒ Implementation of soil issues in legal frameworks (e.g. soil protection acts, spatial planning) to give the consideration of soil issues a more binding character
- ⇒ Enforce quality of compensation measures regarding remediation and recultivation
- ⇒ Awareness raising and networking: Enforcement of cooperation between soil experts and spatial planning (e.g. adjustment of goals, compensation measures, best practice examples)

12.5 NEXT STEPS IN PP COUNTRIES

- ⇒ Application of the guidance, especially Chapter 11 - Guidance for soil in SEA/EIA in the different cities and municipalities, promotion on the national level to support other municipalities and cities in soil related planning processes

- ⇒ Development of shortened guidance for planners on SEA and EIA level (see chapters 11.4 and 11.6) in project partner countries based on national and local objectives
- ⇒ Use of the shortened guidance for SEA and EIA, implementation in planning procedures and in legal frameworks

13 ANNEX 1 – QUESTIONNAIRE TEMPLATE

1. National legal (if necessary transboundary) requirements (including legal requirements on subnational/federal level, if applicable) to include soil aspects in SEA
 - a. Name the act/law
 - b. Name the main approaches of soil protection and soil assessment in the referred act/law
 - c. Most urgent needs and gaps regarding soil protection
2. National legal (if necessary transboundary) requirements (including legal requirements on subnational/federal level, if applicable) to include soil aspects in EIA
 - a. Name the act/law
 - b. Name the main approaches of soil protection and soil assessment in the referred act/law
 - c. Most urgent needs and gaps regarding soil protection
3. National (including subnational/federal levels) guidelines for SEA
 - a. Name the guideline
 - b. Name the main approaches of soil protection and soil assessment in the referred guideline
 - c. Most urgent needs and gaps regarding soil protection
4. National (including subnational/federal levels) guidelines for EIA
 - a. Name the guideline
 - b. Name the main approaches of soil protection and soil assessment in the referred guideline
 - c. Most urgent needs and gaps regarding soil protection
5. Focus of SEA (level of plans and programmes - e.g. spatial planning and related plans and programmes, urban plans, city development plan, regional development plans, programmes)

for regional development) approaches related to soil aspects in urban and suburban environment

6. Focus of EIA (level of projects - e.g. urban development sites, city construction projects, airport projects related to cities) approaches related to soil aspects in urban and suburban environment

7. SEA approaches based on practical case studies/examples to include soil protection aspects
 - a. Name of programme or plan

 - b. Main soil aspects

 - c. Why did you choose this SEA as good example?

8. EIA approaches based on practical case studies/examples to include soil protection aspects
 - a. Name of project

 - b. Main soil aspects

 - c. Why did you choose this EIA as good example?

14 ANNEX 2 – EXISTING LEGAL REQUIREMENTS OF PP IN SEA

14.1 AUSTRIA

- Name of the act/law

The legal basis for the implementation of the SEA-Directive into Austrian legislation arises as a result of the existing allocation of authority between the federal state and the nine “Länder” (federal states) for planning and environment. The implementation took place at both, the federal and the “Länder” level, predominantly via the integration of the SEA requirements into the existing subject laws, partially in addition, via own laws.

No general SEA act is implemented on the federal level. To the predominant part the requirements of the SEA-Directive are integrate into the existing planning procedures. Thus the authority, responsible for planning, accomplishes also the SEA.

For the following sectors, SEA relevant plans and programmes are in accordance with the application area of the SEA-Directive:

National level:

- Waste; Noise; Water; Transport Planning; Air; EU-Advancement.

Federal State level:

- Waste; Noise; Water supply and waste water management; Transport Planning; **Spatial Planning; Regional Development**; Nature conservation; Hunting/Fishery/Agriculture.

By January 2010, there are 37 pieces of SEA legislation¹⁸.

- Need and gaps

In the Austrian SEA legislation, soil is only mentioned as one of the 12 subjects of protection, which have to be dealt with in SEA. Relevant impacts on soil have to be assessed and taken into account. However, there are no regulations concerning soil that go beyond the EU SEA Directive or the UNECE SEA protocol. There is no precise soil protection objectives mentioned and no references to soil related regulation or polices.

- Name of the act/law

Bauordnung für Wien LGBl. für Wien Nr. 11/1930 in der Fassung Nr. 24/2009 - Spatial Planning and Building Legislation of Vienna Particular legal regulation concerning soil sealing

- Main approaches of soil protection and soil assessment

- Goal for zoning plans: Laying down the goal to use the soil as economically and ecological compatibly as possible,
- Few articles reduce sealing: only one third of a building lot is allowed to be obstructed. On building lots more than 500m² 10 % must remain unsealed.

The SEA of the Land Use Plan is a good possibility to include soil protection in the earliest possible stadium – the planning stadium. The Land Use and Building Plan can determine directly soil consumption respectively sealing.

¹⁸ http://www.arbter.at/sup/sup_rg.html

- Name of the act/law

Salzburger Raumordnungsgesetz 2009 – ROG 2009 – Regional Development Act of Salzburg

- Main approaches of soil protection and soil assessment

- Laying down the goal to conserve nature – including soil – as future base of life in sufficient quality and quantity;
- Laying down the goal to use the ground – especially building land – in a sparing and sustainable way,
- The consumption of a certain amount of land has to be reported to the state government;
- All negative impacts from a spatial development plan/programme that can serve as basis for a construction project have to be documented in a report. The report includes also measures for minimizing negative impacts. The report has to be published;
- The plan or programme can only be approved on condition of minimizing the negative impacts;
- The settlement structure, form and density must be specified in the spatial development concept;
- The land use plan regulates the use of land in a structured way by considering future developments such as demographic, economic and traffic development;
- The building regulation plan regulates the territorial arrangement under consideration of a sparsely use of soil.

- Name of the act/law

Salzburger Landesentwicklungsprogramm 2003 - Development Programme Salzburg – rules for the land use plan

- Main approaches of soil protection and soil assessment

The land use plan is in principle an adequate instrument to influence the use of land and consequently soil sealing. The regulations enacted in the development programme of Salzburg contribute to the reduction of land use and to reduce urban sprawl.

- Needs and gaps

The impact is limited to those buildings for which a building permission is required. A strengthening of the application of the land use plan would improve its effectiveness on soil sealing as well.

14.2 CZECH REPUBLIC

- Name of the act/law

Act No. 334/1992 Coll., on protection of agricultural land resources as amended by the following regulations

Act No. 289/1995 Coll., on forests, as amended by the following regulations

Act No. 114/1992 Coll., on nature and landscape protection, as amended by the following regulations

- Main approaches of soil protection and soil assessment

The Articles provides the base for:

- Protection of agricultural land resources, including landscape planning activities,
- Forests,

- Nature and landscape protection –significant landscape elements are specified on what the emphasis is placed in nature and landscape preservation, some of these elements are at the same time soils of agricultural land resources, or forest soil – forests, peat bog, fluvial plain, these significant landscape elements are protected by law and this systematic preservation has already been entrenched in sea.

- Need and gaps

Current legislation covers needs of soil protection with convenient way. The priorities are agricultural land resources and forest soil management, considered as exhaustible resource. Furthermore minimisation of soil loss with respect on range and quality of soil appropriation, soil functions in management, nature and landscape protection or from a water preservation point of view. Further reclamation of devastate lands back in agricultural land resources soil, or land with forest function. In case of land with forest function it is necessary to protect the recreation role of forests.

Most of the municipal plans were ratified before the Guideline of the Department of Forest and Soil Protection of the Ministry of the Environment of the Czech Republic from 1. 1. 1996 File No. OOLP/1 067/96 becomes valid. That means that in some cases the most quality soils of agricultural land resources were already intended for development and other urban functions.

14.3 GERMANY

- Name of the act/law

Gesetz über die Umweltverträglichkeitsprüfung (UVPG-Gesetz): Environmental acceptability assessment act

Landesgesetz über die Umweltverträglichkeitsprüfung (LUVPG): Environmental acceptability assessment act of the federal land Baden-Württemberg

The Strategic Environmental Assessment is a dependent part of administrative procedures for the establishment or revision of plans and programs, be adopted by an authority, government or through a legislative procedure.

- Main approaches of soil protection and soil assessment

The effects on the environment need to be comprehensively determined, described and assessed/evaluated at an early stage in the framework of impact assessment (EIA and SEA).

EIA incorporates the **direct and indirect effects** of projects, inter alia **on soil**. The project solicitor needs to provide all necessary documents to the authority.

- Need and gaps

No gaps in the legal foundations, but there are organizational difficulties in the integration of soil conservation authorities and the acceptance of their demands.

14.4 ITALY

- Name of the act/law

National: Single Act on Environment: National Law 152/06 and further modifications and integrations

Regional:

- Regional Law #12, 11 March 2005: "Land Governance Law"
- Decision of the Regional Council #351, 13 March 2007
- Decision of the Regional Board #6420, 27 December 2007

- Main approaches of soil protection and soil assessment

All laws and decisions refer to general effects on environmental media, among whom soil is specifically quoted but not defined.

Approaches of soil protection and soil assessments are mentioned only in general, delegating to regional development plans for specific approaches.

- Need and gaps

Soil protection is not defined. In practice only sealing and overall open soil consumption is considered, thus not taking into account ecosystem functions in its performance.

14.5 POLAND

- Name of the act/law

The Act on accessibility of environmental information and its protection, society participation in environmental protection and assessment of impacts on environment, 3.10.2008 (Dz. U. Nr 199, poz. 1227)

Ustawa o udostępnianiu informacji o środowisku i jego ochronie, udziale społeczeństwa w ochronie środowiska oraz o ocenach oddziaływania na środowisko (Dz. U. Nr 199, poz. 1227)

- Main approaches of soil protection and soil assessment

This regulation implements obligations coming off the Directive 2001/42/EC of the European parliament.

SEA is applied for concepts of national spatial development plans, local spatial development plans and regional development strategies as well as policies and programs in such sectors as industry, energy production, transport, water management, waste management, agriculture, tourism or land use. Decision on whether to perform the SEA or not is based on relation of the document (e.g. policy) to the environmental issues, likelihood of risks for population and environment, likelihood of transboundary effects, character of territory of interest, etc.

The SEA prognosis contains analysis of environment status within the area under possible effects of the document, information on possible transboundary effects, and assessment of predicted impacts (direct and indirect; short term and long term; positive and negative) on Natura-2000 and whole environment, especially on: biodiversity, people, animals, plants, water, air, land surface, landscape, climate, deposits of raw materials, cultural heritage, material goods. The SEA shall contain solutions to prevent, reduce or compensate negative effects on the environment.

- Need and gaps

The main gap is that word "soil" does not appear in the regulation. There are no soil protection approaches described and forced by the regulation. Requirement for assessment of impact on land surface is too broad. The impacts on soil functions could be included and considered in the process of assessment.

14.6 SLOVAKIA

- Name of the act/law

Law No. 24/2006 Code from 14th December 2005 on “Assessment of environmental impacts and on change and complements of some laws” (instead of the former law 127/1994 Code). This law is acting as joint law for SEA as well as EIA projects.

- Main approaches of soil protection and soil assessment

The objects of the assessment are potential impacts on environment for strategic documents like policies, development programmes, plans and programmes of various branches, documents of regional development and urban planning documentation. The assessment considers potential impact on the environment at two levels: national; and regional (local.) Soil assessment is a part of the obligatory evaluation. The principles and guidelines of SEA procedure are similar than in the EIA one.

- Need and gaps

For SEA projects there are no considered some aspects of soil functions, soil sealing and consumption. Also problems of good quality soil consumption are not respected in SEA projects of national significance.

14.7 SLOVENIA

- Name of the act/law

Zakon o varstvu okolja – ZVO-1 (Environment Protection Act; Official Gazette of the Republic of Slovenia, No. 41/04, last amended in 2006) is the top Act which regulates environment protection measures and other environmental protection-related issues

- Main approaches of soil protection and soil assessment

The Act provides the base for:

- Prevention and reduction of environment and soil pollution,
- Promotion of the sustainable use of natural resources (requires SEA to be considered for plans and programmes prepared for e.g. town, urban and regional planning, water management, forestry, fisheries, mining, transport, industry, waste management, energy and requires EIA for major facilities),
- Elimination of the consequences of the environment pollution (including soil) to improve the demolished ecological balance and re-establishment of its regeneration capacities.

The aim of soil protection regarding the Act is only visible in SEA for spatial plans, because its results have to be implemented in further plan adoption procedure.

The disadvantage of the Act is its universality and bylaws regarding soil topic are still missing.

15 ANNEX 3 – EXISTING GUIDELINES OF PP IN SEA

15.1 AUSTRIA

15.1.1 SEA – from Screening to Monitoring

- Name and source

The Assessment of the significance of environmental effects Screening approach and criteria applied in strategic environmental assessments functions worth of protection¹⁹, and the Strategic environmental assessment: From scoping to monitoring - Content requirements and proposals for practical work²⁰, guideline by Andreas Sommer state possible “Assessment rules for factors and interests to be protected”.

- Soil protection and soil assessment

“If applicable, consideration is to be given to:

Functions of factors to be protected - Soil and subsoil²¹ in their function as:

- A habitat for animals, plants and other organisms,
- A part of natural balance, including in particular the water and nutrient cycles,
- Decomposition, neutralisation and accumulation media,
- An area used, e.g. for settlements, transport, recreation, sports, tourism, agriculture and forestry, horticulture,
- Groundwater storage,
- Deposits of raw materials.”

15.1.2 Local Spatial Planning – Federal State Carinthia

- Name and Source

Die Strategische Umweltprüfung (SUP) in Kärnten - Handbuch zur SUP für die örtliche Raumplanung²², 2. überarbeitete und ergänzte Auflage

- Soil protection and soil assessment

There is an impact assessment matrix provided in which the effects on soil (namely on soil quality and contaminated sites) are mentioned.

15.1.3 Screening form – Federal State Lower Austria

- Name and Source

Screening Formular 2 – Abteilung Raumordnung und Regionalpolitik des Amtes der Niederösterreichischen Landesregierung – unit for spatial planning and regional policy of the federal state of Lower Austria²³

¹⁹ <http://www.umweltnet.at/article/articleview/56588/1/7241>

²⁰ <http://www.umweltnet.at/article/articleview/27812/1/7242/>

²¹ Including soil structure and type, ecological and physico-chemical characteristics, quality, geological and geomorphologic aspects (e.g. relief, slope inclination and erosion risk).

²² http://www.verwaltung.ktn.gv.at/168779p_DE-

²³ www.raumordnung-noe.at/dynamisch/showinfostand.php?id=4

- Soil protection and soil assessment

Concerning the subject of protection soil, two impacts, namely

- the use of soil (especially related to constantly populated areas and its deposit in the region) and
- the degree of sealing

have to be assessed. The state of the soil and its dynamics of development have to be described.

15.1.4 Spatial Planning Federal State Salzburg

- Name and Source

Handbuch Raumordnung Salzburg (Amt der Salzburger Landesregierung, Abteilung 7, Raumplanung, 9. ergänzte Ausgabe, 2004) - Guide Spatial Planning Federal State of Salzburg (2004)²⁴

- Soil protection and soil assessment

- Safeguarding of soil, flora and fauna;
- Economical and considerate exploitation of land, especially economical and spare handling of building land;
- Active soil policy in municipalities;
- Economical and spare soil consumption.

15.1.5 Environmental Report for Transport Planning – high-ranking transport system

- Name and Source

Leitfaden zur Erstellung des Umweltberichtes im Rahmen der strategischen Prüfung – Verkehr für Netzveränderungen im hochrangigen BundesverkehrswegeNetz (SP-V-Leitfaden), Bundesministerium für Verkehr, Innovation und Technologie, Wien, 2006, Version 2.1²⁵

- Soil protection and soil assessment

Goals:

- Reduction of soil loss via erosion and compaction,
- Keeping free of contaminated sites, potentially contaminated areas and abandoned industrial site,
- Reduction of pollution,
- Conservation of the production- and utilisation capacity of soils,
- Safe guarding of soil quality and quantity and minimisation of land consumption.

15.1.6 Alpine Convention – Protocol on Soil Conservation

Protocol on the Implementation of the Alpine Convention in the field of Soil Conservation²⁶, respectively:

Bundesgesetzblatt III Nr. 235/2002. Protokoll zur Durchführung der Alpenkonvention von 2002 im Bereich Bodenschutz (Protokoll „Bodenschutz“)

²⁴ http://www.salzburg.gv.at/themen/bw/raumplanung/rp1_publicationen/publi_haro.htm

²⁵ www.asfinag.net/plapb/plapb_start.htm

²⁶ http://www.cipra.org/documents/17_de/

- Soil protection and soil assessment

Conservation of soil functions in quality and quantity, setting measures against soil erosion, compaction and contamination, preservation of diversity of typical soils in the Alps.

If there is a risk of serious and sustained damage to the functionality of soils, protection shall, as a matter of principle, be given priority over utilisation (Art. 2(2)).

It contains single contents respectively protection regulations:

- Conservation of soils in wetlands and moors,
- Designation and management of Alpine areas threatened by erosion,
- Agriculture, pasture farming and forestry,
- Exploitation of mineral resources,
- Limiting inputs of harmful substances,
- Contaminated soils, environmental liabilities, waste management & monitoring concepts.

When assessing the spatial and environmental compatibility of large-scale projects in the fields of trade and industry, construction and infrastructure, especially in the transport, energy and tourism sectors, soil conservation and the scarcity of space in the Alpine region shall be taken into account within the framework of the national procedures (Art. 7 (3)).

- Needs and gaps

The Alpine Convention encounters a lot of laws and rules with different targets. The practical relevance cannot be appraised easily.

The goals and measures are of declarative character and only partially directly applied. The goals are considered mainly in permission processes or impact assessments.

In four out of nine Austrian Federal States there are no adequate laws for soil protection.

Monitoring reports make clear that not all goals were put into practice so far.

There is still need for the implementation of single measures into practice so far.

There is still need for the implementation of single measures.

Good practice instrument in terms of relevant goals and the necessity to establish a monitoring system. Would be best practice instrument, if monitoring and execution would function stricter.

15.2 CZECH REPUBLIC

- Name and Source

Guideline to the Department of Forest and Soil Protection of Ministry of the Environment of the Czech Republic from 1.1.1996 File No. OOLP/1 067.

- Soil protection and soil assessment

The guidelines concern soil uptake from agricultural land resources. Soils of agricultural land resources are divided into categories of protection and categories of protection including landscape planning activities.

- Needs and gaps

Most of the municipal plans were ratified before the Guideline of the Department of Forest and Soil Protection of the Ministry of the Environment of the Czech Republic from 1. 1. 1996 File No. OOLP/1 067/96 becomes valid. That means that in some cases the most quality soils of agricultural land resources were already intended for development and other urban functions.

- Name the guideline

Act No. 100/2001 Coll. on Environmental Impact Assessment and Amending Some Related Acts, as amended

- Soil protection and soil assessment

§ 2 Range of assessment, among others impact on soil is mentioned there.

§ 4 Issue of assessment of intent impact on environment with reference to app. No. 1 of the act. App. No. 3, 3s, 4 and 5 of the act featuring terms of notice, documentation and reference including information concerning impact on soil.

- Needs and gaps

There is not any significant need or gaps in national guidelines for SEA. The only needs and gaps consist in:

- Obtaining of complete databases processed in EIA and SEA intended for Planning analytic materials of Prague actualization;
- Obtaining of source materials for evaluation of goals in Prague area and materials for processing of sustainable development analyse.

In a database all EIA and SEA goals and the state in EIA process should be included, both in text and graphic form. The topic significantly characterizes real goals in area. The overview provides a comprehensive conception of possible territory development and its problems.

To establish real background for observing a development and needs in Prague territory is necessary; and to help to formulate basic functional and spatial regulators in new municipal plan of Prague and mark public works.

15.3 GERMANY

- Name and Source

“Soil status report as a part of the regional plan” can be seen as guideline for SEA for the region of Stuttgart

- Soil protection and soil assessment

It delivers the description of the soil function maps and how to use them, information to soil contamination, description of soil landscapes and bases for soil protection in the planning process with goals and best practice examples.

- Needs and gaps

The qualitative goals for a sustainable soil use are not described in detail.

15.4 ITALY

- Name and Source

National: Guidelines for SEA, Structural Funds 2000 – 2006 but still in use

Regional, but in an international context, is the Enplan Handbook (cooperation between Italy and Spain (<http://www.interreg-enplan.org/linee3.htm>))

- Soil protection and soil assessment

There's no explicit reference to the soil as environmental medium.

- Needs and gaps

As for law and regulations, in guidelines neither soil is defined as environmental medium, hence in practice only sealing and overall open soil consumption is considered, thus not taking into account ecosystem functions in its performance.

15.5 POLAND

There are no guidelines that focus on SEA available in Poland.

15.6 SLOVAKIA

- Name and Source

Guidelines for items in the environmental impacts assessment of strategic document at national level (§17 of the Law 24/2006)

Guidelines for items in environmental impacts assessment of strategic documents at regional and local level.

- Soil protection and soil assessment

The soil protection and soil assessment respects the Law No. 220/2004 on soil conservation following the Law 219/2008 (economical compensation tool – payment for agricultural soil consumption) as well as Decree No. 376/2008 (rules for payment). Especially in urban areas soils are not protected. Sites with contaminated soils (brownfields) are subjects of other laws. Guidelines use Building Law 50/1976 with its many amendments is referred to soil protection only marginally.

The procedure consists of these basic items:

1. Announcement about SEA project and comments,
2. Determination of the extent of strategic document and time schedule,
3. Report about assessment of strategic document and proposal and comments,
4. Public presentation of the report,
5. Expert expertise of the strategic document,
6. Final standpoint resulting from the assessment.

- Need and gaps:

In SEA projects there are no especially conditions referring to soil functions and other characteristics in urban areas. It refers only agricultural land which consumption in Slovakia represents about 90 %.

15.7 SLOVENIA

- Name and Source

Uredba o okoljskem poročilu in podrobnejšem postopku celovite presoje vplivov izvedbe planov na okolje (Decree laying down the content of environmental report and on detailed procedure for the assessment of the effects on certain plans and programmes on the environment; Official Gazette of the Republic of Slovenia, No. 73/05)

- Soil protection and soil assessment

The Decree provides the content and scope of environmental information to be provided by the environmental report and the procedures of implementation of a comprehensive impact assessment of the implementation plan on the environment.

The process includes analysis of potential impacts on the environment, inter alia soil, recording those effects in the environmental report, public consultation with residents on this report (public hearing). Comments are taken into account in the final decision making process.

The strategic environmental impact assessment is carried out:

- In the process of preparing a spatial plan,
- Different programmes (water management, fisheries, mining, agriculture, energy, industry, transport, waste management and waste management, telecommunications, and tourism policies) and
- Policy (economic strategy).

An SEA is designed to mainstream the environmental issues into strategic decisions. Unlike the EIA which is focused on projects. It can be seen as extension of EIA on environmental objectives and is used in the early stages of preparation of spatial plans.

Effects on soil are considered only in terms of potential impact due to pollution. Compaction and soil sealing are not considered.

16 ANNEX 4 – CASE STUDIES, BEST PRACTICE EXAMPLES FOR SEA AND TESTSITE EXPERIENCE

16.1 AUSTRIA

16.1.1 Federal State Vienna

- Name of programme or plan:

SUPer NOW - "Strategische Umweltprüfung Entwicklungsraum Nordosten Wien"²⁷ – Strategic Environmental Assessment Development Area Vienna North-East

- Main soil aspects:

- Description of the high quality of the soil in the north-east of Vienna and its use for agriculture and forestry purposes, as well as for nursery and horticulture,
- Areas with lower soil quality are used for gravel mining,
- Protection of environment and resources foresees stewardship of available resources, including lower floor loading,
- Soil and the related security of supply of agricultural products for its citizen (close to the city agricultural production),
- Reduction of soil consumption, protection and sealing,
- Active soil policy to ensure the desired development (e.g. area safeguarding, concrete area acquisition of the public authorities),
- Soil procurement and –mobilisation via budget and laws.

This example gives a good overview of envisaged possible developments and takes into account certain exploitability of soil (e.g. agriculture, forestry, urban development) and sustainable usage of soil as a non augmentable good.

- Name of programme or plan

Land use and building plan of a railway station according to the Viennese Building Act

- Main soil aspects

- Contamination

This is an example for the use of partly contaminated soil. And it raises the question of the assessment of land use changes and soil consumption in these cases. Is it really a positive impact on soil as a subject of protection when already contaminated areas are used?

- Name of programme or plan

Building plan for a subject-market

- Main soil aspects

- sealing

A very detailed balance of soil sealing rates for each alternative in this SEA raises the quality of assessment for the aspects of soil consumption.

²⁷ <http://www.wien.gv.at/stadtentwicklung/supernow/ergebnis.htm>

- Name of programme or plan

SEA of the developing region of north-eastern Vienna (SUPerNOW) Doppelt (siehe ausführlich bei 16.1.1)

- Main soil aspects
 - sealing,
 - soil consumption,
 - contamination

This was a voluntary SEA. The work on this SEA showed the needs of a data platform for all useful soil data.

- Name of programme or plan

Land use and building plan for a rebuilt hospital

- Main soil aspects
 - Soil consumption

This SEA stopped at the stage of screening because there are no significant effects on the environment. This is a positive example for good screening tables where reversible and irreversible effects as well during the building phase as during the operating phase have been assessed.

- Name of programme or plan

Connecting road between two motorways

- Main soil aspects
 - sealing

This SEA is an example for the positive effects of consultation of the environmental authorities. They have been consulted during the earliest steps of SEA and this opens the possibility for solid data use and constructive communication.

Test-Site Experience

City development area in Vienna

| SEA Soil topic | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study | |
|---|---|---|---|--|
| <u>Description of current state of soil:</u> | Soil types | Y | Not considered | |
| | Soil mapping and description of current land use | Y | No soil mapping but current landuse | |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | Y | Only verbal description | |
| | Soil functions, primarily natural soil functions | Y | Not considered | |
| | Soil pollution / contaminant loads/ contaminated sites | Y | Only estimated because of landuse | |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | N | | |
| | <u>Description and analysis of impacts/effects on soil:</u> | Envisaged possible intentions for plans and programmes | Y | A masterplan exists |
| Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | | Y | No detailed balance but estimated increase | |
| Changes of soil quality and soil functions | | Y | Described but not analysed | |
| Soil pollution (assessment of pollutant emission and deposits on soil) | | N | | |
| Evaluation of consumed square meters of soil | | Y | Only estimated, not evaluated | |
| Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | | N | Exploitability only according to thresholds of contaminations (ÖNORMen) | |
| <u>Description of measures to</u> | avoid | Protection of environment and resources foresees stewardship of available resources | N | In landuse plans the soil use is allowed according to the dedication |

| | | | | |
|---|-------------------|--|---|---|
| <u>avoid, minimize or compensate impacts/effects on soil:</u> | | Sustainable usage of soil as a non augmentable good | Y | Only words in the chapter “environmental objectives” |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | Y | But only as a suggestion |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | N | Not extra |
| | | Soil procurement and mobilisation via budget and laws | N | |
| | | Reuse of contaminated sites | N | |
| | | Use of areas with lower soil quality | Y | Not considered |
| | <u>Minimize</u> | Construction supervision on soil issues to assure proper measurement implementation | Y | As special remarks in building plans, not considered in SEA |
| | <u>Compensate</u> | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way. | N | |

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

The SEA of two plans of the evaluated city development area in Vienna ran in the beginning phase of the URBASN SMS project. So the SEA guideline was not really used. But we compared the possibilities of the guideline with the environmental report of the SEA for this questionnaire. The existence of the guideline influenced the communication in the planning phase in a positive way. The whole quality of SEA would rise by using the guideline because the necessary steps are forced to be considered.

A railroad Station in Vienna

| SEA Soil topic | | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|---|-------|---|--------------------------------|--|
| <u>Description of current state of soil:</u> | | Soil types | Y | Not considered |
| | | Soil mapping and description of current land use | Y | No soil mapping but current landuse |
| | | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | N | |
| | | Soil functions, primarily natural soil functions | Y | Not considered as soil functions but contaminants, sealing and soil water household was considered |
| | | Soil pollution / contaminant loads/ contaminated sites | Y | Only estimated because of landuse and known incidents in the past |
| | | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | N | |
| | | Envisaged possible intentions for plans and programmes | N | |
| <u>Description and analysis of impacts/effects on soil:</u> | | Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | Y | No detailed balance but current status and estimated changes |
| | | Changes of soil quality and soil functions | Y | Described but not analysed |
| | | Soil pollution (assessment of pollutant emission and deposits on soil) | Y | |
| | | Evaluation of consumed square meters of soil | Y | Only estimated |
| | | Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | N | Exploitability only according to thresholds of contaminations (ÖNORMen) |
| <u>Description of measures to avoid, minimize or compensate</u> | avoid | Protection of environment and resources foresees stewardship of available resources | N | In landuseplans the soiluse is allowed according to the dedication |
| | | Sustainable usage of soil as a non augmentable good | Y | Only words in the chapter "environmental objectives" |

| | | | | |
|--------------------------|-------------------|--|---|--|
| impacts/effects on soil: | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | N | |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | N | |
| | | Soil procurement and mobilisation via budget and laws | N | |
| | | Reuse of contaminated sites | Y | Partly brownfield reuse |
| | | Use of areas with lower soil quality | N | No soil data available |
| | <u>Minimize</u> | Construction supervision on soil issues to assure proper measurement implementation | Y | Only according reduction of sealing |
| | <u>Compensate</u> | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way. | Y | Measures for compensation against sealing (greened areas, trees, unsealed areas) and soil waterhousehold (retention areas) are mentioned |

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

The SEA of the plans of this railroad station in Vienna ran before the URBAN SMS project started. So the SEA guideline was not used. But we compared the possibilities of the guideline with the environmental report of the SEA for this questionnaire. The whole quality of SEA would rise by using the guideline because the necessary steps are forced to be considered.

Example of draft SEA screening guidance of the city of Vienna:

Urban SMS

Screening Leitfaden Schutzgut Boden – Entwurf

Erstellt von:

Dr. Isabel Wieshofer (MA 22 – Wiener Umweltschutzabteilung)

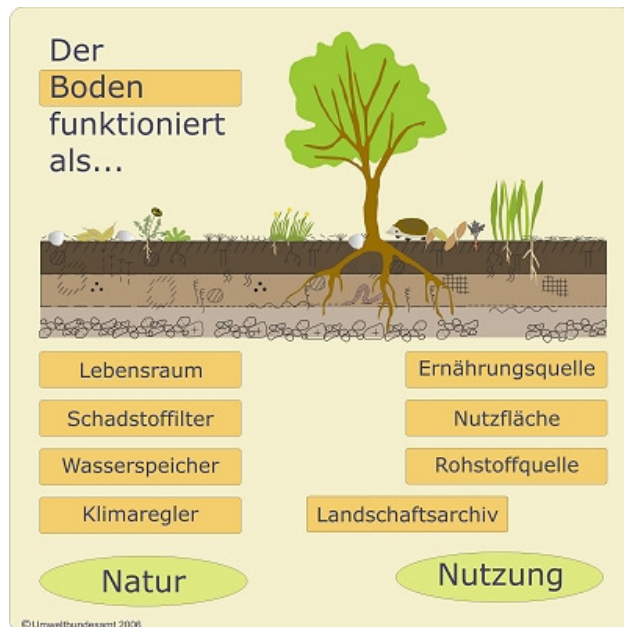
Dr. Kerstin Arbter (Büro Arbter, www.arbter.at)

Für Änderungen von Flächenwidmungs- und Bebauungsplänen ist zu prüfen, ob eine Strategische Umweltprüfung (SUP) nötig ist oder nicht. Wenn die Planänderung voraussichtlich erhebliche Umweltauswirkungen hat, ist eine SUP durchzuführen. Dies wird im Zuge einer Erheblichkeitsprüfung (Screening) ermittelt.

Dieser Screening Leitfaden zum Schutzgut Boden unterstützt VerwaltungsmitarbeiterInnen bei der Beurteilung, ob die Umweltauswirkungen auf das Schutzgut Boden voraussichtlich erheblich sind oder nicht.

Der Leitfaden ist so vereinfacht, dass VerwaltungsmitarbeiterInnen ohne BodenschutzexpertInnen in einigen Stunden die Erheblichkeitsprüfung durchführen können. Wenn für eine Planänderung eine SUP durchzuführen ist, kann die Erheblichkeitsprüfung zum Schutzgut Boden eine intensivere Prüfung im Zuge der SUP nicht ersetzen.

Warum ist “Boden” ein wichtiges Schutzgut



Quelle: Deutsches Umweltbundesamt

Der Boden erfüllt zahlreiche Funktionen. Man unterscheidet zwischen

- natürlichen Funktionen des Bodens, z. B. als Lebensraum, Wasserspeicher oder Schadstofffilter, und
- den Nutzungsfunktionen, die der Mensch für sich in Anspruch nimmt, z. B. zur landwirtschaftlichen Nutzung oder als Siedlungsfläche.

Boden ist eine nicht erneuerbare Ressource²⁸. Er ist nicht „herstellbar“, sondern bildet sich langsam über Tausende von Jahren. Deshalb müssen wir mit dem Boden sorgsam umgehen, damit wir von seinen Funktionen auch in Zukunft profitieren können.

²⁸

Vgl. Thematische Strategie für den Bodenschutz, KOM (2006) 231

Wie können Flächenwidmungs- und Bebauungspläne das Schutzgut Boden beeinträchtigen?

Die meisten Änderungen von Flächenwidmungs- und Bebauungsplänen sehen neue Bauflächen, Straßen oder Parkplätze vor. Daher sind folgende 2 Auswirkungen auf das Schutzgut Boden relevant:

1. Bodenverlust oder Bodenversiegelung
2. Bodenverschmutzung

Im ersten Schritt sollte abgeschätzt werden, wie viel m² Boden durch die Planänderung verloren gehen oder versiegelt werden könnte und mit welchem Verkehrsaufkommen (DTV – durchschnittlicher täglicher Verkehr) auf neu zu widmenden Straßen zu rechnen ist.

| Voraussichtliche Auswirkungen auf den Boden | Fläche / Verkehrsaufkommen |
|---|-----------------------------------|
| Bodenverlust oder Bodenversiegelung | m ² : |
| Bodenverschmutzung | DTV auf neu zu widmenden Straßen: |

Tabelle 1: Abschätzung der voraussichtlichen Auswirkungen der Planänderung auf das Schutzgut Boden

Sind diese Auswirkungen voraussichtlich erheblich?

Die wesentliche Frage im Screening ist, ob die Planänderung voraussichtlich erhebliche Auswirkungen auf den Boden verursacht, so dass eine SUP durchgeführt werden muss.

Vorgeschlagene Screening Grenzwerte zum Schutzgut Boden

Eine SUP sollte durchgeführt werden, wenn die Planänderung

- a) eine Versiegelung von mehr als **300 m²** hochwertiger Böden verursachen kann und/oder
- b) eine Versiegelung von mehr als **1 ha** verursachen kann und/oder
- c) eine zusätzliche Versiegelung in einem Planungsgebiet verursachen kann, in dem der durchschnittliche Versiegelungsgrad bereits größer als **80%** ist und/oder
- d) eine Bodenverschmutzung durch neue Straßen mit einem voraussichtlichen Verkehrsaufkommen von mehr als **15.000 DTV** (durchschnittlicher täglicher Verkehr) verursacht.

Wenn eine dieser Voraussetzungen zutrifft, ist mit erheblichen Auswirkungen auf das Schutzgut Boden durch die Planänderung zu rechnen. Dann ist eine SUP durchzuführen.

Erklärung der vorgeschlagenen Grenzwerte

Ad a) Versiegelung von mehr als 300 m² hochwertiger Böden

Erklärung des Grenzwerts von > 300 m²:

Das Wiener Naturschutzgesetz sieht in § 18 (2) vor, dass die Errichtung und wesentliche Änderung unterirdischer Einbauten ab einer Fläche von 300m² bewilligungspflichtig ist. Diese Regelung bezieht sich auch auf die Beeinträchtigung von Böden. Daher wurde dieser Grenzwert übernommen:

„Folgende Maßnahmen bedürfen im Grünland einer Bewilligung der Behörde:

1. die Neuanlage, Verlegung und Verbreiterung von Straßen mit öffentlichem Verkehr und Forststraßen,
2. die Errichtung und wesentliche Änderung von Anlagen mit einer zusammenhängend bebauten Fläche von mehr als 2.500 m²,
3. die Neuanlage, Verlegung und Vergrößerung von Rohrleitungen mit einem Querschnitt von mehr als DN (Diameter Nominal) 300 mm, die sie einzeln oder in gebündelter Form erreichen, sowie Rohrleitungen für den Transport von Mineralölen und chemischen Stoffen, ausgenommen Rohrleitungen innerhalb genehmigter Anlagen,
4. Geländeänderungen einer Fläche von über 1.000 m², wenn das Niveau durchschnittlich mehr als einen Meter verändert wird,
5. die Neuanlage und wesentliche Änderung von Zeltplätzen und Sportanlagen einschließlich ihrer Nebenanlagen mit einer Gesamtfläche von über 1.000 m²,
6. die Neuerrichtung und wesentliche Änderung von ober- und unterirdischen Hochspannungsleitungen über 20 kV Nennspannung,
7. die Entwässerung von Feuchtgebieten sowie von Verlandungsbereichen der Gewässer, soweit diese nicht zu geschützten Biotopen nach § 7 Abs. 2 erklärt sind,
8. die Beseitigung von Alleen und Baumzeilen, ausgenommen in Baumschulen, Gärtnereien oder Obstplantagen stockende Bäume und
9. die Errichtung und wesentliche Änderung unterirdischer Einbauten **ab einer Fläche von 300 m².**

Definition des Begriffs "hochwertige Böden":

= Böden, deren Wertzahl des Ackerschätzungsrahmens (Bodenzahl) einen Wert von 55 oder mehr ergibt.

Quelle: Bodenschätzung für Österreich des Bundesministeriums für Finanzen

Ad b) Versiegelung von mehr als 1 ha

Erklärung des Grenzwerts von > 1ha:

Der Wiener Stadtentwicklungsplan 2005 grenzt das Siedlungsgebiet, das zur Bebauung zur Verfügung steht, von den Grünflächen, die unbebaut erhalten bleiben sollen, ab. Das Siedlungsgebiet umfasst Flächen, die entweder schon bebaut oder für Bebauung gewidmet sind oder die noch nicht als Bauland gewidmet, aber für künftige Bebauung vorgesehen sind. Insgesamt umfasst das Siedlungsgebiet 50,9% der Wiener Stadfläche. Das sind 21.117 ha. 19.914 ha des Siedlungsgebiets sind bereits bebaut oder als Bauland oder Verkehrsfläche gewidmet. Das entspricht 48 % der Wiener Stadfläche. Zieht man vom gesamten Siedlungsgebiet die bereits bebauten oder als Bauland oder Verkehrsfläche gewidmeten Flächen ab, so bleiben jene Flächen, die für Umwidmungen in Bauland oder Verkehrsfläche noch zur Verfügung stehen (der "verfügbare Kuchen"). Diese Flächen betragen 1.203 ha. Das entspricht 2,9% der Wiener Stadfläche. Wenn diese Flächen verbraucht sind, ist gemäß Stadtentwicklungsplan keine weitere Siedlungsentwicklung mehr möglich. Damit steht noch eine begrenzte Flächenreserve für weitere Bauland- oder Verkehrsflächenwidmungen zur Verfügung. Wenn durch die Planänderung mehr als 1ha (das entspricht etwa 0,1% der verfügbaren Fläche) versiegelt wird, wird dies als erhebliche Auswirkung auf die nicht erneuerbare Ressource Boden gewertet. Der Grenzwert von 1ha soll kleine Nachverdichtungen ermöglichen.

- Wiener Stadfläche: 41.487 ha

- 50,9% der Wiener Stadtfläche ist entweder schon bebaut oder für Bebauung gewidmet oder noch nicht für Bebauung gewidmet, aber für künftige Bebauung vorgesehen (21.117 ha)
- 48% der Wiener Stadtfläche ist schon bebaut oder für Bebauung gewidmet (inkl. Verkehrsflächen), aber noch nicht bebaut (19.914 ha)
- 2,9% der Wiener Stadtfläche ist noch nicht für Bebauung gewidmet, ist aber für künftige Bebauung vorgesehen (1.203 ha).

Quelle: MA 18, Siedlungsflächenbilanz Wien

Ad c) zusätzliche Versiegelung in einem Planungsgebiet, in dem der durchschnittliche Versiegelungsgrad bereits größer als 80% ist

In der Literatur wird ab 80 % von "hochversiegelten Böden" gesprochen (z.B.: Meinel, Neumann 2003: Flächennutzungsentwicklung der Stadtregion Dresden seit 1790). Hochversiegelte Flächen können ökologische Auswirkungen auf ein Gebiet haben. Dies sind stadtklimatische Effekte (geringere Luftfeuchtigkeit, höhere Temperaturen, geringere Nachtabenkung), reduzierte Grundwasserneubildung, hohe Abflussraten bei Starkregenereignissen und Verdrängung der heimischen Flora und Fauna.

Quelle: Grünraummonitoring (Versiegelung)

Ad d) Bodenverschmutzung durch neue Straßen mit einem voraussichtlichen Verkehrsaufkommen von mehr als 15.000 DTV (durchschnittlicher täglicher Verkehr)

Durch den Verkehr auf stark befahrenen Straßen werden Schadstoffe emittiert, die durch den Niederschlag in den umgebenden Boden abgeschwemmt oder durch Wind verfrachtet und auf dem Boden abgelagert werden können. Nach dem Regelblatt 35 (2003) des Österreichischen Wasser- und Abfallwirtschaftsverbandes (ÖWAV) ist der Niederschlagsabfluss von Straßen mit einem durchschnittlichen täglichen Verkehrsaufkommen > 15.000 KFZ/24 h derart verschmutzt, dass es notwendig ist, das abfließende Wasser vor der Versickerung vorzubehandeln (siehe Tabelle 4, Seite 11 sowie Tabelle 5, Seite 15).

Wenn die genannten Grenzwerte in einem Fall nicht sinnvoll angewendet werden können, sind Adaptierungen in Absprache mit der MA 22 – Umweltschutz (Bodenschutz) möglich.

16.1.2 Federal State Salzburg

- Name of programme or plan

Räumliches Entwicklungskonzept (REK) Gemeinde Henndorf – Spatial Development Concept for Municipality Henndorf

- Main soil aspects

Comprehensive analysis and disquisition of subareas towards

- Soil types,
- Soil validity (agricultural production function),
- Soil functions,
- Contaminant loads/ contaminated sites,
- Raw material deposit and protection forest.

Areas with high soil value have to be protected, from the point of view of soil protection. Measures like construction supervision on soil issues are seen as absolute necessary.

Good basis collection and description of soil issues. Recommendations on how to deal with areas, especially on the regional level are given.

- Name of programme or plan

Sportplatz Strasswalchen – Sports ground Strasswalchen

- Main soil aspects

Comprehensive analysis and disquisition towards

- Soil mapping,
- Soil validity (agricultural production function) and soil quality,
- Contaminated sites/contaminant loads,
- Soil functions.

Good soil quality, the plan can only be realised with substantial additional requirements (construction recommendations) – are integrated in SEA – the obligingness remains questionable.

SEA is based on the spatial act of the federal state Salzburg. Soil is taken care of by the soil protection act of the federal state Salzburg which comprises soil function assessment as well as protection of “good” high quality soils.

Test-Site Experience

Land use change Elixhausen

| SEA Soil topic | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|---|---|--------------------------------|--|
| <u>Description of current state of soil:</u> | Soil types | Y | Has been considered |
| | Soil mapping and description of current land use | Y | Has been considered |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | Y | Security of supply of agricultural products is not discussed |
| | Soil functions, primarily natural soil functions | Y | The new guidance for soil function assessment of Salzburg was used for soil function description and assessment (on SEA level) |
| | Soil pollution / contaminant loads/ contaminated sites | Y | Briefly |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | Y | Soil protection law and alpine convention are mentioned but no discussion on compatibility of objectives |
| <u>Description and analysis of impacts/effects on soil:</u> | Envisaged possible intentions for plans and programmes | Y | no consideration |
| | Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | Y | no consideration |
| | Changes of soil quality and soil functions | Y | no consideration |
| | Soil pollution (assessment of pollutant emission and deposits on soil) | Y | no consideration |
| | Evaluation of consumed square meters of soil | Y | no consideration |
| | Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | Y | no consideration |

| | | | | |
|--|------------|--|---|------------------|
| <u>Description of measures to avoid, minimize or compensate impacts/effects on soil:</u> | avoid | Protection of environment and resources foresees stewardship of available resources | Y | no consideration |
| | | Sustainable usage of soil as a non augmentable good | Y | no consideration |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | Y | no consideration |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | Y | no consideration |
| | | Soil procurement and mobilisation via budget and laws | Y | no consideration |
| | | Reuse of contaminated sites | Y | no consideration |
| | | Use of areas with lower soil quality | Y | no consideration |
| | Minimize | Construction supervision on soil issues to assure proper measurement implementation | Y | no consideration |
| | Compensate | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way. | Y | no consideration |

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

For the questionnaire one example was chosen, in which soil aspects were assessed most properly and in an adequate form (Example: land use change Elixhausen, Salzburg).

Other examples were screened and the results presented in a general summary.

Generally description of soil and soil functions are part of the process, the new guidance on soil function assessment of Salzburg has been used. The assessment of impacts is limited to the statement, that there IS an impact on soil (statement of relevancy). Although the evaluation of “as is” situation shows a high degree of protection aspects of nature conservation are proposed for the final decision (potential for natural vegetation). In this case soil as single criteria is not considered as the deciding subject.

On SEA level soil scientific background for this assessment is not comprehensive and not very transparent.

Compensation measures are not discussed at all.

Generally assessment of effects is not presented on SEA Level. The ‘as is’ situation is described properly (for SEA level) but no real evaluation of single impacts.

Generally the usual approach for decisions in SEA is, that (high) impacts on soil or soil functions are stated properly (even if they are not described in detail), but commonly the interest in using the area for construction is the justification for made decisions and they overrule needs for agricultural use.

16.2 CZECH REPUBLIC

- Name of programme or plan

Concept: Prognosis, conception and strategy of nature and landscape protection in Prague

- Main soil aspects

Concept assessment, that estimates among others, relations between brownfield revitalization and land or open landscape appropriation for developments of housing, industrial and commercial zones. Evaluation to what degree the concept creates conditions for limitation of appropriation of land.

In Prague area occurred in the past years the most significant changes in agricultural land ratio and the area is characterized by highest urban sprawl in the Czech Republic. Arable soil and urbanized areas cover more than 70 % of the area, whereas arable soil represents 30 % of Prague territory. Current rate of urbanization at the expense of ALR is long term unbearable. High rate of urbanized areas led to marked natural conditions changes, in consequence of this has a current landscape very low degree of ecological stability.

Within the concept problems of ALR endangering by building activities were solving and municipal planning as tool of ALR protection, too. On the other hand problems of brownfields revitalization as prevention against appropriation of free land were not solved there.

In case that the scenario of PCSNLPP concept would not be realized, it is possible to await continuing of current negative trends, primarily radical decrease of high quality agricultural soils belonging to protection category I. and II., as a result of enormous pressure for gaining territories for new housing development.



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Test-Site Experience

No Information was provided.

16.3 GERMANY

- Name of programme or plan

Preparatory Land Use Plan (Flächennutzungsplan FNP) in combination with the Landscape Plan (Landschaftsplan LSP) 2010 : The Landscape Plan implements the aims of nature protection and landscape conservation and thus adds these components to municipal urban development and land use planning. The Landscape Plan supplements and counterbalances the provisions of the Preparatory Land Use Plan and elaborates on landscape as a natural life resource. It covers both settled and non-settled areas, as well as areas zoned for development.

- Main soil aspects

- Most effective way to protect soils is to avoid sealing of natural soils. Especially assessed are very fertile soils, soils with an extreme potential for natural vegetation and soils with a high potential as filter and buffer for heavy metals.
- There are marked priority areas for arable land on medium to very good soils on basis of the soil quality map.
- The usage of unsettled areas could be limited to 220 ha in the FNP 2010 (1% of the whole Stuttgart area) because of the large amount of re-use areas (in comparison: FNP 1990: 1.380 ha/ 6 %, FNP 1974: 2.500 ha/12 %).

- Name of programme or plan

Local building plan "Hohlgrabenaecker": an area of 16 ha which was mainly under agriculture use with high and very high quality soils. In August 2007 building activities for 350 residential units for 1.100 residents plus areas for infrastructure have been started.

- Main soil aspects

- Sealing of a huge amount (for Stuttgart circumstances) of soils with high and very high quality
- Compensation of soil loss is in this case not possible because no adequate areas, e.g. for removal of sealing, are available.

Soil issues have been considered and documented in detail on the bases of the soil concept of Stuttgart (BOKS).

- Name of project

Local building plan Leuzetunnel in Cannstatt

- Main soil aspects

- Sealing,
- Possible mobilisation of Chlorine-Carbon-Hydrates (CKW).

Soil issues have been considered and documented in detail on the bases of the soil concept of Stuttgart (BOKS).

- Name of project

Local building plan Enlargement of the area for housing and healthcare on the brink of district Berg

- Main soil aspects

- Economical and spare handling with field and soil,
- soils have at most just medium quality, also some contaminated sites exist
- Goals referring to soil protection in the planning area,
- Handling of contaminated excavated soil,
- Sealing and loss of soil functions, including soil degradation, rearrangement and compaction.

Soil issues have been considered and documented in detail on the bases of the soil concept of Stuttgart (BOKS). Because of the low loss of soil quality a fully compensation is possible.

Due to the protection of ground water from contaminants by sealing no measures to reduce these adverse effects are possible, taking into account interactions between soil and climate, water.

Green covering of a roof is a measure, due to inner development. But in Stuttgart this measure is not accepted as a compensation for loss of soil quality by the soil protection authority.

The examples show that the assessment based on BOKS is used and accepted. With BOKS the affected soils can be determined by a "soil indication" according to their quantity (= area size) and quality (= soil function). The change can be evaluated. This "soil indication" is supported by the "Planning Map - Soil Quality", which covers the entire Stuttgart city area. This figure indicates the soil quality as the sum of the soil functions to be protected specified by the Federal Soil Protection Act of 1998. Also anthropogenic influences as pollution and cultivation/sealing are considered. As a result the quality of soils is characterised by 6 levels (0 to 5). "Soil Index Points" are calculated in BOKS by the dimension of a planning area and the respective soil quality levels given in the planning map. This area-specific value will be reduced with every further demand on the soil in relation to the regional quality loss (= loss of soil functions).

Test-Site Experience

| SEA Soil topic | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study | |
|---|---|---|---|---|
| <u>Description of current state of soil:</u> | Soil types | Y | Soil types on base of existing soil mapping Stuttgart | |
| | Soil mapping and description of current land use | Y | | |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | N | Assessment of soil in Stuttgart in based on natural functions | |
| | Soil functions, primarily natural soil functions | Y | Points for soil quality base on the natural functions mentioned in the soil protection act | |
| | Soil pollution / contaminant loads/ contaminated sites | N | Contaminated sites are considered separately, but they are integrated in the soil quality map | |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | N | Assessment is related to soil protection act of Germany | |
| | <u>Description and analysis of impacts/effects on soil:</u> | Envisaged possible intentions for plans and programmes | N | ? |
| Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | | Y | Relevant for calculation the loss of soil resource | |
| Changes of soil quality and soil functions | | Y | Calculation of change of soil quality with index points | |
| Soil pollution (assessment of pollutant emission and deposits on soil) | | N | | |
| Evaluation of consumed square meters of soil | | N | In Stuttgart this is the same as sealing rate | |
| Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | | N | | |
| <u>Description of measures to</u> | avoid | Protection of environment and resources foresees stewardship of available resources | Y | Administration of soil index points with BOKS |

| | | | | |
|---|-------------------|--|---|--|
| <u>avoid, minimize or compensate impacts/effects on soil:</u> | | Sustainable usage of soil as a non augmentable good | Y | Sustainable Management of Building Areas Stuttgart (NBS), BOKS |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | N | There are no soil protection areas with special requirement, in general the handling of soil must be carefully, economical and sustainable, this is anchored in building and soil protection law |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | Y | Target agreement with municipality council in frame of BOKS |
| | | Soil procurement and mobilisation via budget and laws | N | ?? |
| | | Reuse of contaminated sites | Y | NBS |
| | | Use of areas with lower soil quality | Y | BOKS |
| | | <u>Minimize</u> | Construction supervision on soil issues to assure proper measurement implementation | Y |
| | <u>Compensate</u> | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way. | Y | In several laws there is a duty for compensation anchored but for soil only partly helpful. In Stuttgart we hold the opinion that compensation of soil quality is almost not possible. |

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

We think there are many parallels to the SEA processes how they are currently conducted in Stuttgart. The consideration of soil in planning process works in Stuttgart so the guidance will be useful. However it's of course no guarantee, like in Stuttgart, that the weighing of decision maker/policy has negative impacts on soil.

16.4 ITALY

- Name of programme or plan

Piano regionale di gestione di rifiuti urbani della Regione Piemonte (Urban waste management plan for the Region of Piemonte)

- Main soil aspects

Soil in one of the main aspects considered in the plan related to environmental impacts; in specific:

- Soil sealing reduction in waste disposal sites concerning new locations,
- Organic matter increase in disused landfills.

It is a good example of SEA for the urban environment as cities produce a large quantity of wastes and disposal sites (active or past) are often in proximity (or within) the City borders.

- Name of programme or plan

SEA on transport planning

- Main aspects

In SEA applied to transportation planning, effects on environment are assessed only on a parametric level proportional to the traffic flows; often also the simple assessment of pollutant emission is missing, and for sure no fallout on soil is evaluated.

As for other plans, SEA is performed on the Land Governance Plan of the Municipality of Milano and evaluates only square meters of soil consumed, not soil quality change.

For the first time, in the “exclusion procedure” for an Integrated Building Scheme (a executive planning instrument of the Municipality of Milano), where it was demonstrated that the whole SEA procedure was not necessary, the Regional Environmental Protection Agency of Lombardy asked anyway for a pre-emptive compensation of consumed soil: an equivalent green surfaces was to be allocated and made available to the public in the surrounding of the consumed one.

16.5 POLAND

- Name of programme or plan

Types of investments supported by the Program were assessed based on 35 criteria combined into 3 main groups: Environment friendly development; Life quality; Ecological safety. Soil issues are somewhat addressed in group 1 (as reduction of contaminants input to soil; balanced land use) and group 3 (diversity of rural landscape; sustaining of land retention capacity).

- Main soil aspects

Operational Program Infrastructure and Environment

16.6 SLOVAKIA

- Name of programme or plan

Land use change and complements of the zoning plan of Bratislava (SEA project)

- Main soil aspects

The main goal is to achieve the land use change of the zoning plan in order to create new areas for the multifunctional hall (for ice hockey) including training areas and other infrastructure for the World championship in ice hockey in 2011 in Bratislava.

The district Nove Mesto, where the land use change was conducted, is the area with most sportive use and with a good developed infrastructure. In this area, two projects for a primary school and bicycle stadium were cancelled and will be built on another location, due to the foreseen development for the multifunctional hall.

Test-Site Experience

| SEA Soil topic | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study | |
|--|---|---|---|---|
| <u>Description of current state of soil:</u> | Soil types | Yes | Instead of soil types there is used land evaluation units (comprising climate, soil types, soil depth, stoniness, exposure, slope and texture) | |
| | Soil mapping and description of current land use | Yes | Some results are provided in the Municipal land use plan | |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | Yes | Soil quality is derived from the land evaluation units – 9 soil quality categories, inner urban area is not categorized, only agricultural land | |
| | Soil functions, primarily natural soil functions | No | Soil functions are not considered | |
| | Soil pollution / contaminant loads/ contaminated sites | Yes | Contaminated sites are considered separately as there are available | |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | No | | |
| | <u>Description and analysis of impacts/effects on soil:</u> | Envisaged possible intentions for plans and programmes | No | Not directly to soil |
| Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | | Yes | Calculation of soil loss (area size) | |
| Changes of soil quality and soil functions | | No | | |
| Soil pollution (assessment of pollutant emission and deposits on soil) | | No | | |
| Evaluation of consumed square meters of soil | | Yes | Only as calculation of soil loss | |
| Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | | No | | |
| <u>Description of measures to avoid, minimize</u> | avoid | Protection of environment and resources foresees stewardship of available resources | Yes | According to the Act on Nature and Landscape Protection |
| | | Sustainable usage of soil as a non augmentable | No | |

| | | | | |
|--|-------------------|--|-----|---|
| or compensate impacts/effects on soil: | | good | | |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | Yes | Using the Act on Soil Protection, in practice there are many exceptions |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | No | Not known. |
| | | Soil procurement and mobilisation via budget and laws | No | |
| | | Reuse of contaminated sites | Yes | According to the Act on soil rehabilitation and revitalization |
| | | Use of areas with lower soil quality | Yes | Not general practice |
| | <u>Minimize</u> | Construction supervision on soil issues to assure proper measurement implementation | | |
| | <u>Compensate</u> | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way. | Yes | Soil is protected by economical tool according to Act 219/2008 – respecting soil quality not soil functions |

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

It is hardly distinguish separately procedure or methods for SEA and EIA (the environmental impacts are seen to be the same). If there will be accepted and adopted Guidelines on SEA – there will be practicably problem on data provision and working. There will emerge a new demand on soil data (maps, databases, limits values). Mainly data referring to soil functions are not available and not known. Area of inner urban development is not well surveyed and there is a need to complete it.

16.7 SLOVENIA

- Name of programme or plan

„OPPN Gaberje jug – II.del“ - Municipal detailed spatial plan for the area of south Gaberje; ex metallurgy company site

- Main soil aspects

- Contaminated soil due to past industrial activities of zinc and sulphuric acid production

Soil in this area is highly degraded and polluted by past industrial activities of zinc and sulphuric acid production. So the area presents a risk to human health (emissions of particular matter, heavy metals and asbestos) and water (leaching pollutants into groundwater and surface water). The area is intended for re-urbanisation (preferential future urbanisation area) into service, commercial and residential area.

In the process of SEA of the detailed spatial plan the soil was evaluated in terms of pollution with the class D (the impact is significant). Therefore the process of adopting the plan stalled and has to be complemented with the planned rehabilitation measures to reduce environmental impact.

The process of new plan preparation has started at the time of old legislation (2002). If the process would be quicker there would not have been the possibility that the Ministry of the Environment and Spatial Planning would on base of high soil pollution decide to undergo an SEA. And without it the sealing of this area would be carried out without appropriate remedial measures. This would represent a risk to human health.

Using the procedure of SEA for this area was obtained:

- Systematic review of relevant environmental issues,
- Better understanding of the environmental impacts of the plan,
- Increased transparency in decision-making process,
- Guidelines for implementation of the plan to mitigate the effects on the environment.

- Name of programme or plan

„OPPN za območje Splošne bolnišnice Celje“ - Municipal detailed spatial plan for the area of Celje General Hospital

- Main soil aspects

This area has, on the basis of past research, a slightly higher amount of Cd and Pb in soils. The main problem of this area is the high risk of flooding and therefore the risk of effusion of different hospital wastes into water, groundwater and soil.

During the process of preparation of a new detailed spatial plan, the special situation and needs of this area were considered. One of the requests was to provide even more green areas for hospital patient. And due to slightly higher amount of Cd, a detailed soil treatment/care programme during building works was prepared and accomplished to prevent dust formation during the area excavation. Additional special measures were stressed to prevent transfer of hospital dangerous wastes into water and consequently into soil in case of floods.

Test-Site Experience

OPPN Gaberje jug – II. lrel (Municipal detailed spatial plan for the area of south Gaberje; ex metallurgy company site)

| SEA Soil topic | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study Y/N | Comments |
|--|---|--------------------------------|---------------------------------------|--|
| <u>Description of current state of soil:</u> | Soil types | N | N | The area is highly polluted in some parts, planned use predicts very high percentage of sealed area |
| | Soil mapping and description of current land use | Y | partly | No soil mapping was done; only description of current land use |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | N | Y | Criteria are not relevant because no agricultural use was there before, only some small gardens in front of workers houses. Planned use predicts high percentage of sealing, no agricultural use. The area is brownfield and will be remediated. |
| | Soil functions, primarily natural soil functions | partly | Y | Only water retention and indirectly microclimate function of soils on this area are relevant. This (potential loss of water retention) is also calculated in environmental report. |
| | Soil pollution / contaminant loads/ contaminated sites | Y | Y | High amount of heavy metals is highlighted – indirect risk of current status in summer months for citizens via wind erosion – urgent need on remediation; also potential under surface high tar concentrations are mentioned in connection with soil pollution and possible ground water pollution |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | N | N | |
| <u>Description and analysis of</u> | Envisaged possible intentions for | N | N | ? |

| | | | | | |
|--|----------|---|---|---|---|
| impacts/effects on soil: | | plans and programmes | | | |
| | | Soil consumption and sealing (sealing rate), Soil sealing rates for each programme model | Y | Y | Detailed tables of calculated amount of excavated soils based on maximum allowed buildings surface and depth of excavation for cellars. Also calculation of predicted storm water. |
| | | Changes of soil quality and soil functions | Y | Y | Evaluation from soil functions view (water retention,...) not in soil quality – it could be even improved |
| | | Soil pollution (assessment of pollutant emission and deposits on soil) | Y | Y | |
| | | Evaluation of consumed square meters of soil | Y | Y | |
| | | Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | Y | Y | Only in sense for urban development and lowered pressure on peri-urban areas |
| <u>Description of measures to avoid, minimize or compensate impacts/effects on soil:</u> | avoid | Protection of environment and resources foresees stewardship of available resources | Y | Y | Due to high pollution with heavy metals only indirect impact was mentioned – need for comprehensive and thorough remediation |
| | | Sustainable usage of soil as a non augmentable good | Y | Y | Due to pollution soil was not treated as natural resource |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | Y | Y | Best soils are protected with state act; the area is within city borders and is planned for industrial, residential use and services. Soil value was not measured as soils are polluted and foreseen for cleaning/disposal on a hazardous land fill |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | Y | Y | Only indirect, with foreseen high sealing and use factor - protection of areas on city limits |
| | | Soil procurement and mobilisation via budget and laws | Y | N | No state act or law predicts this and was therefore not done |
| | | Reuse of contaminated sites | Y | Y | After thorough cleaning of the whole area |
| | | Use of areas with lower soil quality | Y | Y | Reuse of current brownfield |
| | Minimize | Construction supervision on soil issues to assure proper measurement | Y | Y | Special treatment and disposal of polluted soil is predicted; detailed procedure will follow in EIA |

| | | | | | |
|--|------------|---|---|---|---|
| | | implementation | | | |
| | Compensate | <p>Obligation of measures to protect soil and its functions</p> <p>E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way.</p> | Y | Y | <p>Based on its pollution no direct protection measures will apply in this case, only cleaning of soil and possible reuse and for good welfare additional green roofs and smaller green areas with water (fountains) are foreseen.</p> <p>In general when preparing plans there are no obligations for soil protection, just soil loss mentioned, not even quantification of soil loss area, its volume and quality</p> |

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

Facing lack of information on detailed soil pollution and possible tar areas/pits a general SEA for planned use of area was made. In updated version also some guidelines from Guidance were taken into account to even improve quality of SEA that is not obligatory by national Decree. Facing problems with not adequate national Decree that sets limits for possible land use on polluted soils (no differentiation on allowed pollution by different planned activities there) majority of the area is treated as very polluted and only removal with disposition of soil to hazardous land fill or stabilization with concrete on site is foreseen. Only these two possibilities for soil management are weakening possibilities for optimal, cost-effective remediation of the test site which could even enable better spatial solutions (more green areas and trees ...).

We think this Guidance is very useful, offering many detailed sub-objectives and criteria that should be reconsidered when making a SEA and are not common to current SEA evaluation practices. Perhaps only quantification for all criteria is missing to make assessment easier and more independent from evaluators opinion on soil importance/investors requirements on minimization of potential impacts.

17 ANNEX 5 – EXISTING LEGAL REQUIREMENTS OF PP IN EIA

17.1 AUSTRIA

- Name of the act/law

Environmental Impact Assessment Act (UVP-G 2000)²⁹

- Main approaches of soil protection and soil assessment

The EIA is a clear quality improvement over previous project licensing instruments, and is thus an important step towards precautionary and integrative environmental protection.

The objectives of the EIA are to:

- Prevent environmental damage beforehand, according to the precautionary principle,
- Regard environmental effects from an integrative and comprehensive point of view, and not just section-wise,
- Achieve improved project planning and approval procedures,
- Integrate environmental concerns into the evaluation and decision-making procedure, giving them the same amount of attention as any other concerns,
- Make the project approval procedure more transparent and explicit by involving the public.

The main objective is to **secure the soil functions** as a basis of livelihood for humans, animals, plants, ecosystem functioning with its water cycle and cycles of matters, and genetic resources. In terms of quantitative soil conservation, EIA shall contribute to avoiding unnecessary land consumption and to **conservation of soils in their laminar spreading and diversity**.

General planning goals:

- Preserving the productivity of soils and preventing soil consumption,
- Taking into account the sensitivity of soil and soil use,
- Limitation of laminar soil destruction and soil sealing towards the indispensable necessary degree,
- Furthest possible conservation of the soil functions when implementing projects in undeveloped areas.

Influence of proposed project on quantitative and qualitative soil aspects:

- Changes of the natural soil functions that need to be taken into account:
 - Habitat,
 - Filter,
 - Regulation,
 - Land use and production and
 - Archive for physical and cultural heritage.

²⁹ [UVP-G 2000 idgF.](#)

17.2 CZECH REPUBLIC

- Name of the act/law

Act No. 334/1992 Coll., on protection of agricultural land resources, as amended

The Decree No. 13/1994 Coll., governing some details to protection of ALR

Act No. 289/1995 Coll., on forests (land protection with role of the forest), as amended

Act No. 114/1992 Coll., on nature and landscape protection, as amended

- Main approaches of soil protection and soil assessment

Compared to SEA, soil protection concerns and implementation of specific measures to reduce negative effects have a higher intent.

Protection of soil is regulated via the following rules:

- Rules enabling intervention into agricultural land resources; temporary or permanent exemption of soils from agricultural land resources,
- Rules to minimize production and ecologic soil functions, regarding e.g. Exemption of soils, plough layer management or reclamation,
- Rules in forest soils protection, vegetation growing on forest soils and functions,

In some cases duplicate soil preservation occurs. Some areas have a higher level of protection as significant landscape elements or specially protected area.

17.3 GERMANY

- Name of the act/law

Gesetz über die Umweltverträglichkeitsprüfung (UVPG-Gesetz): Environmental acceptability assessment act

Landesgesetz über die Umweltverträglichkeitsprüfung (LUVPG): Environmental acceptability assessment act of the federal land Baden-Württemberg

Baugesetzbuch (BauGB): Building Act of the Federal Republic of Germany

- Main approaches of soil protection and soil assessment

The effects on the environment need to be comprehensively determined, described and assessed/evaluated at an early stage in the framework of impact assessment (EIA and SEA).

EIA incorporates the **direct and indirect effects** of projects, inter alia **on soil**. The project solicitor needs to provide all necessary documents to the authority.

No gaps in the legal foundations, but there are organizational difficulties in the integration of soil conservation authorities and the acceptance of their demands.

In the case of building development plans interests of environmental protection in particular the impacts on soils are to be taken into account. The interests of agriculture and forestry are also to be taken into account.

With ground and soil should be dealt with economically and carefully. Measures for the inner urban development have to be used. Measures for avoidance and for the compensation of substantial interventions have to be considered (intervention regulation according to nature protection act).

- Need and gaps

The sparingly, carefully and economically handling of soil is an indefinite legal term. Therefore in practice the effectiveness of these requirements is low. Particularly regarding the building legislation the influence of the administration for soil protection is restricted because the municipalities have the planning authority. No gaps in the legal foundations, but there are organizational difficulties in the integration of soil conservation authorities and the acceptance of their demands.

17.4 ITALY

- Name of the act/law

National:

- (National) D.Lgs 152/2006, (Regional) L.R. 40/1998
- Decree of the President of the Council of Ministries (D.p.c.m.), 27 December 1988

Regional:

- Regional Law #20, 3 September 1999, modified by Regional Law #5, 2 February 2010

- Main approaches of soil protection and soil assessment

Variations that the proposed project can cause on the evolution of geodynamic processes - both exogenous and endogenous need to be identified. Compatibility measures of project actions with a balanced use of natural resources need to be specified. Analysis on soil and subsoil are therefore carried on, in a proper territorial domain and timeframe for the kind of project and for the current status of the affected environment, through:

- Geo-lithological and geostructural characterization of the involved land, identification of seismic of the area and description of possible volcanic phenomena.
- Hydro-geological characterization of area directly and indirectly affected by the project, with a specific focus on infiltration and underground water circulation, existing underground water tables and its surface evidences (sources, wells), vulnerability of aquifers.
- Geomorphologic characterization and identification of ongoing land-shaping processes, with a specific focus on erosion and sedimentation phenomena and for massive displacements (slow displacements in regulate, landslides), as well as for evolutionary tendencies of slopes, of alluvial plains and coastlines possibly affected;
- Determination of soil and rock mechanics parameters, relating to stability problems of slopes.
- Characterization of soils in the area affected by the proposed project, with a specific focus on physical and chemical of soil, to its biotic components and to their interactions, as well as to the genesis, to the evolution and to the capacity (yeld) of the soil
- Geochemical characterization of solid (minerals, organic matter) and fluid (water, gases) phases in soil and subsoil, with a specific focus on elements and natural compounds of nutritional and toxicological relevance.

Every geological, geomorphological and geopedological characteristic and phenomenon will be examined as an effect of endogenous and exogenous dynamics, as well as of human activities and subsequently as the product of a series of transformations, which result is detectable by a survey and is predictable for the future, both with and without realization of the project proposed.

In this framework seismic and geological risks (broadly speaking) will be defined – for the enlarged area affected by the project – in correspondence of events variously predictable

(seismic or volcanic activity, landslides, extreme weather and sea conditions, ...) and with a varying extent descending from human activity on the chosen site.

(...)

E. Ecosystems. Aim of the characterization of mechanisms and of quality of an environmental system is to establish meaningful effects provoked by the project on the ecosystem and on ecosystem units residing in it. Analysis relating to ecosystems is performed through:

a) Identification on the map of ecosystem units, natural or anthropic, residing on the land affected by the intervention:

b) a qualitative, at least, characterization of the structure of ecosystems themselves through the description of the corresponding abiotic and biotic components and of their dynamics, with a specific focus on both the role played by food chains on transportation, on possible accumulation phenomena and on shift of pollutants to other species and to human beings, as well as on their self-depuration power.

c) When the situation requires them, direct surveys on maturity of ecosystems and on their quality.

d) The assessment of change in biodiversity between the actual situation and the potential one in the concerned habitat, referred to more significant species (vertebrate fauna, vascular plants and aquatic macro- invertebrates). In specific actual ecological diversity will be compared with the best hypothetic case corresponding to similar areas in a undisturbed and totally natural state. Critical aspects will be also examined through the analysis of identified highly vulnerable situations relating to existing pressures and to present deterioration status.

Specific soil protection measures are delegated to municipalities.

- Need and gaps

The regional government has a preventive and integrated approach about direct and indirect environmental impacts (also for soil and subsoil); every activity about EIA measures follows these approaches.

In fact, even if the attachment to the first D.p.c.m. on 1988 is very detailed, the assessment of effects is performed only on sealing and on overall land consumption, because of lack of expertise both on the side of the submitter than on the side of the evaluator (the public authority).

17.5 POLAND

- Name of the act/law

The Act on accessibility of environmental information and its protection, society participation in environmental protection and assessment of impacts on environment, 3.10.2008 (Dz. U. Nr 199, poz. 1227)

Ustawa o udostępnianiu informacji o środowisku i jego ochronie, udziale społeczeństwa w ochronie środowiska oraz o ocenach oddziaływania na środowisko (Dz. U. Nr 199, poz. 1227)

- Main approaches of soil protection and soil assessment

EIA is applied for activities/investments that usually (due to character of activity) affect or may potentially affect the environment. The list of activities to undergo the EIA is contained in another regulation.

The regulation is the Decree of the Government on types of activities/investments that may significantly affect the environment and qualification for EIA (9.11.2004).

Rozporządzenie Rady Ministrów z 9 listopada 2004 r. w sprawie określenia rodzajów przedsięwzięć mogących znacząco oddziaływać na środowisko oraz szczegółowych uwarunkowań związanych z kwalifikowaniem przedsięwzięcia do sporządzenia raportu o oddziaływaniu na środowisko (Dz. U. Nr 257, poz. 2573, z późn. zm.)

The above decree contains two groups of activities: group 1 for which EIA is always required and group 2 that may potentially have a negative impact and applying EIA depends on various circumstances (e.g location).

EIA involves assessment of an activity/investment impact on environment, health and life conditions of human beings, material goods, cultural heritage, raw materials availability. The assessment must contain approaches for mitigation of negative impacts of the proposed investment as well as required monitoring range. The monitoring is assumed to allow assessment of actual impacts during activity period and correction of mitigation efforts if needed. An integral part of the EIA is analysis of impact on Natura-2000 areas.

EIA must be submitted before approval of the investment project.

Soil issues are taken into account when qualifying activities with potential environmental effects (group 2 of activities) for EIA procedure. The EIA must be performed for projects located in the neighbourhood of muck soils and those with shallow water level, soils with excessive contaminants contents, lands with high biodiversity and forest lands.

- Need and gaps

Impact assessment on soil functions is urgently needed would be very helpful.

17.6 SLOVAKIA

- Name of the act/law

Law No. 24/2006 Code from 14th December 2005 "On assessment of environmental impacts and on change and complements of some laws" (instead of the former law 127/1994 Code)

- Main approaches of soil protection and soil assessment

The main objectives of the law are assessment of direct and indirect impacts of proposed activities on the environment incl. determination of measures to prevent environment deterioration or contamination. Activities are evaluated according to threshold limits for obligatory assessment (part A); and for inquiry action (part B).

The main approaches of the EIA projects are to:

1. Find, describe and assess direct or indirect impacts on environment including impacts exceeded state boundaries,
2. Clarify and comprise advantages and disadvantages of proposed activity including of the comparison of zero option,
3. Determine measures for prevention of environment pollution, for pollution mitigation or avoid environment deterioration,

4. Gain expert background for decision making process and approve.

The environmental impacts on soil are designed into some parts:

- General description, natural conditions,
- Soil condition – soil types, soil texture, land evaluation unit, and soil quality description,
- Evaluation of supposed impacts on soils,
- Evaluation of sensibility/vulnerability on soils,
- Proposal of measures for impact mitigation.

- Need and gaps

To extent soil protection into urban area

17.7 SLOVENIA

- Name of the act/law

Uredba o vrstah posegov v okolje, za katere je treba izvesti presojo vplivov na okolje (Decree on the categories of activities for which an environmental impact assessment is mandatory; Official Gazette of the Republic of Slovenia, No. 78/06, last amended in 2007 and 2009)

- Main approaches of soil protection and soil assessment

The Decree specifies the type of interventions into environment and the criteria for which interventions EIA is mandatory and those interventions where EIA has to be made if a certain volume is exceeded (e.g. quantity of product, number of livestock).

Environmental impact assessment (EIA) is mandatory for the following interventions:

- infrastructure (e.g. roads, railways, airports, ports, water pumping stations, treatment plants, gas pipelines, oil pipelines, electric lines), tank farms, power stations, incinerators, industry (smelter, foundry, metallurgy, chemical processes, electrolytic processes, paper mills), agriculture (farm), refineries, nuclear fuel processing.

EIA is a process which ensures that in the stage before the adoption of certain intervention environmental impact, due to prejudice is identified and measures to reduce the impact of facility on the environment are included. On the basis of report on the environmental impacts of the facility environmental approval is obtained.

- Needs and Gaps

Regulation is less effective for soil erosion protection and soil compaction as it does not restrict directly intensive agriculture.

18 ANNEX 6 – EXISTING GUIDELINES OF PP IN EIA

18.1 AUSTRIA

18.1.1 EIS Guidelines – Information for Environmental Impact Statements

- Name and Source

EIS Guidelines – Information for Environmental Impact Statements³⁰

- Soil protection and soil assessment

Soil can be affected from a quantitative as well as a qualitative point of view by projects. Especially the effects on natural soil functions need to be taken into account, especially its function as a habitat, filter, buffer, storage and production.

18.1.2 EIA-Projects – Methodological guidelines for authorities and project solicitors

- Name and Source

EIA-Projects – Methodological guidelines for authorities and project solicitors³¹

- Soil protection and soil assessment

Soil and subsoil and its function as:

- Habitat for animals, plants and other organisms,
- Component of the ecosystem, especially with its water- and nutrient cycles,
- Degradation/decomposition-, compensation- and composition medium,
- Useable surface, e.g. for settlement, traffic, recreation, sports, tourism, agriculture and forestry, horticultural use,
- Ground water reservoir,
- Deposit for raw materials/resources.

Interaction processes between water, soil, flora and fauna.

18.2 CZECH REPUBLIC

- Name and Source

Act No. 100/2001 Coll. on Environmental Impact Assessment and Amending Some Related Acts, as amended

- Soil protection and soil assessment

All possible impacts on soil of proposed projects need to be documented and assessed.

³⁰ <http://www.umweltbundesamt.at/fileadmin/site/publikationen/REP0184.pdf>

³¹ <http://www.salzburg.gv.at/pdf-leitfaden-uvp-2.pdf>

18.3 GERMANY

18.3.1 Environmental compartment soil in the compensation regulation

- Name and Source

Guideline of the ministry of environment Baden-Württemberg (2006): Das Schutzgut Boden in der naturschutzrechtlichen Eingriffsregelung (The environmental compartment soil in the compensation regulation)

- Soil protection and soil assessment

The guideline enables the quantitative determination of functional soil losses on the basis of soil evaluation. Thereby the impacts of encroachments, e.g. sealing, excavation or compaction caused by construction damage, and the compensation requirements could be determined. Thereby the soil quality as well as the size of the area is considered. The guideline contains suggestions for compensation measures and the calculation of the compensation effect. The instrument is often applied but not in all planning processes. The main users are the planning offices of municipalities or other initiators of projects (not according to the building legislation).

- Needs and gaps

The guideline has not legally binding up to now. Deficits may be compensated by relatively small payments. In planning processes according to the building legislation, deficits can be ignored within the weighing process. Compensation measures on the legal base of the nature protection act usually compensate other environmental compartments and not the soil. Urgent measures for the inner development cannot be induced on legal regulations of nature protection and at the same time the compensation payments cannot be used for sustainable inner development.

18.3.2 Guidelines for the Assessment of soils according to their performance

- Name and Source

Leitfaden "Bewertung von Böden nach ihrer Leistungsfähigkeit" - Guideline for the assessment of soils according to their performance (Umweltministeriums Baden-Württemberg, 1995)

- Soil protection and soil assessment

Assessment of soil according to their performance - most important soil functions to be evaluated and considered in planning processes:

- Natural soil fertility
- Regulation of water balance
- Filter and buffer
- Habitat for specific natural vegetation (biodiversity)

- Needs and gaps

Proposals that could be implemented in planning processes:

- Steering soil consumption on soils with low performance
- Protection of soils with a very high and high performance regarding soil functions
- Steering soil consumption by a compensation regulation
- Minimization of land consumption by inner urban development

18.4 ITALY

- Name and Source

National:

EIA guidelines – National Agency for the protection of the Environment (ex-ANPA, now Ispra) – 2001

Regional:

Handbook for the Environmental Impact Assessment – Lombardy Region - 1994

- Soil protection and soil assessment

- Identification of potential negative impacts of a project on the soil:
 - Increase of hydro-geological risks following the alteration (direct or indirect) of the hydraulic structure of waterways and of the appurtenant areas,
 - New or increased safety problems for inhabitants of areas affected as a consequence of the increased risk of landslides provoked by the project,
 - Indirect erosion of coastlines following the reduction of transportation of solid matter by waterways,
 - Unjustified consumption of fertile land,
 - Unjustified consumption of underground resources (excavation materials, minerals),
 - Alteration of the present soil structure,
 - Actual or potential subsidence phenomena,
 - Undue use of soil for the disposal of waste materials,
 - Soil contamination caused by storage of materials containing dangerous substances,
- And of potential positive impacts:
 - Reduction of existing risks of hydro-geological damage through actions connected to the project,
 - Reclamation of fertile soils,
 - Elimination or reduction of present polluted areas,
- Identification of potential negative impacts of a project on ecosystems:
 - Alteration in the spatial structure of existing eco-mosaics and consequent losses of overall ecosystem functionality,
 - Alterations in the level and/or in the quality of existing biodiversity and consequent losses of overall ecosystem functionality,
 - Overall loss of naturalness in involved areas,
 - Fragmentation of overall ecologic continuity in the affected land,
 - Negative impacts on aquatic ecosystems as a consequence of the lack in maintenance of minimum vital flow in waterways,
 - Interruption of ecological continuity in running water ecosystems,
 - Eutrophication of ecosystems in lakes, lagoons or sea,
- Potential positive impacts:
 - Creation, through mitigation or compensation actions, of new elements helping recovery of ecosystem equilibrium in areas suffering present ecological damages.

- Needs and gaps

As for law and regulations, in guidelines the assessment of effects is performed only on sealing and on overall land consumption, because of lack of expertise both on the side of project

solicitor than on the side of the evaluator (public authority). Urban soil and soil sealing are mentioned only marginally.

18.5 POLAND

- Name of programme or plan

Ministerstwo Rozwoju Regionalnego. Wytyczne w zakresie postępowania w sprawie oceny oddziaływania na środowisko dla przedsięwzięć współfinansowanych krajowych lub regionalnych programów operacyjnych. 5.05.2009

Ministry of Regional Development - Guidelines for procedures concerning EIA for investments co-financed from national or regional operational funds.

- Main soil aspects

The guideline contains rather administrative instructions to follow within EIA process for investments co-financed by operational funds. It does not introduce additional guides regarding the assessment besides what is contained in the act on accessibility of environmental information and its protection, society participation in environmental protection and assessment of impacts on environment, 3.10.2008 (Dz. U. Nr 199, poz. 1227).

Formal procedures are described for the transitional period before EU and national regulations are fully integrated. It is stated that EU directives have priority over national regulations for investments funded by operational funds (e.g. Directive 2001/42/WE). The procedure involves screening (what investments), scoping (what information required for EIA) and range of impacts to be assessed. It is stated in the guidelines that the EIA for the EU funded investments must contain impact on soil, e.g. input of contaminants to soil.

18.6 SLOVAKIA

- Name and Source

Guidelines for items in the environmental impacts assessment of proposed activities
Methodology for the environment vulnerability assessment (EIA 2004)

- Soil protection and soil assessment

Direct impacts on the environment inputs:

- Total consumption,
- Soil sealing areas, (ha, agricultural land, forest land, land evaluation units, temporary and permanent consumption),
- Soil characteristics:
 - Land use,
 - soil type,
 - soil texture and land evaluation,
 - degree of vulnerability on mechanical and chemical degradation,
 - quality and degree of soil contamination,
- Impacts on soil:
 - Manner of land use,
 - contamination,
 - soil erosion, etc.,

In the urban planning documentation about 90% of agricultural land is considered for consumption. The protection of the high value (most fertile) soils is restricted factor of urbanization development. Respecting the Law 220/2004 Code, newly 219/2008 Code and Direction of the government 276/2008 soils of high quality are protected against to land consumption by economical instrument (payment for each m²). The proposal of urban planning documentation deals not only with building plan but also impacts on agricultural land and environment.

- Needs and gaps

In the described assessment some aspects or some characteristics are missing like respecting degree of soil consumption and sealing, soil functions in the landscape, share of soil on 1 inhabitant in the cities.

- Unclear regulations regarding soil consumption,
- Not respecting all soil functions in the landscape.

18.7 SLOVENIA

- Name and Source

Uredba o obremenjevanju tal z vnašanjem odpadkov (Decree on burdening of soil with waste spreading; Official Gazette of the Republic of Slovenia, No. 34/08)

- Soil protection and soil assessment

This Decree lays down:

- The conditions with burdening of soil by entering waste,
- Compulsory treatment at planning and execution of the input of excavated soil or artificially prepared soil to improve the ecological condition of the soil.

This Decree defines excavated material (upper ground – soil, stones and mineral sediments) as waste. If this material has values of several pollutants lower than action values, defined in this Decree (for example, Cd < 1 mg/kg of dry weight of material) it can be used again for reuse of soil on agricultural land, on non-agricultural land, land filling and filling the ground after extraction. Otherwise it is treated as real waste and has to be deposited due to regulations, dealing with waste disposal.

If total amount of excavated material is higher than 30.000 m³ a special environmental permission for disposal has to be issued (procedure R10).

- Name and Source

Uredba o vsebini poročila o vplivih nameravanega posega na okolje in načinu njegove priprave (Decree on the content of report on the effects of intended activity into the environment and its method of drawing up; Official Gazette of the Republic of Slovenia, No. 36/09)

- Soil protection and soil assessment

Based on EIA Decree this detailed decree is prepared. It gives the instructions how to prepare a report with the effects of intended activity into the environment. Within it soil related impacts are covered, we can say, on a general level as:

- Description of the soil quality and its other characteristics,
- Description of predicted land use/soil consumption,
- Type and amount of intended activity emissions into the soil.

The reason why in the report effects of intended activity on the soil remain mostly on this general effect description is that in Slovenia there are no special regulations, limit values (except for soil



contamination with heavy metals) or other legislation which would give more detailed instructions and stated indicators how soil quantity in connection with quality should be evaluated.

19 ANNEX 7 – CASE STUDIES, BEST PRACTICE EXAMPLES FOR EIA AND TESTSITE EXPERIENCE

19.1 AUSTRIA

19.1.1 Federal State Vienna

- Name of project
“Hauptbahnhof” – Main Railway station

- Main soil aspects
 - Contamination: the whole project area is investigated in a 50m raster. More than 100 samples have been analysed. In 2 blocks contaminated soil was disposed.
 - Changes in ground level: more than 170 deep samples have been taken between 1993 and 2007. The building activities in the area lead to an increase of the carrying capacity of the ground.
 - Soil-consumption: a balance of consummated area and the percentage of the whole area are listed in the environmental impact statement. Differed in sealed/unsealed and public places/public green area.

Each subject of protection is specified, also the interactions between them. Therefore all impacts on the interactions between soil and other subjects of protection (e.g. air, water) are included in the environmental report.

- Name of project
Vienna Airport – 3rd airstrip

- Main soil aspects
 - Some archaeological soil monuments have been found in the investigated area, for example bomb craters. This is an example for consideration of archive function of soil.
 - The natural structure of soil is disturbed by the movements. In the construction phase the building of parallel airstrips is necessary. Agricultural soils are used for this. Humous topsoil's are constraint to be removed in layers.
 - To minimize wind-erosion of soil during the construction phase open soil is recultivated immediately.

- Name of project
MVA Pfaffenau – municipal waste plant

- Main soil aspects
 - Airborne soil contamination: Heavy metal and organic pollutant deposition is estimated up to an operating phase of 25 years.
 - Within the scope of environmental impact monitoring a bio-monitoring with phytoindicators is established.

- Name of project

ALZ Pfaffenau - waste distribution center

- Main soil aspects

- Soil contamination: Scoping is expanded all over a market gardening area in the district Simmering. The risk of immission of the waste distribution centre is the main aspect.
- No measures to reduce emissions of heavy metals and organic contaminants are necessary because of modern technical standards of the centre.
- Only in the construction phase emissions of particulate matter have to be reduced. This is achieved by moistening of the road surfaces. A minimisation up to 80% is declared.
- Within the scope of environmental impact monitoring a bio-monitoring with phytoindicators is established as in the project "municipal waste plant".

Test-Site Experience

Street construction EIA in Vienna

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|--|---|--------------------------------|-----------------------------------|
| <u>Description of current state of soil</u> | Soil functions - mainly natural functions | Y | |
| | Soil quality – e.g. nutrients, soil physics, CEC, acidity, organic carbon | Y | |
| | Soil erosion risk | N | |
| | Contaminant loads – tackling of soil contamination issues (organic and inorganic pollutants) | N | |
| | Current land use | Y | |
| | Productivity, soil index | Y | |
| | Additional to EIA procedure: | | |
| <u>Description and analysis of impacts/effects</u> | Loss of soils, sealing, soil/land consumption, (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area), changes of land use | Y | |
| | soil functions (loss), including soil degradation, rearrangement and compaction | Y | |
| | Soil erosion and potential negative effects on the groundwater | Y | |
| | Immission of contaminants on sites due to construction activities | N | |
| | Immission load of contaminants (considering relevant pollutants from fuel provided emissions and their effects on soil) – e.g. NO ₂ , SO ₂ , respirable dust, heavy metals, benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL etc | N | |
| | Comprising evaluation of deposition and emission | Y | |
| | Changes in ground level | N | |
| | Ecological soil quality | Y | |
| Soil productivity | Y | | |

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | | Relevance for case study (Y/N) | Criteria considered in case study | |
|---|--|---|--------------------------------|---|--|
| | Interactions between soil and other subjects of protection | | Y | | |
| | Additional to EIA procedure: | | | | |
| <u>measures to avoid, minimize and compensate impacts/effects on soil</u> | avoid | Economical and spare handling with land and soil in operating and construction phase, e.g. project area was chosen due to low soil quality or difficult accessibility for agricultural machinery | Y | Y, as general aim | |
| | | Goals referring to soil protection (legal) requirements in the project area, | | Y, a very general question with no effect | |
| | | Reuse of contaminated sites or brownfields, decontamination and revitalisation to decrease land consumption | N | | |
| | | Reduction of immission on soil via, e.g. modern technical standards | N | | |
| | minimize | Additional to EIA procedure: | | | |
| | | Obligatory application of guidelines for e.g. professional recultivation | Y | For ecological building supervision | |
| | | Soil scientific construction supervision – consulting and guarantee of professional measurement implementation | N | | |
| | | Save handling of soil in construction phase: <ul style="list-style-type: none"> • Storage of humus layers, • Assessment notice for soil storage, • Professional treatment of excavated soil, e.g. open soil is recultivated immediately to minimize wind-erosion, contaminated soil is treated according to waste demands, emissions of particulate matter | Y | Mostly waste management, some of them are legal needs | |

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | | Relevance for case study (Y/N) | Criteria considered in case study |
|-------------------|---|--|--------------------------------|-----------------------------------|
| | | <p>have to be reduced by moistening of the road surfaces,</p> <ul style="list-style-type: none"> • Avoidance of leaching/infiltration of chemicals, oil or fuel in construction area, • Measures to balance and minimize soil compaction e.g. mats, coverage, no pass of wet soils, using light machines • Measures to preserve soil functions e.g. professional recultivation to preserve productivity for agricultural production, preserve soil quality during storage | | |
| | | <p>Preservation of evidence (soil assessment) for follow-up care and accompanying monitoring</p> | N | |
| | | <p>Implementation of monitoring e.g. of contaminants in soil using periodic random sampling or bio-indicators (e.g. phytoindicators) for conservation of soil and forage quality & soil functions mainly for agricultural purposes, to avoid exceeding of critical values of pollutants</p> | N | |
| | | <p>Supervisory right/right to monitor of the authority at all times e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection</p> | N | |
| | | <p>Fertilizing plan, verification of used pesticides according to licences and legal requirements for use</p> | N | |
| | | <p>Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination</p> | N | |
| | | <p>Annual evaluation of compensation measures to reduce particle immission, evaluation of</p> | N | |

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study | |
|-------------------|---|---|-----------------------------------|--|
| | | traffic related emissions (diffuse contamination) | | |
| | | Additional to EIA procedure: | | |
| | compensate | | N | |
| | | | N | |
| | | | Y | Treerows, use of material, alternative deicing salts |
| | | | N | |
| | | | | |

Short Summary of the final assessment of the EIA Project regarding the usability of the guidance:

The EIA was finished before the guideline was available. The environmental statement was compared with the guideline. The use of the guideline or even the in hand questionnaire would rise the quality of the consideration of soil aspects in the EIA.

19.1.2 Federal State Salzburg

- Name of project

Golfplatz Sankt Johann - Golf course Sankt Johann

- Main soil aspects

Soil as a subject of protection was examined in detail during the consultation process with other authorities - input and comments of all participating players are possible.

In this case the focus was on contaminant loads – tackling of soil contamination issues (soil was analysed) via health aspects. Additionally the contamination history was analysed in detail.

The focus was on measures especially:

- Obligatory application of the guidelines for recultivation³²;
- Soil scientific construction supervision – guarantee of implementation,
- Saving handling of soil,
- Preservation of evidence and monitoring,
- Fertilizing plan – verification of used pesticides,
- Supervisory right/right to monitor of the authority at all times.

Measures in the construction phase:

- Minimisation of soil compaction,
- Assessment notice for soil storage.

An added value is given due to the consultation process in EIA of measures to improve the project and reduce the effects on soil issues are of high importance.

- Name of project

380 KV Leitung Salzburg - 380 KV Transmission Line Salzburg

- Main soil aspects

Describing and assessing:

- Soil functions,
- damage of soils,
- loss of soils,
- soil compaction and
- soil contaminants.

Analysis:

- Contaminants on sites of old masts,
 - Disposal of upper soil considered as waste and amelioration of soils and soil functions for these.
- Considering aspects of soil compaction

Measures:

- Implementing compensation measures to balance soil compaction (e.g. Mats, coverage),
- Preserve soil functions (e.g. productivity for agricultural production).

³² <http://land.lebensministerium.at/article/articleview/74843/1/18483>

- Name of project

Zementwerk Leube - Erhöhung des Brennstoffeinsatzes / cement mill – extension of fuel provided

- Main soil aspects

Describing and assessing:

- Contaminants,
- Organic pollutants (mainly PAH - Polycyclic Aromatic Hydrocarbons),
- Considering enhanced contents.

Analysis:

- Of immission load of contaminants for impact evaluation (considering relevant pollutants from fuel provided emissions and their effects on soil) (NO₂, SO₂, respirable dust, heavy metals, benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL),
- Soil functions,
- Soil productivity,
- Relevant contaminants:
 - Inclusion of federal soil survey results consideration of forage for deposition evaluation, assessment due to Austrian and international standards,
- Comprising evaluation of deposition and emission.

Measures:

- Implementation of programme for securing evidence for monitoring of contaminants in soil and forage using bioindicators (protection of soil and forage quality & soil functions mainly for agricultural purposes).
- Monitoring results have to be presented to administration authority, if samples show enhanced contents, measures have to be set by authority (e.g. further investigations) for soil and health protection.
- Requirement to change impact assessment to “significant negative impacts” on soil if programme shows increased values in soil to make impact on soil evident or if predicted concentration values are exceeded.
- Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination.
- Annual evaluation of compensation measures to reduce particle immission, evaluation of traffic related emissions (diffuse contamination).

Test-Site Experience

Golf course Anif

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|--|---|--------------------------------|--|
| <u>Description of current state of soil</u> | Soil functions - mainly natural functions | Y | |
| | Soil quality – e.g. nutrients, soil physics, CEC, acidity, organic carbon | Y | |
| | Soil erosion risk | Y | |
| | Contaminant loads – tackling of soil contamination issues (organic and inorganic pollutants) | Y | no pollutants |
| | Current land use | Y | |
| | Productivity, soil index | Y | |
| | Additional to EIA procedure: | | |
| <u>Description and analysis of impacts/effects on soil</u> | Loss of soils, sealing, soil/land consumption, (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area), changes of land use | Y | |
| | soil functions (loss), including soil degradation, rearrangement and compaction | Y | |
| | Soil erosion and potential negative effects on the groundwater | Y | partly |
| | Immission of contaminants on sites due to construction activities | Y | Partly considered |
| | Immission load of contaminants (considering relevant pollutants from fuel provided emissions and their effects on soil) – e.g. NO ₂ , SO ₂ , respirable dust, heavy metals, benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL etc | N | |
| | Comprising evaluation of deposition and emission | N | |
| | Changes in ground water level | Y | less ground water and lower ground water horizon |
| Ecological soil quality | Y | Not considered | |

| EIA Soil Subtopic | | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|---|----------|--|--------------------------------|-----------------------------------|
| | | Soil productivity | Y | Has been considered |
| | | Interactions between soil and other subjects of protection | Y | ground water |
| | | Additional to EIA procedure: | | |
| <u>measures to avoid, minimize and compensate impacts/effects on soil</u> | avoid | Economical and spare handling with land and soil in operating and construction phase, e.g. project area was chosen due to low soil quality or difficult accessibility for agricultural machinery | Y | area was available |
| | | Goals referring to soil protection (legal) requirements in the project area | Y | Has been considered |
| | | Reuse of contaminated sites or brownfields, decontamination and revitalisation to decrease land consumption | N | |
| | | Reduction of immission on soil via, e.g. modern technical standards | Y | Not explicit |
| | | Additional to EIA procedure: | | |
| | minimize | Obligatory application of guidelines for e.g. professional recultivation | Y | guidance on soil protection |
| | | Soil scientific construction supervision – consulting and guarantee of professional measurement implementation | Y | Has been considered |
| | | Save handling of soil in construction phase: <ul style="list-style-type: none"> • Storage of humus layers, • Assessment notice for soil storage, • Professional treatment of excavated soil, e.g. open soil is recultivated immediately to minimize wind-erosion, contaminated soil is treated according to waste demands, emissions of particulate matter have to be reduced by moistening of the road surfaces, • Avoidance of leaching/infiltration of chemicals, oil or fuel in construction area, • Measures to balance and minimize soil compaction e.g. mats, coverage, no pass of wet soils, using light machines | Y | Has been considered |
| | | | | |

| EIA Soil Subtopic | | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|-------------------|---|---|--------------------------------|---|
| | | <ul style="list-style-type: none"> Measures to preserve soil functions e.g. professional recultivation to preserve productivity for agricultural production, preserve soil quality during storage | | |
| | | Preservation of evidence (soil assessment) for follow-up care and accompanying monitoring | Y | Has been considered |
| | | Implementation of monitoring e.g. of contaminants in soil using periodic random sampling or bio-indicators (e.g. phytoindicators) for conservation of soil and forage quality & soil functions mainly for agricultural purposes, to avoid exceeding of critical values of pollutants | N | |
| | | Supervisory right/right to monitor of the authority at all times e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection | Y | Recommended |
| | | Fertilizing plan, verification of used pesticides according to licences and legal requirements for use | Y | Recommended |
| | | Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination | N | |
| | | Annual evaluation of compensation measures to reduce particle immission, evaluation of traffic related emissions (diffuse contamination) | Y | for construction phase |
| | | Additional to EIA procedure: | | |
| | compensate | Obligation of measures to protect soil and its functions, e.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way | Y | guidance on soil protection has been obligatory |
| | | Amelioration of contaminated soils and soil functions | N | |
| | Recovery and recultivation e.g. after exploitation of | Y | No consideration | |

| EIA Soil Subtopic | | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|-------------------|--|--|--------------------------------|-----------------------------------|
| | | underground | | |
| | | Compensation charge of certain amount of money | N | |
| | | Additional to EIA procedure: | | |

Short Summary of the final assessment of the EIA Project regarding the usability of the guidance:

For the questionnaire two examples were chosen, in which soil aspects have been assessed. These are the golf course Anif and the highway junction Salzburg Hagenau.

In general, the EIA guidance was not used for any EIA in the surrounding of Salzburg, due to only a very few numbers of EIA's and already a very good and appropriate inclusion of soil during the EIA process! Generally description of soil and soil functions are part of the process, the new guidance on soil function assessment of Salzburg has been used.

The EIA/SEA guidance was not used for the EIA of the golf course ANIF (EIS from Fall/winter 2010, EIA Process still running!) or for the EIA - Highway junction Salzburg Hagenau (EIS in Summer 2010, EIA Process still running), but most of the steps and processes recommended in the guidance were performed and realised in this EIA. This guidance can be seen as a solid maximum list of issues that need to be taken into account for soil in the EIA procedure, especially in the Environmental Impact Statement (EIS). Additional, national available guidance on soil protection has been used within this EIA. This information has already been taken into account in the draft guidance document. No new experiences have been made that shall be included in the current guiding document.

The decision is not solely based on soil, but in general on the stocks on it, usually related to nature conservation. In general, soil is being used and parts are restored in the state-of-the-art manner. In neither of the EIA's soil has been the key area of protection.

19.2 CZECH REPUBLIC

- Name of project

“Golf Areal GOLF RESORT BLACK BRIDGE, Praha 9 – Dolní Počernice“

- Main soil aspects

In this case, a wide range of soil protection problems was included. Lands of agricultural land resources were concerned in considerable size. Following problems were concerned:

- Municipal plan – municipal plan adjustment of part of golf course predate to the project itself,
- The total area of soil appropriation and exemption is 80 ha of average soil quality. Landscape modelling was done on bulk of the golf course area. The consequence was the removal of “upper cultivated soil layer” including subsoil too, on all golf course area. There was a need to solve a water regime by using functional drainage and irrigation system. Together the water erosion questions had to be solved. Specific issue was to ensure dust free environment during the golf course development for reason of vicinity of housing estate Černý Most.

In this case the appropriation of land – permanent exemptions of soil from agricultural land resources on 80 ha - was concerned. The exemption of soil on such a big area is not very common in the territory of Prague. Although the soil was exempted from agricultural land resources and the landscape modelling was done and new anthropogenic soil layer was created, the design realisation does not represent irreversible loss of agriculture soil. Soil cover of golf course enables the agricultural reuse.

Test-Site Experience

No Information was provided.

19.3 GERMANY

- Name of project
City railway line U15

- Main soil aspects
- Sealing,
 - Possible mobilisation of Chlorine-Carbon-Hydrates (CKW).

Soil issues have been considered and documented in detail on the bases of the soil concept of Stuttgart (BOKS).

- Name of project
Landesmesse Stuttgart – Exhibition Center federal State Baden-Württemberg

- Main soil aspects
- Sealing,
 - Description of necessary measures and compensation charge of € 2,5 Mio.

The assessment focuses on the Guideline for the assessment of soils according to their performance.

19.4 ITALY

- Name of project
Programmema di intervento urbanistico “Monte della Breccia” (an example of Residential plan in the municipality of Rome)

- Main soil aspects
Monte della Breccia project concern a residential urban complex of a surface of 175.271 square meters.

The identified soil impacts concern:

- Soil erosion and
- soil sealing, with also potential negative effects on the groundwater.

Expected impacts will be investigated in depth by geological techniques to identify the best environmental mitigation.

Actually the only prevented mitigations concern green areas for landscape protection constraints.

This EIA represents a common urban situation where soil aspects are only marginally considered.

Sometimes the assessment of ecosystems fragmentation subsequent to the realization of a project is performed on the land; moreover in the future, in every Integrated Building Scheme an assessment also on quality of soil consumed will be performed. A survey on EIAs available

online on the dedicated website of the Lombardy Region³³ led to the identification of the following examples:

- Name of project

Urban regeneration schemes, industrial or facilities upgrade in Metropolitan area:

- Former city exhibition area,
- Former chemical plant connected to the railway system, redeveloped as housing, convention centre and commercial, south-eastern city border,
- Former magnet factory redeveloped as housing scheme, north-eastern city border,
- Waste incinerator upgrade, north-western green area.

- Main soil aspects

Soil considered only from a physical – chemical point of view, no ecological property acknowledged, new agricultural soil provided from outside for new green areas/parks.

- Name of project

New roads bypassing urban centres of minor towns/villages

- Main soil aspects

Mitigation of impacts on soil consumption/landscape through “in-trench” design of infrastructure, use of naturalistic engineering (reinforced slopes) and care of land continuity for small animals (tunnels, overhead passages).

- Name of project

Underground passage of high voltage cables

- Main soil aspects

Recovery of agricultural land in place of concrete basements of electrical poles, recovery of land use continuity

- Name of project

Intensive farming (pigs, cows)

- Main soil aspects

Use of animal dejections for fertilization, regulated on specific crops and soil properties

- Name of project

Quarries under current exploitation

- Main soil aspects

- Recovery of surface soil properties and of pre-existing woodland: removal and storage of first 70 cm of soil in excavation phase, with specific care in avoiding soil quality decay (maximum height in 3 m, mixing with compost and microbes to avoid nutrient cleaning from rainwater);
- After extraction of sand and gravel for building purposes, re-laying of agricultural soil and application of fertilization plan,
- Land shaping works for landscape purposes and for protection against erosion;
- Balancing of vegetal species and enhancing ecological continuity.

³³ <http://www.cartografia.regione.lombardia.it/silvia/>

19.5 POLAND

- Name of project

By-pass of Augustow city as a part of national road 8

- Main soil aspects

The EIA consisted with 3 phases – screening, assessment and proposal of environmental conditions of the construction. The assessment was performed for 6 different variants of the by-pass location. The assessment was based on scoring of impacts on various environmental aspects (elements of environment) by panel of experts. Each expert scored the impacts from 10 (maximum negative impact, irreversible) to 1 (impact can be mitigated) or 0 (no impact). Particular environmental aspects had weights dependent on relevance to the area and type of construction. The total assessment score was a sum of all environmental aspects.

Main soil aspects included were soil contamination due to air contamination and loss of soil agricultural and environmental quality, expressed by land quality index. However the impacts of all assessed by-pass variants on soil aspects were similar. Decisive for a variant selection were issues related to impact on fauna corridors, biodiversity and natural habitats due to presence of Natura 2000 areas. Mitigation efforts during construction work shall include e.g. collision-free corridors for animals, archaeological findings prior to the construction work, protection of groundwater at construction site, reuse of topsoil, recultivation.

Complex approach, expert panel involvement, instructions for mitigation actions during construction work.

19.6 SLOVAKIA

- Name of project

Residence area Bohacky (complex Tirrelus)

- Main soil aspects

- Land consumption for the residential area/ sealing
 - arable land - 55 m²,
 - orchards 34 115m²,
 - gardens 720 m²,
 - forest land – 170 m²,
 - total: 34 890 m²

Land consumption is quite big, however the site was chosen due to the low soil quality. The status of orchards, and garden was very bad. The residential area remains compacted and seems as an ensemble with the surrounding nature (edging the forest). It is part of continuous housing development in the Bratislava district Zahorska Bystrica.

- Name of project

Kapitulske polia Zone of administration, housing, recreation and a roman-catholic church

- Main soil aspects

Land consumption for the residential area: 368 073 m²

This land consumption was chosen due to the low soil quality and due to difficult accessibility for agricultural machinery. In the long term, the cooperative farm PD Rusovce (district of the

Bratislava city) offers these parcels of land for urbanization goals. These areas were not-used for agricultural management for a long period.

- Name of project

Multifunctional housing on the Vajnorska street (district Nove Mesto)

- Main soil aspects

Contaminated soil from the chemical industry (ISTROCHEM) – brownfields, will be decontaminated and revitalized. After this process the location will be used as a multifunctional complex of housing (20 000 inhabitants) including administration, commercial, various services and hotel.

Decontamination and revitalization of the area, which was permanently used for chemical industry, can contribute to the change of the urban site use. The goal of the project is to re-shape the area into a multifunctional building complex.

Test-Site Experience

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|--|---|--------------------------------|-------------------------------------|
| <u>Description of current state of soil</u> | Soil functions - mainly natural functions | No | |
| | Soil quality – e.g. nutrients, soil physics, CEC, acidity, organic carbon | No | |
| | Soil erosion risk | No | |
| | Contaminant loads – tackling of soil contamination issues (organic and inorganic pollutants) | Yes | Map of contaminated sites |
| | Current land use | Yes | Municipal land use plan |
| | Productivity, soil index | No | |
| <u>Description and analysis of impacts/effects</u> | Additional to EIA procedure: | | |
| | Loss of soils, sealing, soil/land consumption, (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area), changes of land use | Yes | Area size of soil loss |
| | soil functions (loss), including soil degradation, rearrangement and compaction | Partially yes | |
| | Soil erosion and potential negative effects on the groundwater | No | |
| | Immission of contaminants on sites due to construction activities | Yes | According to demands of inhabitants |
| | Immission load of contaminants (considering relevant pollutants from fuel provided emissions and their effects on soil) – e.g. NO ₂ , SO ₂ , respirable dust, heavy metals, benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL etc | No | |
| | Comprising evaluation of deposition and emission | No | |
| | Changes in ground level | No | |
| | Ecological soil quality | No | |
| | Soil productivity | No | |
| Interactions between soil and other subjects of protection | No | | |
| Additional to EIA procedure: | | | |

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | | Relevance for case study (Y/N) | Criteria considered in case study |
|---|---|---|--------------------------------|--|
| <u>measures to avoid, minimize and compensate impacts/effects on soil</u> | avoid | Economical and spare handling with land and soil in operating and construction phase, e.g. project area was chosen due to low soil quality or difficult accessibility for agricultural machinery | Yes | Due to low soil quality |
| | | Goals referring to soil protection (legal) requirements in the project area, | Yes | Soil protection act, nature protection act (Protection of trees) |
| | | Reuse of contaminated sites or brownfields, decontamination and revitalisation to decrease land consumption | Yes | |
| | | Reduction of immission on soil via, e.g. modern technical standards | No | |
| | | Additional to EIA procedure: | | |
| | minimize | Obligatory application of guidelines for e.g. professional recultivation | Yes | |
| | | Soil scientific construction supervision – consulting and guarantee of professional measurement implementation | Y/N | |
| | | Save handling of soil in construction phase: <ul style="list-style-type: none"> • Storage of humus layers, • Assessment notice for soil storage, • Professional treatment of excavated soil, e.g. open soil is recultivated immediately to minimize wind-erosion, contaminated soil is treated according to waste demands, emissions of particulate matter have to be reduced by moistening of the road surfaces, • Avoidance of leaching/infiltration of chemicals, oil or fuel in construction area, • Measures to balance and minimize soil | No | I do not know |

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | | Relevance for case study (Y/N) | Criteria considered in case study |
|-------------------|---|--|--------------------------------|-----------------------------------|
| EIA Soil Subtopic | | compaction e.g. mats, coverage, no pass of wet soils, using light machines • Measures to preserve soil functions e.g. professional recultivation to preserve productivity for agricultural production, preserve soil quality during storage | | |
| | | Preservation of evidence (soil assessment) for follow-up care and accompanying monitoring | No | |
| | | Implementation of monitoring e.g. of contaminants in soil using periodic random sampling or bio-indicators (e.g. phytoindicators) for conservation of soil and forage quality & soil functions mainly for agricultural purposes, to avoid exceeding of critical values of pollutants | No | |
| | | Supervisory right/right to monitor of the authority at all times e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection | No | |
| | | Fertilizing plan, verification of used pesticides according to licences and legal requirements for use | No | |
| | | Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination | No | |
| | | Annual evaluation of compensation measures to reduce particle immission, evaluation of traffic related emissions (diffuse contamination) | No | |
| | | Additional to EIA procedure: | | |
| | compensate | Obligation of measures to protect soil and its functions, e.g. an ecological compensation and balancing area has to be allocated and made | No | |

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study |
|-------------------|---|--------------------------------|-----------------------------------|
| | available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way | | |
| | Amelioration of contaminated soils and soil functions | Yes | According to act |
| | Recovery and recultivation e.g. after exploitation of underground | Yes | According to act |
| | Compensation charge of certain amount of money | No | |
| | Additional to EIA procedure: | | |

Short Summary of the final assessment of the EIA Project regarding the usability of the guidance:

In the evaluated EIA project there were assessed all relevant compounds of environment including soil. Soil was assessed by standard way without many expertises.

Sum of indicated criteria is time-consuming matter. Some of data are not available. In our soil protection legislation there are rather considered soil properties and soil productivity instead of soil functions. Soil functions are not clearly defined in our legislation. Also soil ecological quality is not well-known term.

As referring EIA case study we have found one disproportion – in the brownfield area – toxic chemical waste dump do not require any EIA assessment if any developer plans projects less than 500 apartments. That is strange as any contaminated site represents risk of potential pollution of surrounding area and approve of such residential area in the vicinity is doubtful. We propose to make EIA process for each contaminated brownfield – environmental load.

19.7 SLOVENIA

- Name of project

Izgradnja severne vezne ceste v Celju - Construction of northern connective road in Celje

- Main soil aspects

Soil was evaluated from the aspects of:

- Loss of agricultural areas,
- Recreation areas and
- Possible pollution from road traffic.

Municipalities in Slovenia are not directly involved in the EIA process (it is regulated by ARSO- The Environmental Agency of the Republic of Slovenia), this EIA was chosen, due to the whole documentation due to the fact that the municipality was the project solicitor.

The project was prepared in a way that new roads would have as little negative effects on the environment, especially air, as possible. Water and soil pollution were considered as national legislation sets down.

20 ANNEX 8 – GENERAL QUESTIONNAIRE AND RESULTS ON THE USEFULNESS OF THE GUIDANCE AND IMPROVEMENTS DURING THE URBAN SMS PROJECT

Usefulness of Guidance and its application on test sites based on the recommendations in the the *draft guidance for soil in SEA/EIA*³⁴:

| Question | Yes/No | Why / In which way? Please describe briefly |
|---|--------|---|
| Steering of superior planning on low quality soils | | |
| Consideration of soil functions in plans and programmes | | |
| Improvement of communication between planners, soil experts and policy making | | |
| Improvement of acceptance of soil issues in the planning process | | |
| Improvement of effectiveness of compensation measures focused on soil | | |
| Definition of goals and aims for soil quality and sustainability | | |
| Clarification semantic problems | | |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | | |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | | |
| Use of guidance in planning procedures | | |
| Connection of guidance to legal requirements? | | |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | | |
| Do you miss any major item in the guidance? | | |

³⁴ URBAN SMS WP3 Action 3, Draft guidance for soil in SEA/EIA, based on - Collection of existing approaches for soil protection aspects in SEA and EIA and - Analysis of best practice examples, March 2010, Chapter 11.2 Part B - General recommendations for SEA and EIA, page 35

20.1 AUSTRIA

20.1.1 Federal State Vienna

| Question | Yes/No | Why / In which way? Please describe briefly |
|--|--------|---|
| Steering of superior planning on low quality soils | Y | The most important step for superior planning in Vienna is the City development plan (STEP). There is no obligatory SEA foreseen in this planning procedure therefore the use of SEA guideline would show the quality of used land. |
| Consideration of soil functions in plans and programmes | N | We used only ESQ with our data. We have too less data for the consideration of soil functions |
| Improvement of communication between planners, soil experts and policy making | Y | The knowledge of the project leads to more communication in the case of statement to land use and building plans |
| Improvement of acceptance of soil issues in the planning process | N | Awareness raising is a longer process, it is too short for an improvement. It is only seen as a duty currently. |
| Improvement of effectiveness of compensation measures focused on soil | N | We are not able to measure the amount of compensation measures |
| Definition of goals and aims for soil quality and sustainability | N | |
| Clarification semantic problems | N | |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | N | This was not relevant at this site because we didn't implement an a brownfield |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | Y | This is an indirect effect of any assessment of soil in planning area |
| Use of guidance in planning procedures | N | The guidance is used only at the level between the environmental planning unit and the soil experts and between the consulted authorities. |

| | | |
|---|---|---|
| Connection of guidance to legal requirements? | N | |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | Y | ESQ is better than ASQ because there is more acceptance for this kind of evaluation |
| Do you miss any major item in the guidance? | N | |

20.1.2 Federal State Salzburg

| Question | Yes/No | Why / In which way? Please describe briefly |
|---|-----------|---|
| Steering of superior planning on low quality soils | y | Avoiding sealing and consumption of high quality soils at the earliest is a key factor. Guidance provides a basis, maybe a bit complex for planners. |
| Consideration of soil functions in plans and programmes | y | To filter areas of high sensitivity to identify protection areas which can be considered in plans and programmes the guidance gives a good basis to lead to further specific guidelines or regulations. Updates and integration of new information will increase the acceptability. |
| Improvement of communication between planners, soil experts and policy making | y/n | Raising soil awareness in spatial planning is an important step to enforce soil protection Guidance will be a good basis of knowledge – for concrete application for spatial planners and practical application it is too complex. Contents can be used to generate a concrete and short guidance for planners |
| Improvement of acceptance of soil issues in the planning process | See above | |
| Improvement of effectiveness of compensation measures focused on soil | y | Guidance provides a good overview but effectiveness depends on the binding |

| | | |
|--|---|--|
| | | character and quality of implementation of comp. measures. |
| Definition of goals and aims for soil quality and sustainability | | |
| Clarification semantic problems | n | Not discussed, not considered as important |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | y | |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | | |
| Use of guidance in planning procedures | n | Not yet (see comment below) |
| Connection of guidance to legal requirements? | n | Unlikely, more concrete and country specific documents related to legal requirements will be needed. Guidance is a well stated basis. |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | y | Guidance provides a maximum list of soil aspects that have to be considered, can be used as / provide a basis for "checklists" for planners. |
| Do you miss any major item in the guidance? | y | Best practice examples how to bring soil issues into legislation (description of processes) |

20.2 CZECH REPUBLIC

No Information was provided.

20.3 GERMANY

| Question | Yes/No | Why / In which way? Please describe briefly |
|--|--------|---|
| Steering of superior planning on low quality soils | Yes | But these are very general |

| | | |
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| Consideration of soil functions in plans and programmes | Yes | recommendations. In Stuttgart it's possible because we have already a soil quality map and a sustainable management of building areas (NBS). Helpful would be to mention the concrete requirements for an effective steering: e.g. an area wide assessment of the soil quality based on NATURAL soil functions and a mapping of inner urban potentials for building areas. |
| Improvement of communication between planners, soil experts and policy making | Yes | The soil concept of Stuttgart was presented to the municipal council and several discussions with planners took place already. In frame of Urban SMS the exchange is an ongoing process at the moment. |
| Improvement of acceptance of soil issues in the planning process | Yes | By improvement of communication and by providing useful information about the soil quality the acceptance is rising |
| Improvement of effectiveness of compensation measures focused on soil | No | More important is to make clear that the compensation of destroyed soil is almost not possible and that soil is a non-renewable resource |
| Definition of goals and aims for soil quality and sustainability | Yes | Degrressive rate of soil-usage enforce inner urban development |
| Clarification semantic problems | Yes | Mainly by the exchange with the planning department |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | Yes | Approach: Sustainable Management of Building Areas Stuttgart (NBS) |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | No | |
| Use of guidance in planning procedures | No | Several concepts must be applied by planners in Stuttgart: BOKS, NBS, eco account ordinance |
| Connection of guidance to legal requirements? | Yes | In Germany (or perhaps just in Stuttgart) it's a little bit difficult to distinguish SEA and EIA-processes. The names are |

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|---|----|--|
| | | different, usually just “environmental report” |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | No | |
| Do you miss any major item in the guidance? | No | |

20.4 ITALY

| Question | Yes/No | Why / In which way? Please describe briefly |
|---|--------|---|
| Steering of superior planning on low quality soils | Y | The guidance is useful to raise the awareness of a sustainable planning on soils. In this sense the table at p.40 is particularly relevant |
| Consideration of soil functions in plans and programmes | Y | See previous comment |
| Improvement of communication between planners, soil experts and policy making | Y | Some of the points to be considered from the guidance need technical expertise. This requires the involvement of different experts, with a strong necessity for communication |
| Improvement of acceptance of soil issues in the planning process | N | The acceptance of soil in planning has to be somehow imposed by national or local legislation. In this sense, a guidance is not sufficient to determine an improvement of acceptance of soil issues |
| Improvement of effectiveness of compensation measures focused on soil | Y | The guidance provides some good examples that could help the understanding of soil compensation measures and improve their effectiveness |
| Definition of goals and aims for soil quality and sustainability | -- | I do not understand the meaning of this question |
| Clarification semantic problems | -- | I do not understand the meaning of this question |

| | | |
|--|----|--|
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | N | This is too far from the potentialities of the guidance and is related to planning and economical issues. EIA/SEA are only a consequence of these issues, and cannot directly steer them (when referred to redevelopment of brownfields) |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | Y | If the guidance is really adopted then as a consequence green and open spaces will benefit in terms of their quality and their increase in size |
| Use of guidance in planning procedures | -- | I do not understand this question (is it a question?). If it means if the guidance will be used the answer is most likely not. It means if it could be potentially used the answer could be yes |
| Connection of guidance to legal requirements? | N | Not yet, some local guidelines are provided but they are not fully exhaustive to fulfil national/local legal requirements |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | N | The guidance is still too generic to provide methodological improvements |
| Do you miss any major item in the guidance? | Y | Table in p.42 of the guidance is really nice and could be re-drawn as a kind of checklist to help the evaluators in the EIA/SEA processes. In particular, it could help an evaluator in the definition of the project-specific critical soil issues. |

20.5 POLAND

| Question | Yes/No | Why / In which way? Please describe briefly |
|--|------------|---|
| Steering of superior planning on low quality soils | Medium Yes | The issue mentioned at the very beginning of Chapter 11 as a 1 st recommendation. But problem not included in any Table or |

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| | | Summary. Maybe it would be worth to mention that some criteria (often used in current EIA procedures) might be indirectly affected through soil loss, when the valuable soils are sealed. |
| Consideration of soil functions in plans and programmes | YES | Soil function is mentioned many times, mostly on the 1 st place in each summary. After reading this document you cannot avoid considering soil functions in your planning. Also BOKS example (page36) is a good evidence of how important are soil functions in planning. |
| Improvement of communication between planners, soil experts and policy making | Not enough | Communication problem will be one of the main issues after ending URBAN SMS – how to implement all program conclusions in real life. However any SEA/EIA guideline will not solve this problem and probably it is not a place to describe communication procedures. The guideline should be an operational document helping to make the proper strategic or environmental assessment. |
| Improvement of acceptance of soil issues in the planning process | YES | Lots of statistics and examples makes guidance truthful and could encourage planners to include soil problem into their everyday work |
| Improvement of effectiveness of compensation measures focused on soil | YES | Problem mentioned several times – enough to let other know that compensation measures are the right way of protecting soils (e.g. Polish system could be mentioned, where compensation funds are dedicated to soil restoration and improvement) |
| Definition of goals and aims for soil quality and sustainability | Medium YES | The need of clearly formulated soil protection goals is well visible in document. There are few summaries with protection |

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| | | goals and aim included. But shouldn't it be the very first issue in guidance to let people be more interested in the rest of paper? |
| Clarification semantic problems | Medium NO | Semantic problems are mentioned but probably not fully described. Maybe an extra appendix is needed? Semantic problems are important not only on international level but also between decision makers and specialists representing different areas of expertise. |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | YES/NO | Brownfield and contaminated sites issue is mentioned several times but is it enough clearly described that that areas are the type of alternative to using good quality soils for investments? Brownfields are not a new problem and need to be presented in the new, more wide perspective. |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | Rather NO | Open spaces and green areas are not the synonym of high quality soil fields. That's why protection and restoration of them is a bit side problem in our opinion. Although green areas issue is mentioned and is of course important in urban planning |
| Use of guidance in planning procedures | NO | Helpful for using this guidance in planning would be: <ul style="list-style-type: none"> -translation into national languages - making them more detailed in terms of procedures and straight directions for city planners - signed by officials and presented officially in city and municipality councils |
| Connection of guidance to legal requirements? | Rather NO | Strong connection to national law and local procedures would be very helpful in implementation of the guidance. However we know that it would be likely very difficult task to adjust the guide to each local |

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| | | conditions within the URBAN SMS project. |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | Medium | Measurement methods and monitoring etc. are rather field of work for scientists more than city planners who should be real recipients of Guidance. But the brief review of the methods is needed. Maybe cooperation procedures and advices should be included in document? It is not clear if Table 3, page 42 contains indicators for current status assessment of impact assessment, or both. The Assessment guideline or further procedure should not be overloaded with soil related indicators since soil is one of topics to be assessed. The better idea might to provide a short set of indicators that must be analyzed. |
| Do you miss any major item in the guidance? | YES | It must be clearly pointed that Guidance is for those who are in charge of change the soil protection approach. And for sure these are not scientists and farmers. There's no other way out then cooperate with local and national politics working on urban development with soil protection as an important part of it. The document is very well structured. Review of national approaches and regulations is a very valuable part itself. |

20.6 SLOVAKIA

| Question | Yes/No | Why / In which way? Please describe briefly |
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| Steering of superior planning on low quality soils | Yes | This can fulfil economical tool on payment for high-quality land take |
| Consideration of soil functions in plans and programmes | Yes | It is rather new terms. |
| Improvement of communication between planners, soil experts and policy making | Yes | Could be useful, but all components of the environment have to be present. |
| Improvement of acceptance of soil issues in the planning process | Yes | |
| Improvement of effectiveness of compensation measures focused on soil | Yes | |
| Definition of goals and aims for soil quality and sustainability | Yes | |
| Clarification semantic problems | Yes | |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | No | It is technical issue. |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | Yes | |
| Use of guidance in planning procedures | Yes | |
| Connection of guidance to legal requirements? | No | Partially to the contaminated brownfield improvement. |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | Yes | There a problem to gain data and maps |
| Do you miss any major item in the guidance? | No | |

20.7 SLOVENIA

| Question | Yes/No | Why / In which way? Please describe briefly |
|--|--------|---|
| Steering of superior planning on low quality soils | Yes | Although in Slovenia, when preparing new land |

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| <p>Consideration of soil functions in plans and programmes</p> | <p>Yes</p> | <p>use plan/superior municipal plan, general soil quality map prepared by Ministry of Agriculture, Forestry and Food should be taken into account and consequently needs for new bulding land on best agricultural soils should be lowered as much as possible at the end final result is a compromise between city planners and Ministry.</p> <p>Due to the fact that majority of municipalities still has valid superior plan from the mid 80s, when expectations on city and industry growth were high and environmental issues were not the main objective, we have made/are still running tests on our test sites (defined as a area provided for construction of residential houses) based only on general soil quality map as there would be no already defined land use. The results have shown into which areas most needed residential areas should be steered. Process will be repeated in September when we will get new, more detailed soil map.</p> <p>The problem is our valid soil quality map does not include into account, besides agricultural functions, other ecosystem/pollution/human oriented needs soil functions. So some areas were considered as best, but when running URBAN-SMS GIS tools they have lowered suitability because of pollution, highway in proximity, inner city position,...</p> |
| <p>Improvement of communication between planners, soil experts and policy making</p> | <p>No</p> | <p>Not made yet. After final URBAN-SMS tools and gathered test results we will try to “argue” with other groups involved in city planning. Guidance will be, we thing, a good basis for that, with additional results from WP6.</p> |
| <p>Improvement of acceptance of soil issues in the planning process</p> | <p>No</p> | <p>Not made yet. But we think with start of communication, soil functions explanation to policy makers and planners the acceptance of soil issues in the planning process will slowly begin to</p> |

| | | |
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| | | rise. Although it will be probably a long process. |
| Improvement of effectiveness of compensation measures focused on soil | Yes | In June 2011 new Act amending the Agricultural Land Act has entered into force. It defines protection of agricultural land with new substitute compensation measure for loss of good soils – economic evaluation up to 25 €/m ² . Together with start of communication based on URBAN-SMS ecosystem soil evaluation and its functions effectiveness should be even more improved. |
| Definition of goals and aims for soil quality and sustainability | Yes | With prepared tables a good basis was given. |
| Clarification semantic problems | Yes | We think when our communication will start more intensive semantic problems could be clarified with this Guidance. |
| Improvement of rehabilitation / redevelopment of brownfields and contaminated sites | Yes | Directly probably not. But with a process of “pressure” on policy makers to stress the need of inner city renovation. |
| Protection, preservation, restoration and upgrade of (sufficient) open space and green areas | No | This process/goal should be recognised in acts that steer environmental protection and superior planning objectives. |
| Use of guidance in planning procedures | No | Not directly. Perhaps with SEA objectives, know to planners. |
| Connection of guidance to legal requirements? | Yes | Currently a good support for SEA/EIA evaluation companies as national objectives for soil evaluation are not defined very well. |
| Improvement of basics for evaluation and basic ground work? (e.g. measurement methods and monitoring, research, data collection, inventories, evaluation schemes, indicator development) | Yes | Soil evaluation in SEA/EIA could be much more detailed (but we think not much more quantified for several functions) if using objectives from Guidance. |
| Do you miss any major item in the guidance? | Yes | Still we think, although a very good detailed objectives are now listed in prepared tables, there is a lack of indicators which would help to quantify the quality and quantity of lost soil. As it is already standard for air, water,... evaluation of the planned building complexes and activities in them. |



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21 ANNEX 9 – SEA QUESTIONNAIRE ON USEFULNESS OF GUIDANCE AND IMPROVEMENTS IN SEA PROCESS DURING THE URBAN SMS PROJECT

The following table of criteria for soil has been developed for the URBAN-SMS partners in order to assess the relevance of soil within the performance of SEA. The content is taken from the *draft guidance for soil in SEA/EIA*³⁵. It needs to be stated that for e.g. a revision of a land use plan, transport concept or a local development concept the criteria will have different relevance and certain criteria will be more suitable than others, when applying this table. The table below shall assist in assessing the relevance of soil of certain plans, programs and projects. Partners shall apply this template for the current running or decided SEA processes within their test site areas. Name/Type of test site area: _____

| SEA Soil topic | Criteria from maximum list SEA Guidance | Relevance for case study (Y/N) | Criteria considered in case study Y/N | Comments |
|---|---|--------------------------------|---------------------------------------|----------|
| <u>Description of current state of soil:</u> | Soil types | | | |
| | Soil mapping and description of current land use | | | |
| | Soil fertility (soil index) <ul style="list-style-type: none"> Quality of soil and its use for agriculture and forestry purposes, as well as for nursery and horticulture, Security of supply of agricultural products for its urban citizen (e.g. agricultural production within or close to the city borders) | | | |
| | Soil functions, primarily natural soil functions | | | |
| | Soil pollution / contaminant loads/ contaminated sites | | | |
| | Handling and relation to relevant protocols (e.g. Alpine protocol on soil protection) | | | |
| <u>Description and analysis of impacts/effects on soil:</u> | Envisaged possible intentions for plans and programmes | | | |
| | Soil consumption and sealing (sealing rate), Soil sealing rates for each | | | |

³⁵ URBAN SMS WP3 Action 3, Draft guidance for soil in SEA/EIA, based on - Collection of existing approaches for soil protection aspects in SEA and EIA and - Analysis of best practice examples, March 2010, Chapter 6.1.2 Soil protection and soil assessment, page 20-21

| | | | | | |
|--|------------|--|--|--|--|
| | | programme model | | | |
| | | Changes of soil quality and soil functions | | | |
| | | Soil pollution (assessment of pollutant emission and deposits on soil) | | | |
| | | Evaluation of consumed square meters of soil | | | |
| | | Assessment of exploitability of soil (e.g. agriculture, forestry, urban development) | | | |
| <u>Description of measures to avoid, minimize or compensate impacts/effects on soil:</u> | avoid | Protection of environment and resources foresees stewardship of available resources | | | |
| | | Sustainable usage of soil as a non augmentable good | | | |
| | | Areas with high soil value have to be protected, E.g. plan can only be realised with substantial additional requirements (construction recommendations) | | | |
| | | Active soil policy to ensure the desired development (e.g. Area safeguarding, concrete area acquisition of the public authorities) | | | |
| | | Soil procurement and mobilisation via budget and laws | | | |
| | | Reuse of contaminated sites | | | |
| | | Use of areas with lower soil quality | | | |
| | Minimize | Construction supervision on soil issues to assure proper measurement implementation | | | |
| | Compensate | Obligation of measures to protect soil and its functions E.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be | | | |

| | | | | | |
|--|--|--|--|--|--|
| | | <p>compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature protection regulations and cannot be applied on soil issues in the same way.</p> | | | |
|--|--|--|--|--|--|

Assessment method:

Sum of criteria indicated as relevant will be considered as 100 %. Amount of criteria really considered in case study shows achievement of objectives in %.

Short Summary of the final assessment of the SEA plan/programme regarding the usability of the guidance:

22 ANNEX 10 – EIA QUESTIONNAIRE ON USEFULNESS OF GUIDANCE AND IMPROVEMENTS IN EIA PROCESS DURING THE URBAN SMS PROJECT

The following table of criteria for soil has been developed for the URBAN-SMS partners in order to assess the relevance of soil within the performance of EIA. The content is taken from the *draft guidance for soil in SEA/EIA*³⁶. It needs to be stated that for e.g. a highway or wind park or a waste treatment plants the criteria will have different relevance and certain criteria will be more suitable than others, when applying this table. The table below shall assist in assessing the relevance of soil in certain projects. Partners shall apply this template for the current running or decided EIA processes within their test site area.

Name/Type of test site area: _____

| EIA Soil Subtopic | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study Y/N | Comments |
|--|---|--------------------------------|---------------------------------------|----------|
| <u>Description of current state of soil</u> | Soil functions - mainly natural functions | | | |
| | Soil quality – e.g. nutrients, soil physics, CEC, acidity, organic carbon | | | |
| | Soil erosion risk | | | |
| | Contaminant loads – tackling of soil contamination issues (organic and inorganic pollutants) | | | |
| | Current land use | | | |
| | Productivity, soil index | | | |
| | Additional to EIA procedure: | | | |
| <u>Description and analysis of impacts/effects</u> | Loss of soils, sealing, soil/land consumption, (e.g. a balance of consumed area and the percentage of the whole area divided in sealed/unsealed and public places/public green area), changes of land use | | | |
| | soil functions (loss), including soil degradation, rearrangement and compaction | | | |
| | Soil erosion and potential negative effects on the groundwater | | | |
| | Immission of contaminants on sites due to construction activities | | | |
| | Immission load of contaminants (considering relevant pollutants) | | | |

³⁶ URBAN SMS WP3 Action 3, Draft guidance for soil in SEA/EIA, based on - Collection of existing approaches for soil protection aspects in SEA and EIA and - Analysis of best practice examples, March 2010, Chapter 10.1.2 Soil protection and soil assessment, page 30-32

| EIA Soil Subtopic | | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study Y/N | Comments |
|---|----------|--|--------------------------------|---------------------------------------|----------|
| | | from fuel provided emissions and their effects on soil) – e.g. NO ₂ , SO ₂ , respirable dust, heavy metals, benzol, PAH, Benzo-(a)-pyren, PCDD/F, HF, HCL etc | | | |
| | | Comprising evaluation of deposition and emission | | | |
| | | Changes in ground level | | | |
| | | Ecological soil quality | | | |
| | | Soil productivity | | | |
| | | Interactions between soil and other subjects of protection | | | |
| | | Additional to EIA procedure: | | | |
| <u>measures to avoid, minimize and compensate impacts/effects on soil</u> | avoid | Economical and spare handling with land and soil in operating and construction phase, e.g. project area was chosen due to low soil quality or difficult accessibility for agricultural machinery | | | |
| | | Goals referring to soil protection (legal) requirements in the project area, | | | |
| | | Reuse of contaminated sites or brownfields, decontamination and revitalisation to decrease land consumption | | | |
| | | Reduction of immission on soil via, e.g. modern technical standards | | | |
| | | Additional to EIA procedure: | | | |
| | minimize | Obligatory application of guidelines for e.g. professional recultivation | | | |
| | | Soil scientific construction supervision – consulting and guarantee of professional measurement implementation | | | |
| | | Save handling of soil in construction phase: <ul style="list-style-type: none"> • Storage of humus layers, • Assessment notice for soil storage, • Professional treatment of excavated soil, e.g. open soil is recultivated immediately to minimize wind-erosion, contaminated soil is treated according to waste demands, emissions of particulate matter have to be reduced by moistening of the road surfaces, | | | |

| EIA Soil Subtopic | | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study Y/N | Comments |
|-------------------|------------|--|--------------------------------|---------------------------------------|----------|
| | | <ul style="list-style-type: none"> Avoidance of leaching/infiltration of chemicals, oil or fuel in construction area, Measures to balance and minimize soil compaction e.g. mats, coverage, no pass of wet soils, using light machines Measures to preserve soil functions e.g. professional recultivation to preserve productivity for agricultural production, preserve soil quality during storage | | | |
| | | Preservation of evidence (soil assessment) for follow-up care and accompanying monitoring | | | |
| | | Implementation of monitoring e.g. of contaminants in soil using periodic random sampling or bio-indicators (e.g. phytoindicators) for conservation of soil and forage quality & soil functions mainly for agricultural purposes, to avoid exceeding of critical values of pollutants | | | |
| | | Supervisory right/right to monitor of the authority at all times e.g. if samples show enhanced contents, additional measures have to be set (e.g. further investigations) for soil and health protection | | | |
| | | Fertilizing plan, verification of used pesticides according to licences and legal requirements for use | | | |
| | | Implementation of dense underground in risk areas for leaching/input of pollutants to avoid soil contamination | | | |
| | | Annual evaluation of compensation measures to reduce particle immission, evaluation of traffic related emissions (diffuse contamination) | | | |
| | | Additional to EIA procedure: | | | |
| | compensate | Obligation of measures to protect soil and its functions, e.g. an ecological compensation and balancing area has to be allocated and made available to the public nearby project area, but the consumption of soil cannot be compensated by making another soil available to the public - only few functions of lost soil can be compensated by this measure – emerging from nature | | | |

| EIA Soil Subtopic | | Criteria from maximum list EIA Guidance | Relevance for case study (Y/N) | Criteria considered in case study Y/N | Comments |
|-------------------|--|---|--------------------------------|---------------------------------------|----------|
| | | protection regulations and cannot be applied on soil issues in the same way | | | |
| | | Amelioration of contaminated soils and soil functions | | | |
| | | Recovery and recultivation e.g. after exploitation of underground | | | |
| | | Compensation charge of certain amount of money | | | |
| | | Additional to EIA procedure: | | | |

Assessment method:

Sum of criteria indicated as relevant will be considered as 100 %. Amount of criteria really considered in case study shows achievement of objectives in %.

Short Summary of the final assessment of the EIA Project regarding the usability of the guidance:



URBAN SMS Soil Management Strategy



This paper belongs to the following section of URBAN SMS work plan:
WP3 Soil management concept / 3.3 SEA/EIA Guideline / 3.3.2 Guidance
for soil in SEA/EIA

www.urban-sms.eu

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