

# HOME English

## System Exploration Environment and Subsurface (SEES)

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### What is it?

The System Exploration Environment & Subsurface (SEES) is a method which supports and registers the know-ledge exchange between experts of different fields. The method gives an overview of the urban system: it relates the "above ground" layers of people, cycles, buildings, public spaces and infrastructure to "subsurface qualities" divided in four themes: civil constructions, water, energy and soil. The method is related to the Japanese LEAN thinking, that by focussing on quality direct communication, and making and keeping clear appointments and therefore not on impossibilities, avoids mistakes. This System Exploration Environment & Subsurface enables smarter producing if it is performed in an early stage of a development process.

### What is this SEES for?

The System Exploration Environment & Subsurface is meant to be used in project teams, working on urban development. It guides the dialogue between the representatives of the technical and natural boundary conditions and the aboveground specialists that represent the social-economic requirements. It offers a systematic overview that enables the consultation of all necessary specialists and fields and gives to opportunity to search for clever connections. Because the subsurface is taken into account, (see backside of this folder) and gathering and discussing all information in a systematic way in the planning process, it is possible to make smarter urban designs. Smarter urban designs lead to more climate proof, (think about the water issue), to energy-saving (soil energy), more sustainable (the identification of cycles) and to cheaper (earlier identification of benefits, problems and costs) designs.

### How to use it?

The overview underneath is filled by project partners and experts from aboveground and subsurface in a half day workshop. The workshop is prepared by the experts, who have checked which themes are of importance in the project location and surroundings. The workshop starts with an introduction on the plan (usually an urban (re)development plan). Second step is an introduction on the subsurface themes. Then the inventory of challenges, opportunities, points of attention starts, all points are identified in this scheme and first ideas for solutions or integration in the plan are exchanged. The last step is to connect people from aboveground and subsoil, action points for a follow up are agreed on.

SUBSURFACE / SUBSOIL	CIVIL CONSTRUCTIONS	ENERGY	WATER	SUBSURFACE	SUBSURFACE / SUBSOIL
<b>LAYERS</b>	archaeology explosives underground building cables and pipes carrying capacity	ATES (water, thermal energy) geothermal energy fossil energy resources	water filtering capacity water storage capacity drinking water resource	clean soil subsoil life / crop capacity geomorphological landscape ecology ecology sand/clay/gravel resources subsurface storage	<b>LAYERS</b>
PEOPLE					PEOPLE social structure (neighbourhood, typology) social behaviour labour productivity labour capital
METABOLISM					METABOLISM energy / food water waste air (building) material products
BUILDINGS					BUILDINGS offices housing utility culture
PUBLIC SPACE					PUBLIC SPACE living environment culture nature agriculture
INFRA STRUCTURE					INFRA STRUCTURE mobility network
SUBSURFACE					SUBSURFACE subsurface subsoil water energy civil constructions
SUBSURFACE	CIVIL CONSTRUCTIONS	ENERGY	WATER	SUBSURFACE	SUBSURFACE

shallow  
shallow and water layer  
water layer  
deep > 500 meter

More information?

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Figure: System Exploration Environment and Subsurface

### Who developed it?

The "System Exploration Environment & Subsoil" was developed in a collaboration between Deltares, TUD, TNO, The Dutch Ministry of Infrastructure and Environment, the Municipality of Rotterdam and Foundation of Knowledge Development and Transfer Soil (SKB).