

## HIGH DENSITY RESIDENTIAL AREAS

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### Summary

In the densely built-up city, soils occur either as a few remnants or as newly constructed soil bodies established above the sealed area. The remnants are soils of street tree patches and the much more reduced and interrupted pattern of soils between paving stones. Soils are also found in containers and flowerpots. Areas of new soils that can reach a large sizes are those of rooftop planting.

Common to all these soils is the extreme environment of the city and related construction. Soils develop under conditions of strong variation of air and household water or strong concentration of solid matter, solute and water flow. Although more often found in the less densely built-up urban districts, the latter category includes also the soils of ditches for stormwater infiltration of roof runoff. Urban conditions result in new soils of special characteristics and suitability as habitats that contribute to nature and biodiversity.

Of special interest to soils of street tree patches are nutrient content, air and water supply from soils, harmful compounds from traffic emission, salinity and alkalinity from de-icing in cold regions, or from irrigation of street trees in arid countries. The small volume of container gardens is profoundly influenced by dry and wet weather conditions.

Soil sealing acts as a barrier. It occurs in different forms and degrees. The sealing degree can be classified. Effects of sealing can be fragmentation of catchment areas, reduction of evapotranspiration and increase in groundwater renewal in the case of in-place sealing.

Some rooftop plantings are old and consist of gravel deposits. The soils of the modern

rooftop planting are shallow, poor in nutrients and of limited water storage capacity. They are the soil cover of an extensive and easily managed urban vegetation cover.

The success of infiltration of roof runoff into the soil is dependent on the infiltration technique used, selection of suitable soil, ratio of roof to infiltration area, maintenance of the infiltration system, control of pollutants and development of the soil and its degradation.

## **1. Introduction**

High density of population and of buildings reduces vegetated soil resources in the city. For the residents this means some reduction in the quality of life in the city. An obvious answer to this is migration of the population to suburban settlements or farther away. For the city itself this also can mean loss of tax income.

The question is whether there are strategies available to improve the quality of city life and keep people in the cities.

One way is to improve the existing residual green space. Most of it is street trees which can produce a high green volume. To achieve this, the soils must be in a such a condition that the roots of trees can anchor them securely and supply them with water, nutrients and oxygen.

Other means of bringing greenery into the overcrowded and totally packed city include the use of containers. Every city has an abundance of niches which can be used for pots of all sizes, to develop a green effect by their mass. Flowerpots and window boxes can fill this function in the smallest of areas.

There are also opportunities to recover large parts of the green space which were lost by construction and sealing. One way is by rooftop planting. Rooftops offer enormous facilities that are largely unused. Numerous examples from recent centuries show how soils can be established on roofs and that they develop their own significant nature.

Soil and water are closely connected with each other. Management of soils also means water management in the city. As a result of sealing, water and solute flow are concentrated so that they infiltrate into the soils on a large scale at a limited number of points in the city, mainly as stormwater infiltration. The city ecosystem is also characterized by dissection of the original large catchment area into numerous small ones. Small areas can have high impacts on soils due to extensive leaching.

All these soils form special groups in the city and exist under extreme environmental conditions and impacts. They are part of the city's nature and in time they will develop their own balance with the local prevailing factors. If they can be allowed to develop naturally over a larger area they will become of growing importance.

We should therefore start to develop the concept of a soil skin for the city, and incorporate it in city planning. Some examples of the features of parts of the soil skin of the city will be given here.

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