

With a
foreword by
Dr Joan Clos

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Underground Spaces Unveiled

Planning and creating the cities of the future

Han Admiraal and Antonia Cornaro
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Description

Underground Spaces Unveiled is an in-depth overview of the concept of underground space development, investigating major factors determining the future of our cities and how we can plan and create them by applying best practice in underground space development to ensure their sustainability.

Written by an enlightened engineer and a visionary urban planner thereby ensuring a balanced view and wide appeal, the book is intended for civil engineers, urban planners, urban designers and architects as well as policy makers and anyone involved with or interested in the future of urban development and the built environment.

This book shows the benefits and challenges, the possibilities and world-class examples of underground space development and how these translate into sustainable urbanisation.

Underground Space:

- **Approaches all aspects of urban underground space and brings together both past and present insights**
- **Includes worldwide case studies from the perspectives of a civil engineer and an urban planner, offering a multi-faceted approach to the considerations of underground space use**
- **Places urban underground space within the timely context of rapid urbanisation, climate change, and urban resilience and discusses the various claims to the subsurface including legal aspects and value capturing.**

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Han Admiraal has been active in the field of underground space for over 20 years. A civil engineer by training, he worked for the Netherlands Government and as a professor at Zeeland university of Applied Science. Currently he works as an independent consultant in this field. He is chair of the International Tunnelling and Underground Space Association's Committee on Underground Space (ITACUS) and internationally recognised as a thought leader in this field.

Antonia Cornaro, a New York trained urban planner, has worked in urban and transportation planning in America, UK, Austria and Switzerland. She currently specialises in underground infrastructure, focussing on Urban Underground Space with the aim to increase mobility, liveability and resilience of urban areas. This is also central to her work as Vice-Chair of ITACUS. She has published and presented extensively, often jointly with Han Admiraal on this topic. This is her first book.



Foreword by Dr Joan Clos

Underground Spaces Unveiled - Planning and Creating the Cities of the Future is an enriching analysis on underground space which comes at a crucial moment of the implementation process of the New Urban Agenda, the outcome document of Habitat III, adopted in Quito (Ecuador).

The quest for compact, energy-efficient, resilient and livable cities has led to an increasing emphasis on planned urbanization. The character and image of a city, too, are defined and framed by its streets and public spaces, whether boulevards or neighbourhood streets, squares or neighbourhood gardens or children's playgrounds. Urban centres that have limited public space on the surface or face severe weather conditions, such as Montreal and Helsinki, are starting to turn their attention to the underground, from subterranean parks to shopping malls and shopping arcades.

However, the potential of underground spaces is typically overlooked or neglected in planning processes. Most cities have limited understanding of the potential of underground space and there is little clarity on the importance of a planning approach to this space. Traditionally, cities have made use of underground space for transport (particularly rapid rail transport), services and parking. In some cases, such as Hong Kong, Singapore and lately London, public space areas, with commerce and entertainment, as well as pedestrian connectivity, have been developed successfully. However, such spaces often follow the surface public space layout, as the situation and even the legal status below private plots remain unclear, and underground spatial planning or design strategies - where they exist - may not provide adequate guidance in this regard. Indeed, the effective use of underground space poses specific challenges, including geology and underground ecology, as well as legal barriers and governance constraints in its planning and management. Without a vision, a strategy and appropriate legal and fiscal instruments to address these challenges, its use would remain ad-hoc and chaotic.

A growing interest on underground space is clearly driven by the need and opportunities for the location of services, waste management, as well as energy related infrastructure for production and distribution. In addition, locating other functions underground (such as transportation, cinemas and shopping facilities, as well as museums and cultural spaces – e.g. in case of Athens), will create more space above ground for recreation and other social activities. Building underground can improve our urban environment by relieving the pressure on the surface, developing better public transport networks, reducing noise, and leaving more green areas intact above ground.

The use of underground space can help cities remain compact, energy efficient or find the space needed to include new functions in the existing city landscape. Underground spaces can play a critical role in cities, connecting spaces, people and goods, and thereby facilitating commerce, social interaction and mobility, creating new urban tissue, which can also contribute to the liveability and character of cities.

Planning the underground space coupled with the development of legal frameworks will require planners and decision makers to work together with new knowledge and understanding of the specific constraints and opportunities of this important space. This publication occupies an important niche and significantly advances the discussion in this area.

Dr. Joan Clos.

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