



MAKING THE CASE FOR
INFRASTRUCTURE

IMAGINING THE UNDERGROUND

A BLUEPRINT FOR HIGH-DENSITY CITIES

In the second of a series covering our Imagine 2060 partnership with Asia Society, now in its third year, and focusing on 'Earth', AECOM's Asia Pacific President **Sean Chiao** explores how Singapore is leading the way with its visionary planning and utilisation of the space beneath our feet.

A city is filled with many layers. Some high above the earth's surface and others far below. Despite having grown by 25 per cent through reclamation, Singapore comprises just 724 square-kilometres of land. With a population that has steadily increased over the last 50 years and is projected to grow even further, the city must maximise the space that it has. But, with its future needs not yet fully known, Singapore's bold ideas for land-use require effective long-term planning, a people-centric approach and focused political will to be realised.

Planning for the next century

In partnership with Asia Society, AECOM's Imagine 2060¹ dialogue in Singapore explored a range of creative solutions, from vertical farming, floating data centres and solar panels to underground restaurants, hotels, theme parks and even entire cities.

While not required to meet Singapore's immediate infrastructure needs, these solutions warrant urgent attention. It's never easy to predict what will be essential 40 to 50 years from now. But, for the benefit of future generations, cities must aim to plan up to 100 years ahead with a stretch population estimate in mind.



FOR THE BENEFIT OF FUTURE GENERATIONS, CITIES MUST AIM TO PLAN UP TO 100 YEARS AHEAD WITH A STRETCH POPULATION ESTIMATE IN MIND.

As society ages, or climate change progresses, it is critical to have a comprehensive vision for developing each layer of our urban space. Flexibility is needed to optimise a city's land, and equally important, to incorporate the underground in a holistic masterplan.

Singapore stands at the cutting edge of this revolution, with an approach that goes beyond just including the underground in their city's existing masterplan. Singapore's Urban Redevelopment Authority (URA) has created a masterplan dedicated solely to the city's subterranean space. ➔



PUBLIC SECTOR LEADERS MUST CONSIDER LAND OPTIMISATION A PRIORITY, IF INNOVATIVE IDEAS TO MEET POPULATION GROWTH ARE TO BECOME REALITY.



Is there life beneath the surface?

Most people have no issue with moving, wherever possible, transportation infrastructure and services, such as utility lines, drainage, sewage, water storage and power stations underground, to free up land area for residential and recreational purposes. Yet many still feel it is an unnatural ecosystem for day-to-day living.

Unless the public can be convinced of a greater benefit, the added expense of building to live below ground may not be justifiable, and extensive socialisation is required before any real traction can be made. This is despite functioning and thriving below-ground facilities and communities, such as the West Kowloon Terminus² (WKT) in Hong Kong, Ewha Womans University Campus Centre³ in Seoul, the ancient underground city of Derinkuyu⁴ in Turkey, and in cities including Helsinki⁵ and Montreal⁶, that users and residents find liveable, safe and beautiful.

Building below ground today

While the city's current plan does not involve citizens living or studying below ground, Singapore is leading the way with a wide array of underground projects — both existing and in the works. This comprises an extensive MRT system, including the 43-kilometre Thomson-East Coast Line that is currently under construction, and the Tuas Terminal that involved reclamation of some 350 hectares of land to facilitate shifting the current port to Pasir Panjang, making space for further development.

The Jurong Island-Pioneer Tunnel — spanning 5 kilometres — contains transmission cables that will replace eight existing circuits running across Singapore. The cables will carry 20 per cent of the city's current electricity supply. Building the tunnels 50–80 metres deep underground ensures that repair and replacement works are more efficient, causing minimal disruptions to the public.

Singapore is also exploring the use of underground space to collect excess stormwater through an island-wide

network of tunnels, which transports the water to an underground reservoir cavern. This would help to strengthen the city's current drainage infrastructure in preparation for a future in which climate change causes extreme storms.

Land use in 2060

Public sector leaders must consider land optimisation a priority, if innovative ideas to meet population growth are to become reality. Relocating public utilities and other communal services not only requires large amounts of government funding and support, but also focused, long-term strategic planning. Singapore serves as an example of strong government leadership keen to ensure the future liveability of their 'City in a Garden'.

Whether the discussion is on water⁷, air⁸ or land⁹, political will determines the pace of change. As we Imagine 2060, we should steer away from complacency and remain open to pioneering options for urban planning and land use, both above and below ground. **WU**