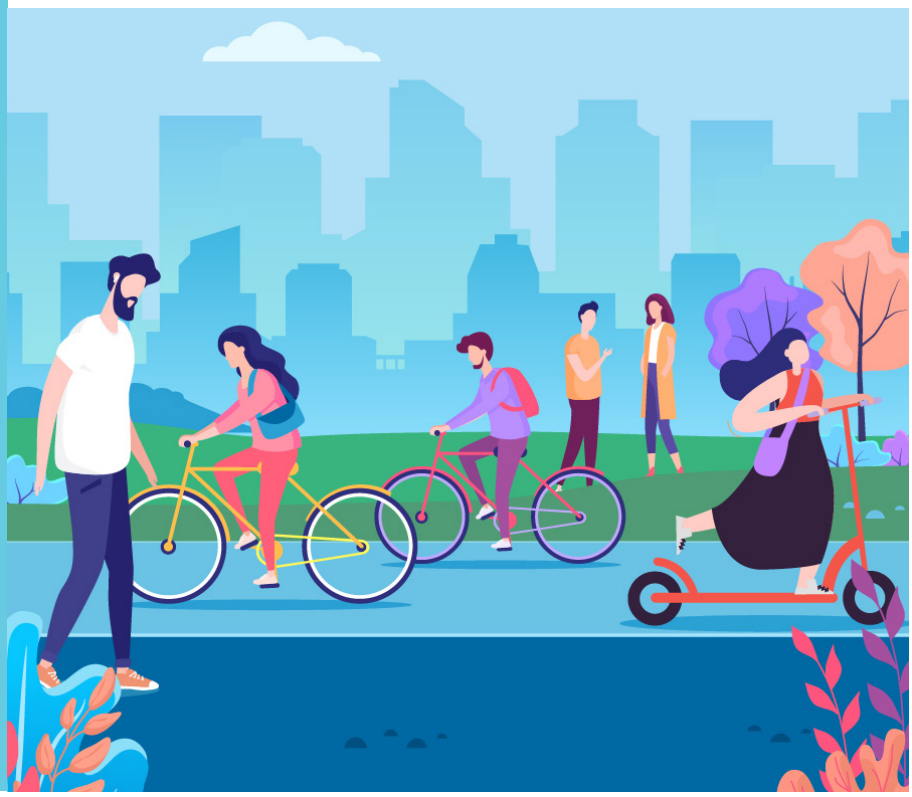
CENTRE for LiveableCities SINGAPORE

Cycling and the use of personal mobility devices are increasingly seen as key components of a city's transport ecosystem, alongside conventional public transport. They are not only a means of transportation but also support liveable and healthy cityscapes. For Singapore to move towards a car-lite future, the active mobility infrastructure network has to be more extensive and permeable than the road network, and be supported by adequate amenities. This article discusses possible strategies for planning an active mobility landscape for Singapore, based on the thoughts of the renowned urban designer Jan Gehl, who was in Singapore as part of CLC's Visiting Fellowship programme, as well as lessons from some of the world's leading cycling cities.



Missing Link in Singapore's Land Transport Planning: A Comprehensive Active Mobility Network Plan

PROMOTING "WALK CYCLE RIDE" IN SINGAPORE

Singapore's leaders, policymakers and planners recognise that Singapore's land transport system has to be made more efficient and sustainable, and that the push for active mobility modes has been gaining momentum. Cycling can be a viable commuting option, while personal mobility devices (PMDs) can serve first- and last-mile travel needs in Singapore's hub-and-spokes public transport model. Travel use of active mobility modes, such as bicycles, power-assisted bicycles, and PMDs such as e-scooters and kick scooters, has gone up from 2.2 million to 2.6 million daily journeys between 2012 and 2016.[1] One in four households in Singapore owns bicycles and 125,000 people cycle as part of their daily commute.[2]

In the Land Transport Master Plan (LTMP 2040) that looks ahead to 2040, LTA is encouraging Singaporeans to choose to "Walk Cycle Ride" to get around. The theme of convenient and sustainable mobility is also emphasised in Singapore's latest Draft Master Plan (DMP) 2019, which aims to enhance connectivity through improved public transport and active mobility networks. In particular, the LTMP Advisory Panel appointed by the

> To achieve a… paradigm shift in Singapore, planners and traffic engineers would need to look beyond KPIs that are based on roadway/vehicular levels of service (LOS) and prioritise active mobility when developing policies, plans, designs and regulations.

Fig 1: Walking And Cycling Design Guide
Source: URA

Ministry of Transport recommended the following targets as goals for LTMP 2040:

- Target 1: 20-minute towns, i.e., all journeys to the nearest neighbourhood centre using public, active and shared modes are completed in less than 20 minutes.
- Target 2: 45-minute city, i.e., 9 in 10 peak-period journeys using public, active and shared modes of transport are completed in less than 45 minutes.
- Target 3: Public, active, shared modes of transport are the preferred ways to travel, accounting for 9 in 10 of all peak-period journeys.

ON THE RIGHT TRACK IN PROMOTING ACTIVE MOBILITY

Beyond setting broad targets for active mobility, there have been nationwide efforts since 2009 to improve the cycling infrastructure in housing estates. To date, about 440 km of cycling paths and park connectors have been built, which is more than half the 700-km target set for building by 2030 under the National Cycling Plan. The LTMP 2040 targeted to increase the network to 1000km by 2040.[3] DMP 2019, too, includes a new Connectivity control plan.[4] Both LTMP 2040 and DMP 2019 laid out, among other things, plans for car-lite precincts, an intra and inter-town cycling network, and the intention to facilitate cycling in private residential estates and industrial estates. Since then, the government made further announcement to explore expanding the network to about 1300km before 2030.[4]

The government has also rolled out additional regulations and guidelines to encourage the private sector to develop active mobility-related infrastructure. From 1 February 2019, developments that are located in car-lite precincts[6] or within 400 m of major transport nodes, or are retail, office or mixed-use developments, are required to submit a Walking and Cycling Plan as part of new development applications. This is expected to provide first- and last-mile connections as well as support end-of-trip amenities such as bicycle parking and changing rooms, making cycling even more convenient. In addition, a Walking and Cycling Design guide drawn up by a multi-agencies committee led by LTA and URA was rolled out in December 2018 to provide a common set of design guidelines for the planning and design of active mobility infrastructure. It is intended to supplement the various agencies' prevailing codes of practice, and engineering and development standards.

Singapore has learnt from international experts, such as the globally renowned expert in walkable and bikeable urban environments Jan Gehl, whose mantra is "better conditions for cyclists encourages more to cycle".[7] This effectively calls on governments to break the vicious circle between the lack of suitable cycling infrastructure and the low rates of cycling. In 2014, Gehl Architects conducted a walkability and bikeability study in Singapore, using Ang Mo Kio town as the study area. More than 55 participants cycled around Ang Mo Kio and uncovered

Figure 2: Jan Gehl visiting Ang Mo Kio in 2018 with CLC and LTA officers. *Source: CLC*

Figure 3: Gehl during a workshop with LTA and CLC on planning for active mobility and the North-South Corridor. *Source: CLC*

issues such as lack of connectivity, car-dominated streets, narrow footpaths, obstacles on cycling paths, and insufficient amenities such as parking facilities and sheltered pathways for bicycles.
The workshop marked the start of Ang Mo Kio's transformation into a model walking and cycling town. Besides constructing more cycling paths, supporting infrastructure and facilities were installed, such as additional bicycle parking at popular locations like the entrances to the Ang Mo Kio MRT station, bicycle maintenance installations, and wheeling ramps retrofitted on staircase ramps. When he visited Ang Mo Kio again in 2018, Gehl was delighted to see the increase in cyclists and attributed it to infrastructure improvements and well-thought out amenities being put in place.

MANAGING THE PITFALLS OF ACTIVE MOBILITY

The downside to the growing popularity of active mobility is that cyclists and PMD users have been increasingly coming into conflict with other road users and pedestrians, sometimes with serious consequences. The statistics are telling. The number of reported accidents between these groups tripled from 42 in 2016 to 128 in 2017. Between May and December 2018, more than 2,500 active mobility offences were recorded,[8] resulting in several errant riders being hauled to court.[9]

To encourage safer path- and road-sharing, LTA subsequently introduced new rules and regulations. These included a lower speed limit for riders on footpaths (10 km/hr), mandatory use of helmets by cyclists, as well as mandatory registration of power-assisted bicycles and, later, e-scooters. Some cyclists and PMD users worry that the new rules and regulations will discourage active mobility.

Like Singapore, many cities are struggling to accommodate different active mobility modes within their existing mobility infrastructure. Some such as Madrid, London and San Francisco have banned the use of PMDs in one form or another. Even in countries such as the Netherlands and Denmark, where the cycling culture and infrastructure are well established, the rapid rise in the use of PMDs such as e-scooters and hoverboards is causing headaches.

In the Netherlands, where cycling paths are packed during peak hours, the upsurge in PMD usage with different speeds and user behaviours is deemed a threat to public safety. With no common set of rules, different Dutch cities have rushed to put out a hotchpotch of rules for various PMDs.

Despite concerns from the Danish traffic council, the police and even cyclists, the Danish Ministry of Transport, Building and Housing went ahead in January 2019 with two trials for the use of PMDs on cycle paths.

Although accommodating cycling and PMD usage can be very challenging, these modes are the missing link in Singapore's car-lite movement and are likely to be here to stay. Creating a comprehensive active mobility network that allows for safe and direct door-to-door movement is crucial, but simply trying to graft active mobility

> Ultimately, for a city's active modes to be more attractive than travelling by private vehicles, its active mobility infrastructure network should be more extensive and permeable than its road network, and be supported by adequate amenities.

Figure 4: Different types of PMDs such as scooters and mobility scooters sharing the cycling path with cyclists in Amsterdam. *Source: Cherub Ho.*

infrastructure onto a well-established transport system has been problematic for the authorities.

ADOPTING AN INTEGRATED LONG-TERM PLANNING APPROACH FOR ACTIVE MOBILITY

For decades, Singapore's transport and urban planners have wisely adopted an integrated and long-term approach to the planning and development of its rail and road networks. The planning and development of an active mobility system requires the same mindset. With our active mobility infrastructure still in its infancy, we have a unique opportunity to develop a system that will be robust and responsive to the needs of active mobility users for decades to come.

Singapore's road network was planned based on a hierarchy of streets from expressways and semi-expressways to arterial, collector and local roads that catered to different contexts and the needs of various types of motorised vehicular traffic. On the other hand, the cycling network has missing links and insufficient direct routes. Cyclists do not have access to a similar hierarchy of routes that link between and within towns to their destination, nor is there any "cycling highway" catering to cyclists who prefer a more direct and faster commute.

Until the forward-looking LTMP 2040, the approach to planning and implementing a cycling network had been based on the perception of cycling as largely a recreational activity and as a first- and last-mile intra-town mode feeding into public transit systems. It was often driven by space considerations with the emphasis that capacity for vehicular traffic would not be compromised and affected. The 700-km network of cycling paths includes existing park connector network (PCN) routes that are extensive but are not conducive to long-distance cycling since they are circuitous and interspersed with traffic lights, having been originally designed for recreational cycling. While LTMP 2040 sets out to construct more dedicated paths and wider shared paths, the approach for implementation continues to be guided by space considerations.

To address these challenges, three strategies are recommended:

1. Treat active mobility as a legitimate transport mode on par with public transport and cars.

Gehl points out, "Singapore's strategy to reduce reliance on private vehicles by investing heavily in public transport is the right move, but to truly achieve the result, we need to do more to prioritise pedestrians and active mobility users." Efforts to develop active mobility infrastructure could be undertaken as part of our existing approach of integrating land use and transport planning to bring people closer to jobs and destinations, and to reduce reliance on vehicular transport modes. This is also one of three strategies identified in LTMP 2040.[10]

Looking at the experience of other cities again, in Freiburg, often called Germany's "eco-city", the city planners understand that to reduce reliance on motor vehicles, they need to integrate urban development with

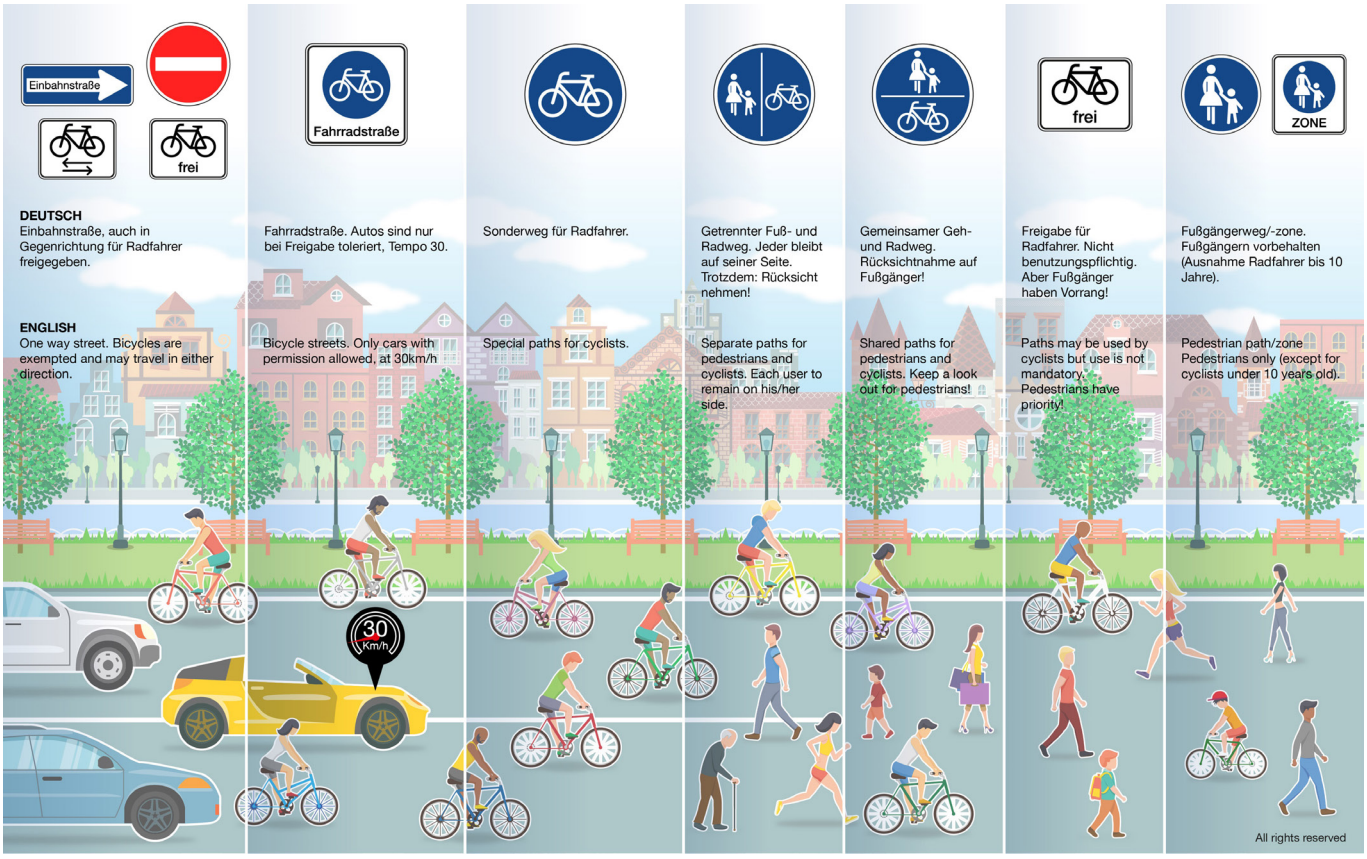


Figure 5: Different rules for different streets—Freiburg's efforts to encourage harmonious coexistence between motorists, cyclists and pedestrians. *Source: CLC*

transport planning to achieve what they term a "city of short distance". They also embrace cycling as part of the transport ecosystem, and help motorists, pedestrians and cyclists to co-exist by instituting different rules for different streets. Consequently, in 2016, a whopping 63% of trips were made on foot and on bicycles, 16% by public transport, and only 21% by car.[11]

In Copenhagen, the authorities have not hesitated to prioritise cycling over driving. Where space is a constraint for installing new cycling tracks or widening existing tracks, street parking and traffic lanes are removed to make way for the former. Traffic engineers also coordinate traffic lights in favour of bicycles during peak hours.[12] It is thus no surprise that 43% of residents in Copenhagen cycle to work daily.[13]

To achieve a similar paradigm shift in Singapore, planners and traffic engineers would need to look beyond KPIs that are based on roadway/vehicular levels of service (LOS) and prioritise active mobility when developing policies, plans, designs and regulations. Details are important when it comes to planning and designing for walking and active mobility. Gehl has identified as barriers to active mobility several existing design features that promote high-speed vehicular traffic. These include wide-radius slip lanes at major intersections, multiple left-turning lanes and overhead bridges.

2. Implement a hierarchy system that caters to different needs and users within the active mobility network.

The speeds of active mobility modes are 10–30 km/hr. Conventional planning and design catering to only pedestrians and vehicular traffic will not be able to cater to the needs of users of active mobility modes. One principal factor that has made cycling a viable commuting option for the leading cycling cities is the completeness of their cycling networks, i.e., their ability to connect cyclists' origins and intended destinations. Gehl Architects' Camilla van Deurs explains that developing cycling infrastructure is "about everyday movement, not recreation; not about exercise, but an equal form of urban transportation."[14] Studies have shown that good cycling infrastructure creates safe conditions that help to raise the cycling mode share in many cities. In Amsterdam, for example, the street network itself is a cycling network and almost all its streets have excellent cycling facilities.[15]

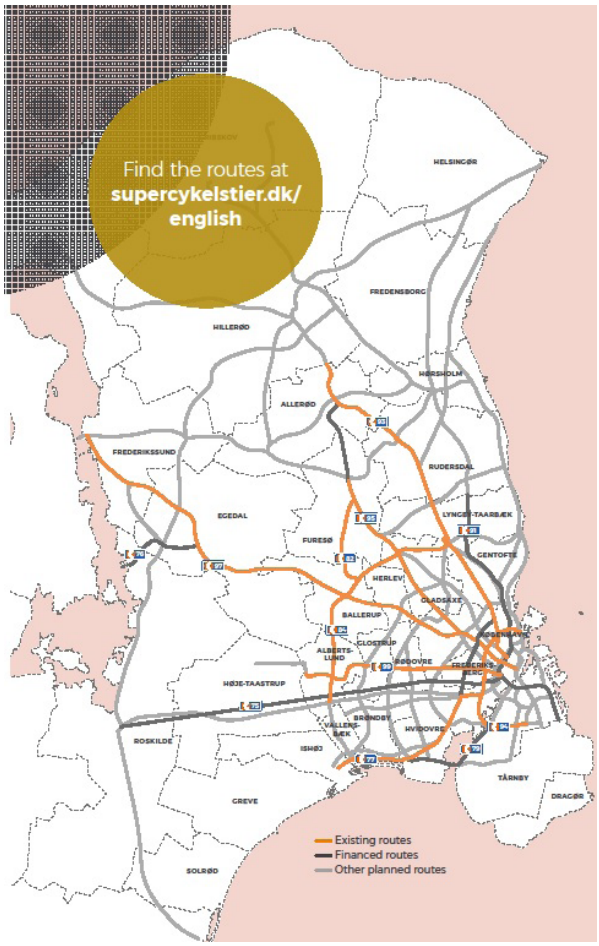


Figure 6: Planned and existing network of cycle superhighways in Denmark. *Source: "Cycle superhighways Capital Region of Denmark", https://supercykelstier.dk/wp-content/uploads/2016/03/Haefte-UK-2018.pdf*

Figure 7: Painted cycling paths at crossings in Amsterdam to ensure visibility and encourage good behaviour. *Source: Cherub Ho.*

Figure 8: Street in Amsterdam where the lack of bicycle parking facilities leads to indiscriminate parking and the obstruction of footpaths. *Source: Cherub Ho.*

Another example is Denmark. In 2012, the completion of a 21-km long cycle superhighway connecting the suburb of Farum to Copenhagen saw a 52% increase in the number of cyclists. More encouragingly, 21% of these were new cyclists who used to commute by car.[16] By 2016, however, cycling trips at the national level were dropping, even as bicycle traffic within central Copenhagen surpassed car traffic. This spurred 23 municipalities and the Capital Region of Denmark to join forces to develop a vision and plan for cycle superhighways linking various regions. Of the 45 routes totalling 746 km planned for completion by 2045, 167 km had been built by 2018.[17] The cycle superhighways are projected to replace one million car trips annually.

Taking reference from these cities that have successfully encouraged a cycling culture, the same thinking could be applied in our plans for making active mobility modes a preferred choice. Ultimately, for a city's active mobility modes to be more attractive to commuters than travelling by private vehicles, its active mobility infrastructure network should be more extensive and permeable than its road network, and be supported by adequate amenities.

3. Encourage active mobility by understanding users' needs and planning ahead.

As demand for cycling grows, overcrowding can become a problem, and, as seen in Amsterdam, this can spark safety concerns among more vulnerable users of the cycling network. To avoid such pitfalls, we could plan ahead to cater to growing demand by safeguarding active mobility corridors and routes, much like how long-term planning allowed Singapore to safeguard rail and road reserve lines so that transport infrastructure could be rolled out in tandem with other development.

> One step that… Singapore policymakers could take is to find out why some pedestrian schemes are underused while others are successful, in order to grasp the human aspects of infrastructure and improve the design…

Moreover, an active mobility network does not exist in a vacuum. It needs to be complemented by a range of supporting infrastructure such as bicycle parking facilities and end-of-trip facilities, and space has to be reserved and allocated for them. While a Walking and Cycling Plan ensures that developers provide end-of-trip facilities in new developments, planning ahead ensures there is overall coherence and avoids situating unnecessary facilities in less than ideal locations.

Judicious planning calls for understanding users' needs first. Gehl points out that "The cities [know] everything about traffic and nothing about people, and how and why people use the city."[18] The traffic departments of most cities invest tremendous effort and resources to study and manage traffic—collecting vehicular traffic data, developing traffic models to simulate traffic impacts, and developing improvements to mitigate any traffic impacts. Yet, not enough effort and resources are being invested into understanding the behaviour of pedestrians and cyclists.

Copenhagen is one rare success in documenting people's movement and use of public spaces. By tracking what activities were taking place when and where, Copenhagen planners were able to gain a better sense of usage patterns and gauge how to appropriately change and connect certain areas. To better plan for cycling infrastructure, safety perception surveys are also conducted bi-annually to gauge how comfortable residents feel about commuting in different areas at various times of the day.

OPPORTUNITY FOR A BOLD MOVE

Although these strategies may take time to materialise, there are opportunities that Singapore planners and designers can grasp now with the roll-out of several major infrastructure works in the coming years. One key opportunity is the development of the North-South Corridor (NSC), where, unlike a typical expressway, greater priority will be given to public transport and active mobility modes than to cars.

Gehl recommended adopting traffic calming and changing the ground level road network as a prominent strategy in the NSC project. Areas affected by the construction of the NSC would present opportunities to emulate on a larger scale Bencoolen Street, where road space was reclaimed for cycle paths, bicycle parking and other amenities.[19] Also, disjointed precincts along the corridor could be linked up through an active mobility network and/or pedestrianisation plans.

However, it is critical that reclaimed road space be activated as meaningful public spaces—a point that Gehl stresses; nothing frustrates people more than seeing space reclaimed from busy roads being left empty and devoid of any meaningful activities. One step that Gehl proposes Singapore policymakers could take is to find out why some pedestrian schemes are underused while others are successful, in order to grasp the human aspects of infrastructure and improve the design of the NSC.

Since Singapore began developing its active mobility infrastructure a decade ago, the focus has shifted from cycling for recreation to recognising active mobility modes as part of the transport landscape. Both DMP 2019 and LTMP 2040 have shown that urban and transport planners are committed to elevating active mobility to be the preferred mode of travel. Strong leadership and political will will be needed to drive the realignment of policy, planning, design and regulation of land use and transport to achieve this goal.

North South Corridor

Photo Credit: Laura Gilmore (CC BY-NC-ND 2.0) https://www.flickr.com/photos/genbug/4732364515 (top), Claudio Zaccherini/Shutterstock (bottom)

Notes

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