

LAND TRANSPORT AUTHORITY
ANNUAL REPORT 2018/19

BRINGING SINGAPORE TOGETHER



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CONNECTING PEOPLE AND PLACES, ENHANCING TRAVEL EXPERIENCE

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VISION

CREATE A PEOPLE-CENTRED LAND TRANSPORT SYSTEM

WHAT IS THE FUTURE OF LAND TRANSPORT?

Most commuters wish to spend as little time as possible travelling to and from their destinations.

This will give them more time to do things that matter at home, at work or at play. A little more time to sleep in or work out, a little less hurrying getting the kids to school, and hopefully, greater inner peace on every journey.

Fast and efficient commuting is one of our key goals for the future of transport in Singapore. We envision transport systems to be better connected, comfortable and convenient. And also smarter, safer and more sustainable.

All this is encapsulated in our Land Transport Master Plan 2040 (LTMP 2040). It is more than just a blueprint which maps out Singapore's transport goals; it is a vision to meet the aspirations of our people.

It also builds on LTMP 2013 which set the 2030 vision for the land transport system. The 2030 vision sought to improve Singapore's public transport system by building connections, enhancing services and developing a liveable and inclusive community.

Today, we are on track to meet our targets set for 2030. We are also gearing up to meet the vision for 2040 and beyond.

BUILDING CONNECTED COMMUNITIES

As we map out space to expand our rail, bus and road networks, we are encouraging Walk-Cycle-Ride (WCR) as the preferred mode of commute.

The target is ambitious: 90 per cent of all peak period journeys using WCR to be completed in less than 45 minutes.

Within the neighbourhood, getting to amenities such as hawker centres, polyclinics and town centres should take no more than 20 minutes from one's doorstep.

In the LTMP 2040, we call this plan "20-minute towns, 45-minute city". This is ambitious but possible given our compact size.

Yet, there are challenges to achieving such a high level of connectivity. It requires a change in the way we commute. It also requires significant infrastructure investment, including moving workplaces closer to homes by locating employment hubs outside the CBD.

Beyond the infrastructure, we aim to make public transport more inclusive for the elderly, families with children and those with special mobility needs. There will be priority queues, more Silver Zones, lifts to pedestrian overhead bridges, wheelchair and stroller-friendly buses. Everyone, regardless of age or ability, should find commuting fuss-free.

Apart from building the hardware, we want to nurture a gracious commuting culture. That begins with every one of us who has a part to play in fostering an inclusive society that looks out for the needs of others.

SEAMLESS TRAVELS

Travelling by public transport would be a seamless experience at every point of the journey.

As Singapore accelerates its drive towards a smart nation, more forms of e-payment modes will facilitate travel. With SimplyGo, for instance, commuters can tap their Mastercard or Visa contactless cards or mobile wallets for fare payments on every ride.

We have also ramped up our digital efforts through our apps and websites to offer enhanced services for motorists and commuters that allow everyone to enjoy the conveniences of a technology-enabled land transport system.

THE ROAD TO 2040

Indeed, the transport of tomorrow is driven by technology. We can look forward to more seamless connections enabled by data, smoother traffic flows on roads with artificial intelligence-controlled traffic lights, dynamically-routed bus services to reduce travelling and waiting times, and autonomous vehicles plying our roads.

Sustainability is among our long-term goals. We have made a commitment to power our entire bus and taxi fleets to cleaner energy by 2040.

As we look ahead, we should also take stock of where we are now. Singapore has done well. A 2018 study by McKinsey ranked our public transport system as the second best among leading global cities.

We will keep moving to meet the transport demands of a growing economy. With the support of everyone on this journey, I believe we will reach our destination comfortably, and on schedule.



CHAN HENG LOON ALAN

Chairman



HOW CAN WE MAKE OUR JOURNEYS SMOOTHER AND SAFER?



NGIEN HOON PING

Chief Executive

Every global city aspires to have a good land transport system, a lifeline of the metropolis and critical enabler of the economy. Singapore is no exception.

But as cities get denser and land more scarce, there will be less space for road expansion. This requires innovative solutions for more efficient and safer commutes in the future.

We are forging ahead with the Land Transport Master Plan (LTMP) 2040 that envisions a land transport system with faster, more seamless journeys that cater to all commuters, and improves Singaporeans' quality of life.

RELIABLE CONNECTIONS

Rail continues to be the backbone of our public transport system, reaching a record of over 3.5 million rides taken daily.

I am happy to share that rail reliability has far exceeded our Mean Kilometres Between Failure (MKBF) targets. MKBF measures how long trains travel before a delay. In July 2019, our MRT network reached a new milestone, crossing the MKBF target of 1 million train-km.

This is possible due to the diligent and dogged efforts of everyone in LTA and our public transport operators, working together night and day. I cannot thank them enough.

We continue to pay close attention to maintenance and safety issues. The extra hours gained by Early Closures and Late Openings (ECLO) has accelerated rail renewal and maintenance.

We are also upgrading the power system and replacing track circuits by early 2020s, and buying new trains for the North-South and East-West Lines, including mid-life upgrades of the North East Line trains. The Bukit Panjang LRT renewal works are ongoing too.

Commuters can look forward to more rail developments, with new lines and trains progressively rolling out. Residents will enjoy greater connectivity with the opening of more new stations.

We will also open additional stations on the North-South Line and Downtown Line, close the Circle Line loop, and construct the Jurong Region Line. It will be an exhilarating and exciting journey.

CONVENIENT RIDES

Apart from rail, buses continue to serve many commuters.

From 2020, three-door buses will be deployed for quicker boarding and alighting. Electric buses will be introduced and more hybrid buses added to our fleet for more sustainable rides. We will also use big data and technology to improve transport planning. Upcoming features like Transit Priority Corridors will further smoothen the journey for buses on the roads, and autonomous buses that are currently on trial will be a game-changer once implemented island wide.

Commuters will continue to benefit from an evolving Point-to-Point (P2P) sector. Through the new P2P regulatory framework, we will be able to safeguard commuters and drivers through measures such as safety standards, and vehicle inspection requirements. In regulating the sector, LTA will adopt a light-touch approach and streamline regulations where possible to allow market forces to drive service delivery and innovation.

Many are already using bicycles and personal mobility devices (PMDs) as their choice mode of travel especially for short journeys in their neighbourhood. While PMDs have brought convenience to many, there are safety concerns. We have put in place measures to address these concerns so that those using public paths, from pedestrians to cyclists to PMD users, can share the space safely.

A CAR-LITE FUTURE

The ultimate goal is a more sustainable car-lite future.

We capped the growth of cars and motorcycles to reduce congestion on roads, while encouraging the use of public transport, shared mobility (such as ride hailing, taxis and car sharing) and active mobility.

We can then look forward to freeing up space for everyone to enjoy, such as for recreation and housing.

To encourage more innovative transport solutions, the Singapore Mobility Challenge was launched by LTA, SBS Transit and SMRT to source for innovative solutions that will benefit the industry and commuters, and support the LTMP 2040 goals.

Looking back, it has been a very busy year for LTA. I am incredibly proud of the hard work and contributions of every employee in shaping Singapore's land transport for the future. Here's to smoother and safer journeys ahead!

BOARD OF DIRECTORS



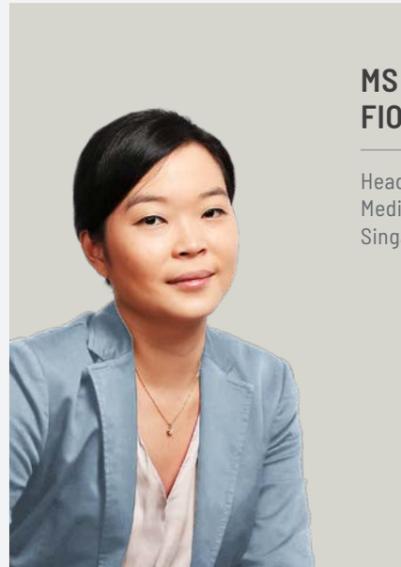
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Chairman,
Singapore-China Foundation
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Pavilion Energy Group of
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**MR RICHARD
HOO ENG JEK**

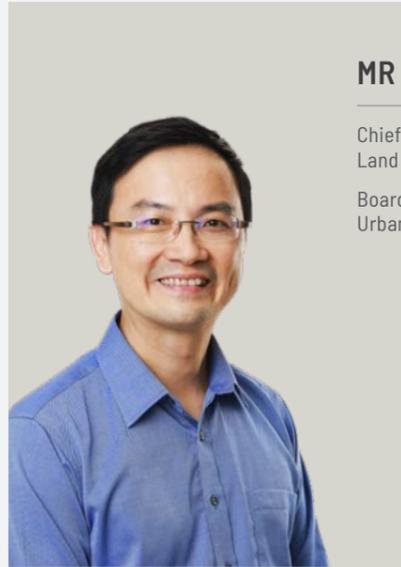
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Partner,
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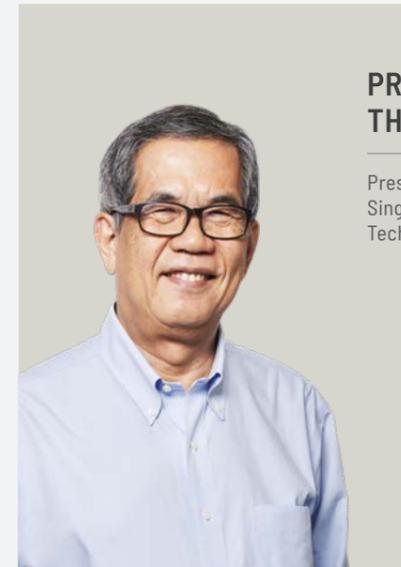
MR TAN KIAT HOW

Chief Executive Officer,
Infocomm Media Development
Authority



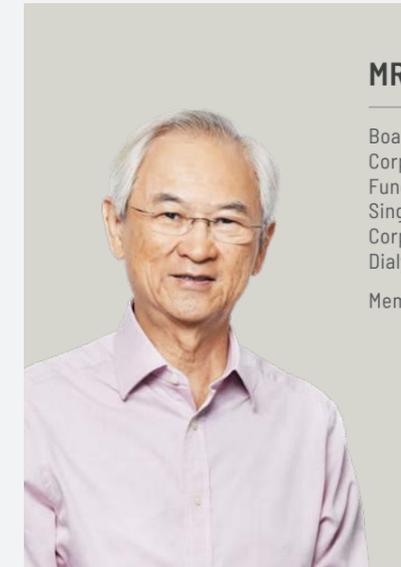
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Defence Science and
Technology Agency



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President,
Singapore Institute of
Technology



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Executive Secretary, National
Transport Workers' Union
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Corporate Communications
DR CHUAI CHIP TIONG
Chief, Quality Service Manager Office

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Rail Asset, Operations & Maintenance
MR LEOW MENG FAI
Secretary
2 Deputy Group Director,
Rail Asset, Operations & Maintenance

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Chief
Quality Service Manager Office

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Deputy Chief Executive
Public Transport, Policy & Planning

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Chief Executive

4
LAM WEE SHANN

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Technology &
Industry Development

5
CHUA CHONG KHENG

Deputy Chief Executive
Infrastructure & Development

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PETER QUEK

Group Director
Information Technology,
Cybersecurity & Digital
Services

7
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Corporate
Communications

8
WINSTON CHENG

General Counsel

9
GOH TECK SENG

Deputy Chief Executive
Corporate



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Contracts & Commercial

2
PAUL FOK
Chief Engineer
(Civil)

3
LEONG KWOK WENG
Chief Engineer
Systems

4
DR CHIN KIAN KEONG
Chief Engineer
Road & Traffic

5
ESTHER WEE
Chief Financial Officer

6
CHOO CHAI FOONG
Group Director
Infrastructure Design &
Engineering

7
YAP CHENG CHWEE
Group Director
North-South Corridor

8
LINA LIM
Group Director
Policy & Planning

9
YEO TECK GUAN
Senior Group Director
Public Transport

10
WONG WAI KEONG
Group Director
Rail Asset, Operations &
Maintenance



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Group Director
Road & Commuter Infrastructure
Development

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SIM WEE MENG

Senior Group Director
Rail and
Group Director
Rail Infrastructure and Expansion

3
DR SAMUEL CHAN

Group Director
Rail/Road Systems Engineering

4
LEW YII DER

Group Director
Safety & Contracts

5
YEE BOON CHEOW

Group Director
Special Duties

6
**VENKTARAMANA S/O
V VIJAYARAGAVAN**

Group Director
Special Projects

7
NG KEE NAM

Group Director
Thomson-East Coast &
Cross Island Lines (Civil)

8
CHANDRASEKAR

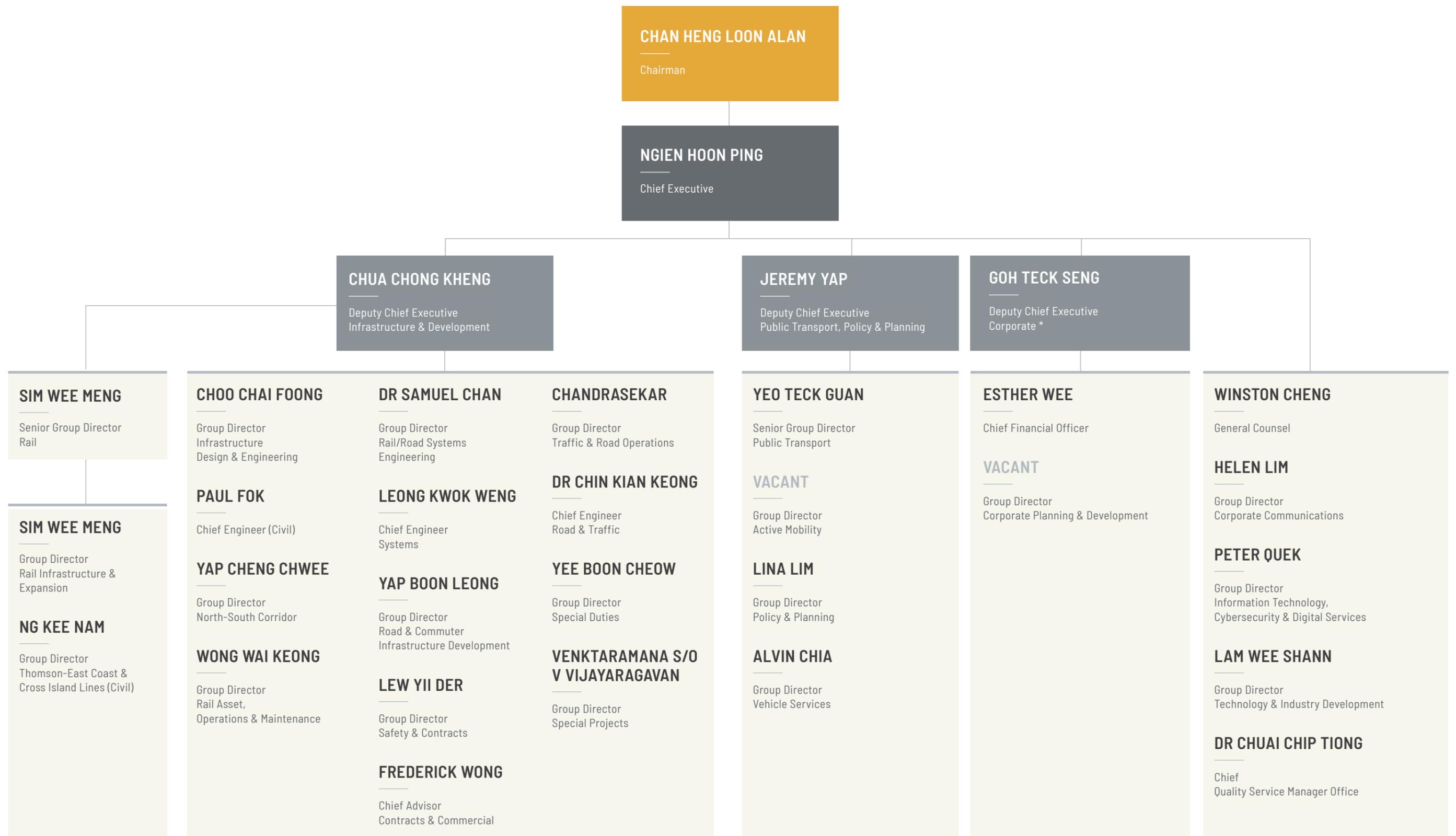
Group Director
Traffic & Road Operations

9
ALVIN CHIA

Group Director
Vehicle Services



ORGANISATION STRUCTURE



* Includes Admin Services, Customer Experience Office, Human Resource, Legal and Transformation Office

WHAT IS THE ROADMAP TO 2040?



GETTING AROUND SINGAPORE: The Tan Family in 2040

Fast forward to 20 years in the future. It is Sunday, and the blue skies call out to the Tan family to spend the day together outdoors. After a refreshing morning at the park in the nearby Jurong Lake District, the Tan family head to town for lunch.

Getting home is a breeze. Mum rides a bicycle, and dad and little Lily are on their e-scooters. Grandpa takes a brisk walk, with welcome breathers at Silver Zone road dividers where he can cross safely in 2 phases.

They freshen up, and the family of six, including grandma and baby Lynn, are raring to go. The Tans do not own a car, a choice they made because there is no lack of good public transport options – including on-demand electric buses and shuttles. They take the train which links them directly downtown.

The Tans take a 10-minute leisurely stroll to the MRT station, sheltered by walkways that connect them from their block to their train ride. They love the comfort and convenience the walkways provide from the elements, come rain or shine.

Baby Lynn's stroller is no challenge with barrier free paths and lifts that reach the train platform. In under 45 minutes, the family reaches their destination, beating the weekend lunch crowd.

On the way home after lunch, the family is grateful for the priority cabin on the train, where grandma and grandpa find seats available to rest their aching feet. There is also ample space for Lynn's stroller.

Fellow commuters, eyeing the tired children, give up their seats for the family. It is a pleasant ride on public transport which caters to commuters with different needs, and where commuters look out for one another.

But grandma and grandpa are not quite ready to go home yet. They explore the neighbourhood shops and library, which are linked as part of an integrated transport hub. Armed with heavy packages, they hail an on-demand electric bus from the hub which gets them home in less than 5 minutes.



Public transport ridership rose to a record high in 2018, with 7.54 million rides on trains or buses daily.



At LTA, we aim to bring the city closer to everyone, and Singapore closer together, through transport. This will be achieved through the Land Transport Master Plan (LTMP) 2040.

Launched this year, it will shape the land transport system into an integrated, well-connected, gracious and sustainable network. It will enable 20-minute towns to exist within a 45-minute city. By walking, cycling or riding, you can get to your destination anywhere across the island in under an hour. Here's what to expect by 2040:

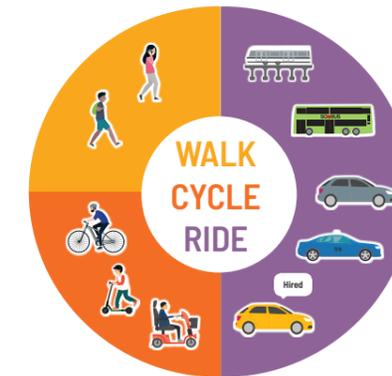
CONNECTED: AN INTEGRATED NETWORK

Public transport developments will leave people spoiled for choice. From rail and bus upgrades to extensive cycling paths, Singaporeans will be able to travel across the country via an even wider range of options.

RAIL SOLUTIONS

By 2040, the Downtown Line (DTL) and Thomson-East Coast Line (TEL) will be extended to provide greater service across the city. The DTL will extend beyond Bukit Panjang station to serve the north-western region including Yew Tee and Choa Chu Kang, while the TEL will service the future Changi Airport Terminal 5.

Studies are also in the works to see if a new rail line in the north and north-east regions is feasible to increase connectivity across Singapore.



SMOOTHER BUS RIDES

Helping buses to travel at better speeds and reliability, Transit Priority Corridors (TPCs) will include a suite of bus priority solutions. The first TPC was implemented on Bencoolen Street and more will be implemented progressively from 2020.

The longest TPC will be on the upcoming North-South Corridor that stretches from Woodlands to the city centre. When completed by 2026, it will save bus passengers an average of 10 to 15 minutes of travel time.



CYCLING AWAY

Cycling is set to become even more popular. There are now 440km of cycling paths in Singapore. We will expand the cycling path network to 750km by 2025, and triple our cycling network by 2030. With a more seamless mobility network in Singapore, people can now reach neighbourhood amenities and beyond with greater ease.

To make cycling even more convenient, new development areas such as Kampong Bugis, Tengah and Woodlands North Coast will see cycling paths on both sides of the roads. This will not only encourage a healthy lifestyle, but also make further areas more accessible.

ONE-STOP HUBS

With bus and train connections enhanced by new Integrated Transport Hubs (ITHs), commuters will never be far from public transport. Dotted across the transport network, ITHs allow people to stop by and have easy access to amenities, before continuing on their journey. Look out for new hubs in Bidadari, Buangkok and Punggol North.

INCLUSIVE: CATERS TO ALL

Being considerate to others improves everyone's commuting experience. Along with public transport staff, everyone plays a part in ensuring a pleasant public transport system that caters to all.

LENDING A HELPING HAND

The public transport experience is shaped by fellow commuters who contribute to an inclusive and gracious system.

Expect to see priority queues at all MRT stations for seniors, expectant mothers, wheelchair users and parents travelling with strollers by the end of 2019. This will be extended to all bus interchanges and ITHs by 2021. Priority cabins will also be tested on one of the MRT lines by 2020.

TRAINING

Greeted by smiles, commuters can expect a high level of service from public transport workers who go through regular training to upgrade their skills to meet diverse and changing needs.

ACCESSIBLE TO ALL

We will also pair technology with transport to ensure commuters with special mobility needs will travel with ease. We still have some way to go to achieve a barrier-free transport system, but we have made great strides. For starters, there are ramps, lifts and other improvements to make it easier for those with additional mobility needs at all bus stops, interchanges, ITHs and MRT stations. By 2020, all bus stops will be barrier-free.

LIVEABLE: SAFE AND SUSTAINABLE FUTURE

Keeping public transport safe is a priority. So are our efforts to make transport sustainable and environmentally-friendly. We will also dedicate more space for public transport, active mobility and community uses.

GREATER SUSTAINABILITY

As we move towards a transport system of the future, we have to ensure that we also consider the environment. Hybrid diesel buses are already part of existing bus fleets, while electric taxis are also in operation. By 2040, taxis and all public buses will be running on cleaner energy, which will go some way in reducing pollution.

VEHICLES RUN ON CLEAN ENERGY



COLLISION WARNING SYSTEM IN 400 NEW BUSES



SAFE TRAVELS

Safety is of utmost importance on public transport. We tap on technological advances to provide safer journeys such as installing a collision warning system in 400 new buses, as well as reverse warnings at Joo Koon ITH and other new bus interchanges.

COVERED LINKWAYS

Rain or shine, we've got you covered. With the addition of 150km of covered linkways between MRT stations, residential areas and amenities by 2040, commuters will be sheltered. Such infrastructure enhancements will provide a level of comfort for people when they travel in Singapore's sometimes unpredictable weather.

ADDITIONAL 150KM OF COVERED LINKWAYS



WALKING AND CYCLING GALORE

For pedestrians and active mobility device users, the widening of footpaths at areas with high footfall will be welcomed. At the same time, cyclists have not been left out – more bicycle parking and end-of-trip facilities like showers and lockers will be available to promote cycling as a practical mode of transport. By 2030, we will triple our current cycling network. All HDB towns will also have cycling networks by 2030.

Building on the success of converting Holland Village, Club Street and Armenian Street into walking streets, popular haunts like Market Street will be transformed into open community zones where people can walk and cycle freely in 2021.

With LTMP 2040, Singaporeans will enjoy a public transport system catered to their needs and have fuss-free journeys in the years to come.



Priority queues on train platforms at all MRT stations by end 2019.



HOW WILL TRANSPORT CONNECT OUR CITY?



GETTING AROUND SINGAPORE: The Tan Family in 2040

After an invigorating weekend, the Tan family is ready to face Monday with a smile. A quick breakfast, a goodbye kiss for baby Lynn, and sending Lily to kindergarten, mum and dad then head to their respective offices at Biopolis 2 near Buona Vista MRT station.

Travelling from the Jurong Region Line to the East-West Line (EWL), they transit at Jurong East station. They marvel at the EWL which has been running smoothly for over 50 years since 1987, in large part due to a rigorous maintenance and renewal programme.

Getting to work is easier than ever now as they can get from home to office more quickly and comfortably!



A new North-South East-West Line train sporting a refreshed red-and-green livery.



3.5 million rides were taken daily on our MRT and LRT networks in 2018.

An efficient public transport network is essential to connect people and places. Our transport needs will continue to evolve against a backdrop of economic progress, so it is vital for us to have the foresight to plan and build transport infrastructure that meets the commuting needs of tomorrow.

For that to happen, we are enhancing our public transport network and embarking on mega infrastructure projects for seamless transport links from first mile to last. Trains will cover a wider area, and commuters will enjoy more reliable services. Bus capacities will expand and routes will increase for more convenient connections around the island. Roads will offer a smoother ride with intelligent transport systems in place to maximise traffic flow efficiency and ease traffic congestion.

With 7.54 million trips taken each day on buses and trains in 2018, the use of public transport has hit a record high. This is good news and inspires us to continue our journey to develop a high quality and sustainable land transport system, and adopt the latest technology to gear up for a connected city in a car-lite future.



Third rail replacement works were carried out on the North-South Line for a more reliable train network. Extended engineering hours allow for renewal works to be completed faster.

RAISING RAIL RELIABILITY

We are committed to enhancing our rail systems, with significant investments in rail assets over the years. As a result, commuters have been enjoying more reliable train services, shorter waiting times and faster journeys with rail enhancement works, system upgrades, and new trains.



MID 2018-2019

Trains travelled an average of 955,000km before a downtime, that is around 24 times around the earth.

1.4 MILLION TRAIN KM

The North-South Line reached 1.4 million train-km before a delay this year, putting it in the same league as top metros around the world.

NORTH-SOUTH LINE

IT TAKES A TEAM

At the heart of our land transport system are the people who work tirelessly with LTA to build, improve and maintain our transport network. We continue to recognise the efforts of our partners – the public transport operators, industry players and many others, who contribute to making our land transport system one that meets our aspirations, at the biennial Land Transport Excellence Awards.

To further boost innovation and recognise excellence in land transport services, the inaugural Ministry of Transport Challenge Shield award for “Most Reliable MRT Line” was launched in 2019. The North East Line (NEL) clinched the award, while the North-South Line (NSL) was named the most improved MRT line. Kudos to them for this achievement!

RAIL IMPROVEMENTS

When the MRT was introduced in the late 1980s, it was Singapore’s largest single investment then. The trains ushered in a new phase of economic development and unparalleled connectivity. More than 30 years later, we continue to invest in extending and improving our oldest and most heavily-utilised lines, the North-South and East-West Lines (NSEWL).

RENEWAL OF 6 CORE SYSTEMS OF NSEWL:

- COMPLETED** 2016: Wooden sleepers replaced with more durable concrete sleepers for improved journey times and smoother rides
- COMPLETED** 2017: Third rail replacement for a more reliable power supply and reduced power faults
- COMPLETED** 2018: New Communications-Based Train Control (CBTC) signalling system that enables trains to arrive more frequently as the gap between each train is reduced, leading to shorter waiting times
- COMPLETED** 2021: The first batch of 66 new trains will arrive, gradually replacing the pioneer batch of trains that have been in service since 1987
- COMPLETED** 2023: Power supply systems will be renewed for a more reliable power supply with better fault detection.
- COMPLETED** 2023: A new track circuit system, gradually replacing the existing track circuits.



Noise barriers help to reduce sound levels from passing trains by about five to 10 decibels.

To accelerate the renewal and maintenance works, the Early Closure Late Opening (ECLO) initiative on rail networks extended the engineering hours – allowing more time for repair and rejuvenation. ECLO has also allowed us to speed up the time taken for the installation of noise barriers by 1.5 times for the second phase between Dover and Boon Lay stations, Kembangan and Eunos stations, and Simei and Tampines stations.

A third phase to install about 5.5km of railway noise barriers at 16 additional locations is underway, with a new tender awarded in August 2019. When Phase 3 is completed in 2023, around 27km of noise barriers would have been installed across the island.

Upgrading works on the NEL, our third oldest line, are also in progress. The mid-life upgrade for 25 NEL trains and selected early closures on the network for renewal and intensified maintenance began in 2019. The improvements will cover the power system, platform screen doors, replacement of rail crossings, signalling point machines and tracks that have been in constant use for over 16 years of service.



First Thomson-East Coast Line (TEL) train at Mandai Depot.



NEW TRAINS

Our oldest trains will be making way for new trains with more spacious interiors and new features. Bombardier was awarded a contract worth up to \$1.2 billion in July 2018 to supply 66 new trains that will replace the first-generation NSEWL trains. These trains will be designed to include more open spaces for parents with strollers, wheelchair users and commuters carrying foldable bicycles and personal mobility devices.

The Bombardier MOVIA CR151 trains will also be equipped with integrated condition-monitoring and predictive maintenance features for early and more efficient identification of potential issues. Slated to progressively arrive from 2021, the new trains will undergo rigorous testing before entering passenger service. Another 99 new trains have been progressively put in passenger service since 2015. Costing \$1.1 billion, these new trains were allocated to the NSEWL (57), Circle Line (24) and NEL (18).

DETECTING FAULTS IN ADVANCE

We continue to tap on predictive maintenance technology to detect and fix faults early, delivering better reliability for our railway systems. The solutions include:

- A real-time condition monitoring system to pick up abnormalities in the rail systems for early intervention. It will be installed on NSEWL trains and during the mid-life refurbishment of the first-generation NEL trains.
- An Automatic Track Inspection (ATI) system for real-time monitoring of the running rails, track equipment and sleepers during operational hours. Imaging sensors and laser scanners built into trains will be used to monitor track conditions and notify of any abnormalities automatically, while drones and all-terrain vehicles will



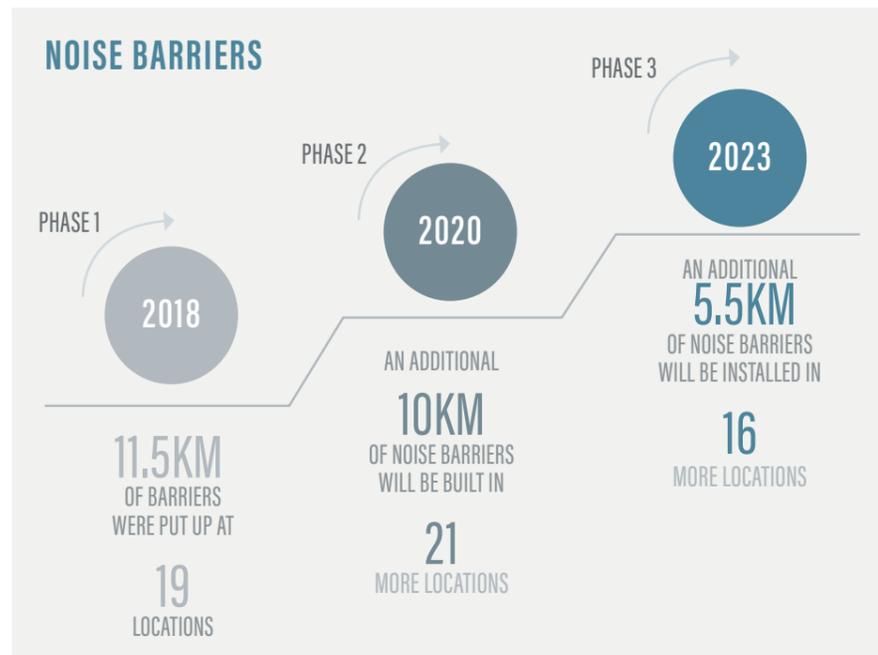
More LRT trains were added to serve Punggol East, Sengkang West and Sengkang East Loops.

LRT UPGRADE

Commuters taking the Light Rapid Transit (LRT) on the Punggol West Loop now enjoy faster rides and shorter waiting times with the launch of bi-directional services from 29 September 2018. Two-way services reduce travel time and crowding while the running of more two-car trains have increased passenger capacity during the peak hours. More trains were also added to serve Punggol East, Sengkang West and Sengkang East Loops which will cater to the growing population in the area.

Over at Bukit Panjang LRT (BPLRT), our first LRT system which opened in 1999, renewal works are being carried out on the power rail system. In addition, the installation of the new CBTC signalling system and deployment of new Light Rapid Vehicles (LRVs) to replace all 19 first-generation trains will be completed by 2022.

To speed up the renewal works, the BPLRT started closing earlier at 11.30pm daily from 13 January 2019. Renewal works include the replacement of power rails and the decommissioning of legacy signalling track circuits, with final works expected to be completed by 2024.





Bulk excavation and casting work carried out at the upcoming Maxwell station along the Thomson-East Coast Line.

RAIL EXPANSION

A high-capacity, well-connected and resilient rail network are vital to keep our world moving. Over the last five years, we added close to 50km of tracks and around 200 trains to our network. Each day, the rail system recorded an average daily ridership of 3.5 million – an increase of almost 5 per cent annually. This number is set to grow as we extend our rail networks further and explore new lines to meet our target of a 45-minute city and 20-minute towns.

We target to increase rail networks to 360km by around 2030, from

230km in 2019. Commuters living and working in Woodlands can look forward to the three Thomson-East Coast Line stations which will be the first to start service. When the 43km line is fully completed in 2024, 32 stations will be added to our MRT network – estimated to serve up to 1 million commuters in the long term.

Work to close the Circle Line (CCL) loop began in 2018, with three new stations by 2025. By the 2030s, we can look forward to the closed-loop CCL, the new Jurong Region Line (JRL) and the Cross Island Line

(CRL). With these new lines, we will be even closer to having eight in 10 households within a 10-minute walk from a train station.

Further studies on the feasibility of constructing a new rail line in the north and north-east regions will be explored. More than 400,000 households living in the region could be served, with commuters in the northern region enjoying time savings of up to 40 minutes when travelling to the city with this new line.

THOMSON-EAST COAST LINE

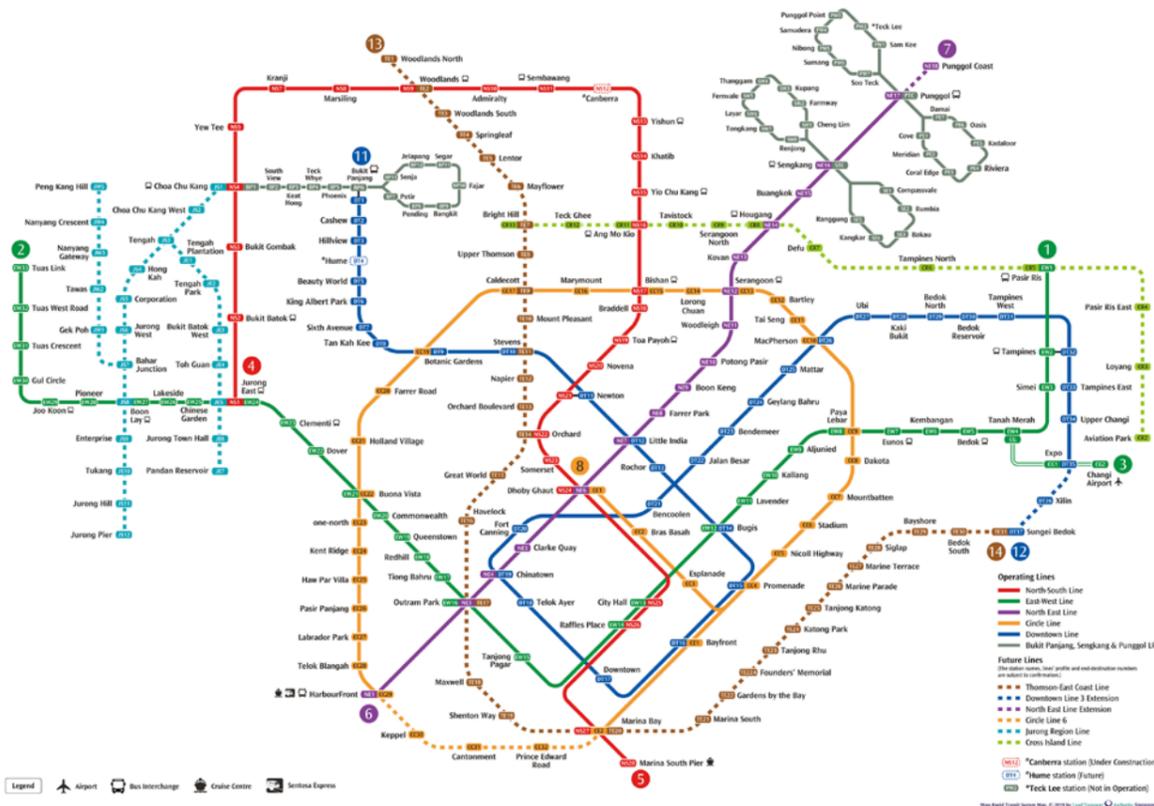


Founders' Memorial MRT station will be opened in tandem with Founders' Memorial. Opening date to be advised.

With the opening of the TEL, Woodlands residents will enjoy better connectivity to the MRT network.

A significant milestone is the addition of a Founders' Memorial station, between Gardens by the Bay and Tanjong Rhu stations. It will be ready in time for the opening of the upcoming Founders' Memorial, a site which commemorates the values and vision of Singapore's pioneer leaders.

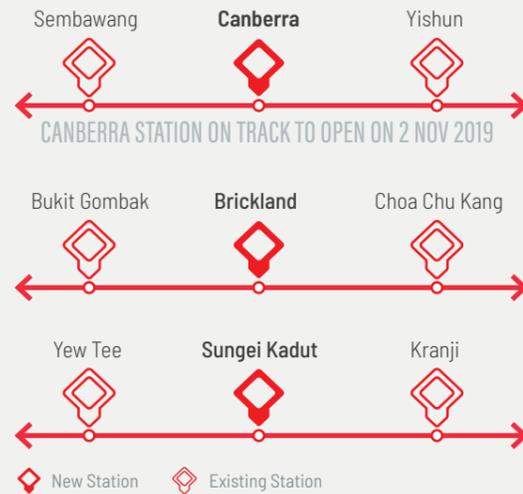
The TEL will be extended further east to provide a direct connection to Changi Airport and the upcoming Terminal 5 by around 2040.



NORTH-SOUTH LINE

Canberra station is set to open on 2 November 2019. Located between Yishun and Sembawang stations, it will serve the adjacent Yishun Industrial Park A and provide better links for residents living in the new and upcoming developments in the area.

Two new stations will be added to the NSL by the mid-2030s: Located between Choa Chu Kang and Bukit Gombak stations, Brickland station will provide better connectivity to residents living in Keat Hong, Bukit Batok West, Pavilion Park, and the upcoming Brickland district in Tengah town. A new interchange station with the DTL at Sungei Kadut is also planned. It will be located between Kranji and Yew Tee stations.

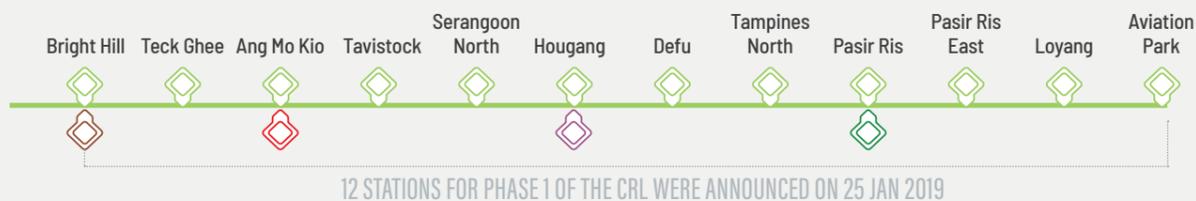


JURONG REGION LINE

The location of train stations for the 24km-long JRL was announced in May 2018, with 24 stations opening in three stages in phases from 2026 to 2028. This will enhance connectivity in the western region of Singapore, which is expected to house the second central business district and new residential estates such as Tengah.

CROSS ISLAND LINE

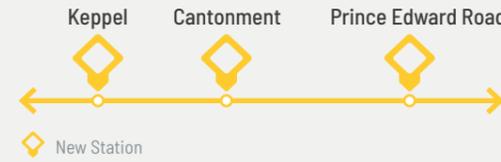
The locations of the 12 stations for Phase 1 of the CRL was announced on 25 January 2019. The 29km-long route will connect Bright Hill to Aviation Park, shortening travel times for commuters between the central, north-eastern and eastern parts of Singapore.



12 STATIONS FOR PHASE 1 OF THE CRL WERE ANNOUNCED ON 25 JAN 2019

CIRCLE LINE

Construction works for the final three stations of the CCL6 – Keppel, Cantonment and Prince Edward Road, commenced in April 2018. The installation of earth retaining walls and stabilising structures for the station boxes, depot and tunnels have progressed smoothly. Tunnelling works began in July 2019. When the 4km stretch is completed by 2025, the CCL will truly come full circle with a completely closed loop.



NORTH EAST LINE EXTENSION

A new station north of Punggol will be added to the 2km-long North East Line Extension (NELE), opening in tandem with the first phase of developments at Punggol Digital district. It will serve the upcoming developments in Punggol Downtown, and is expected to be completed by 2023.



DOWNTOWN LINE

Hume Station on the Downtown Line (DTL) will open by 2025. It will be located between Beauty World and Hillview stations, and serve the residential developments in the area.

DTL3 will extend its terminus, currently the Expo station, to Sungei Bedok. It is expected to be ready in 2024. When completed, the line will be connected to the upcoming TEL and the future East Coast Integrated Depot.

DTL2 will also extend beyond Bukit Panjang to better serve the northwest region, and will form an interchange with the NSL. This is expected to be completed in the mid-2030s.

4-IN-1 DEPOT

The East Coast Integrated Depot will stack three train depots together for the first time, with a bus depot built next to them. It will have a capacity for around 220 trains and 740 buses. This innovative solution which will save 22 hectares of land - or an area of over 60 football fields - was devised by LTA engineers to address the perennial challenge of land scarcity. It will be completed in 2024.

740 BUSES

220 TRAINS



COMING YOUR WAY IN 2024



Buses sporting the lush green livery at Punggol Temporary Bus Interchange.



All new buses will meet the latest Euro VI emission standards.



An Integrated Transport Hub at Bukit Panjang.

BOOSTING OUR BUSES

Ferrying more than 4 million people each day, buses are the most widely taken mode of public transport. Over 350 services currently ply within neighbourhoods and across Singapore - in full air-conditioned comfort. As our bus infrastructure continues to improve, so does connectivity, with more buses on the roads, more routes, and shorter waiting times.

MORE BUSES AND ROUTES

Bus commuters have enjoyed higher service levels since the industry completed its transition to the Bus Contracting Model (BCM) in September 2016. Bus services are now more frequent, less crowded and more comfortable.



1,000
bus drivers hired since implementation of BCM

114 bus services boosted with the addition of 96 buses

15 new bus services introduced

The tender for Sembawang-Yishun will be called in the fourth quarter of 2019 and we target to award this package by the second half of 2020. This is the second Negotiated Contract (NC) that is expiring. To ensure a contestable market, LTA will continue to tender the bus packages as they expire.

IMPROVING INFRASTRUCTURE

In recent years, our fleet of buses has been refreshed, with new and modern vehicles that are greener and more accessible to persons with disabilities. With more than 2,000 new buses added in the past five years, this means 80 per cent of the fleet is less than halfway through their 17-year lifespan.

All buses purchased since 2018 meet the Euro VI emission standard, the strictest emission standard currently used worldwide. LTA is also testing the feasibility of diesel hybrid and electric buses, which are quieter and cleaner. This will be good news for commuters and the environment.

100 NEW 3-DOOR DOUBLE-DECKER BUSES

Following a successful six-month trial of a three-door double decker in 2017, 100 of such buses will join our fleet from 2020. Boarding and alighting from these buses will be speedier, which will improve commuter flow. The tender for these buses was called in May 2018, with 50 units awarded to ST Engineering Land Systems for \$30 million, and the remaining 50 awarded to Alexander Dennis (Singapore) for \$34 million.

111 NEW DOUBLE DECKER BUSES

Our bus fleet will welcome an additional 111 of the familiar two-door double-deck buses. These new buses, the MAN A95, are more efficient and will feature the latest Euro VI standards - for cleaner air and better environmental sustainability. The buses will be supplied by ST Engineering Land Systems Ltd, which was awarded a \$54 million contract in July 2018.

MORE INTEGRATED TRANSPORT HUBS

More Integrated Transport Hubs (ITHs) will be built to make commuting journeys more convenient and pleasant. These hubs combine air-conditioned bus interchanges and train stations with retail and commercial areas. Commuters can enjoy the added convenience of shopping and dining before transferring to connecting bus or train services.

Presently, there are 10 ITHs - Ang Mo Kio, Bedok, Boon Lay, Bukit Panjang, Clementi, Joo Koon, Sengkang, Serangoon, Toa Payoh and Yishun. The newest ITH in Yishun, which is co-located within Northpoint City Shopping Centre, opened on 8 September 2019.

SMARTER BUS SYSTEMS

We have been piloting the use of new technologies such as autonomous, on-demand, dynamically-routed buses to improve bus connectivity on our roads.

ON-DEMAND PUBLIC BUS

A six-month trial for On-Demand Public Buses (ODPB) concluded in June 2019. Using a mobile application, commuters were able to book a ride by requesting to be picked up and dropped off at any bus stop within defined areas during designated hours. The trial provided insights into commuter receptivity and the feasibility of the ODPB concept. With these insights, LTA will continue to explore how new concepts and technologies, such as autonomous vehicles could potentially complement the public bus network through similar trials.

BEATING THE PEAK HOUR TRAFFIC

LESS THAN
15 MINUTES
WAIT TIME FOR ALL SERVICES

FOR 50 PER CENT OF BUS SERVICES,
THE WAIT TIME IS EVEN SHORTER -
UNDER **10 MINUTES**

6 - 8 MINUTE
INTERVALS FOR FEEDER SERVICES



Commuters will enjoy faster rides with full-day bus lanes.

AI AND BIG DATA

We have been using big data, technology and automation to improve transport planning services. Rolled out in 2016 and completed in 2017, the Common Fleet Management System (CFMS) is a centralised bus fleet management system which LTA and bus operators use to monitor the location and performance of their buses. Service control managers and bus captains work together to adjust bus operations in real-time to prevent bunching, and ensure a consistent stream of bus arrivals.

Another project is FASTER, or Fusion AnalyticS for public Transport Event Response, which harnesses AI to enhance commuting experience. It pulls information from a multitude of sensors such as WiFi, farecards, and train, and video feeds to provide proactive information services and round-the-clock visibility of public transport operations. This improves public transport planning and timely response to operations anomalies.

SMARTER TRAFFIC LIGHTS FOR BUSES

More green lights for buses means faster and more reliable bus journeys for passengers on board. This is possible with the “Smart Bus Priority System” which facilitates green traffic signals in favour of public buses that are delayed due to traffic conditions or accidents.

Using Global Positioning System (GPS) trackers to determine the exact location of approaching buses, the system will communicate with traffic lights and prioritise bus movements if required either by extending the green signal duration or shortening the red signal duration.

A six-month-trial was conducted on two public bus services between November 2018 and April 2019. The data collected is being analysed to determine whether the system can effectively complement existing bus priority measures, such as bus lanes, B-signals at junctions and bus priority boxes – which are aimed at improving bus journey times and reliability.

TRANSIT PRIORITY CORRIDORS

With more bus lanes and measures for bus priority, buses will be able to move more quickly. The revitalised Bencoolen Street, the first road to feature a Transit Priority Corridor (TPC), opened in May 2017. We will be implementing more TPCs progressively from 2020, in areas such as Tengah and Bayshore. They will include features such as bus lanes, bus-only roads and turns, and signal priority for buses. This will integrate with efforts to enhance travel time and convenience by public transport and active modes.

Commuters can look forward to more regular buses and shorter journey times when more TPCs are implemented, such as along the upcoming 21.5km-long North-South Corridor, which is expected to be completed by 2026.



As of July 2019, there were over 19,000 registered taxis in Singapore, complementing a fleet of some 72,600 PHCs.



All chauffeured private hire cars are required to display tamper-evident decals, which are subject to regular inspection.

ROADS WITH NEW REACHES

Our latest Household Interview Travel Survey (HITS) revealed that over 5 million trips are made on average each day on private vehicles, taxis and private hire cars. We regularly review our regulatory framework and enhance the road network to ensure smooth journeys on our roads.

POINT TO POINT TRANSPORT SECTOR

With the entry of private hire cars (PHCs) and third-party taxi booking service operators, the landscape for Point-to-Point transport (P2P) has evolved significantly in recent years. These services complement our extensive public transport network, with around 6 per cent of

all journeys completed on taxis and PHCs today.

We reviewed the regulatory framework for this sector and engaged key industry stakeholders such as the National Taxi Association, National Private Hire Vehicles Association, operators, drivers and members of public.

In August 2019, Parliament passed the “P2P Passenger Transport Industry Bill” as a precursor for a new regulatory framework that will kick in from June 2020. The framework will give us tighter control over this sector so that it better serves commuters.

NEW REGULATORY FRAMEWORK FOR THE POINT-TO-POINT (P2P) TRANSPORT SECTOR

Taxis and private hire cars (PHCs) are an important part of our vision for a well-connected land transport network, and complement our public bus and train network.

With the rapid growth and changes in the P2P transport industry, the Land Transport Authority (LTA) will introduce a new regulatory framework from June 2020 and will be able to:

1 REGULATE OPERATORS BASED ON TYPE OF SERVICES

Taxi, PHC and carpool operators will need to obtain separate licences based on the services they offer. There will be two categories of licences:

- A) STREET-HAIL SERVICE**
Commuters flag down a taxi from the street or at taxi stands and stops.
- B) RIDE-HAIL SERVICE**
Commuters book a PHC or taxi through mobile apps or call booking services.

Carpool operators will also need to comply with the regulations, such as not allowing their drivers to conduct more than two carpool trips daily. [Applications for street-hail and ride-hail licences will be open from February 2020.]

2 ENHANCE THE SAFETY OF COMMUTERS AND DRIVERS

Safety standards, such as suspending those who despatch unlicensed drivers, will be imposed on operators.



3 FACILITATE AN OPEN MARKET

Operators will be prohibited from offering exclusive arrangements to drivers, so they are free to choose which operators to drive for.



4 SUPPORTING AN INCLUSIVE TRANSPORT SECTOR

Taxi operators will need to continue providing call booking services so that those without access to smartphones or booking apps can still make such bookings.





The new Lornie Highway and underpasses improve traffic flow along Lornie Road and the PIE, and will cater to expected growth in future traffic demand.

BETTER ROADS AND NETWORKS

Even as we continue to encourage more people to take public transport and reduce reliance on private transport, we are working to improve road connectivity in tandem with new developments and ease traffic congestion. This includes enhancements to existing roads and the construction of new roads to facilitate traffic flow.

NEW LORNIE HIGHWAY AND SIME UNDERPASS

The new Lornie Highway opened to traffic in October 2018 for southbound travel towards Farrer Road, and April 2019 for northbound travel towards Thomson Road.

With traffic projected to increase 20 to 30 per cent by 2020 from the redevelopment of the Bukit Brown area, the new dual four-lane Lornie Highway and Adam underpass aims to ease peak-hour congestion along Lornie Road and the connecting Pan-Island Expressway, and cater to future traffic demand.

PUNGGOL ROAD DEVELOPMENT PROJECT

Punggol residents are enjoying new routes, thanks to the early completion of road links that connect their rapidly growing new town to two key expressways. A new link connecting Punggol Central to KPE and TPE (PIE), opened in November 2018, alleviating traffic congestion along the main roads leading to the expressways. Two other new slip roads, one from TPE(SLE) Exit 6 at KPE/TPE Interchange to Halus Link towards Lorong Halus and Punggol Central was opened in March, and one linking Punggol Central via Exit 7 along TPE (PIE) was opened in May 2019.

By using new design and construction technology, we were able to complete these projects ahead of schedule. These included Virtual Design and Construction (VDC), a more efficient and productive method of planning and collaborating across teams, as well as precast techniques of moving concrete-casting off-site and installing the components modularly.

When all the new roads in this project are completed by mid-2021, traffic flow will improve in the vicinity.

REVERSIBLE TRAFFIC FLOW FOR KJE/PIE CORRIDOR

We are studying the possibility of using reversible traffic flow on expressway lanes to improve traffic movement so that motorists can get to their destinations faster. An engineering study on the feasibility of having reverse-flow traffic schemes on PIE and KJE is currently underway, and will conclude by the end of 2019.

INTEGRATED TRANSPORT CORRIDOR

The North-South Corridor (NSC) will be Singapore's first integrated transport corridor, featuring express bus routes and ground-level cycling trunk routes. When the 21.5km-long NSC is completed in 2026, residents in north will be better connected to the city.

- First civil contract to design and construct a 1.25km stretch of the tunnels with two entry ramp tunnels and two exit ramp tunnels between Novena Rise and Toa Payoh rise for the North-South Corridor (NSC) was awarded to Samsung C&T Corporation in late 2017.
- In May 2018, two civil contracts totalling S\$1.16 billion were awarded to construct tunnel and commuter facilities for two sections of the North-South Corridor between Toa Payoh Rise and Marymount Lane as well as between Kampong Java Road and Suffolk Walk.
- Six contracts were awarded totalling S\$3.14 billion to design and construct the tunnels and commuter facilities such as pedestrian overhead bridges and bus stops for six sections of the NSC:
 - > between East Coast Parkway (ECP) and Victoria Street
 - > between Victoria Street and Kampong Java Road
 - > between Marymount Lane and Pemimpin Place
 - > between Pemimpin Place and Sin Ming Avenue
 - > between Ang Mo Kio Avenue 3 and Ang Mo Kio Avenue 9
 - > between Ang Mo Kio Avenue 9 and Sungei Seletar.
- In January 2019, a contract was awarded to construct a road tunnel, an MRT station box and commuter facilities, between Sin Ming Avenue and Ang Mo Kio Avenue 3.

HOW WILL TRANSPORT CATER TO ALL?



GETTING AROUND SINGAPORE: The Tan Family in 2040

Kindergarten is over for Lily who is four. Grandpa and grandma, with baby Lynn, pick her up from school, and head for Lily's favourite snack, kaya toast, at the nearby mall.

With Lynn in her stroller, they set off for the bus stop across the road. They enter the newly-installed lift at the pedestrian overhead bridge and make their way over with ease. At the bus stop, grandma checks the electronic board for bus timings – the feeder bus is arriving in 3 minutes. And it does, right on time.

As grandpa tries to carry the stroller onboard, the young man queuing behind him offers a helping hand. Grandpa finds a spot next to a wheelchair user and secures the pram next to him using the stroller restraint system. The family is all set for the 10-minute ride.

Breaking down barriers is key to ensuring a land transport system that is accessible to everyone. With the support of technology, infrastructure and transport staff, public transport is more inclusive than ever.

A gracious and inclusive public transport system does not come easy and needs a concerted effort from all of us. From tapping on technology to creating an app for commuters with special requirements, to providing dedicated queues for them at MRT stations and bus interchanges, we aim to make public transport as seamless as possible.

Most importantly, a pleasant commute requires everyone to play their part. Be it offering a seat to those who need it more, or even flashing a simple smile, these actions will go a long way in creating a great public transport system in Singapore.

A dedicated cycling path along car-lite Bencoolen safely connects cyclists to the city, west, north and south of Singapore.



INFRASTRUCTURE UPGRADES TO MEET DIVERSE NEEDS

We are focusing on accessibility as we develop our land transport infrastructure to meet the needs of a diverse population.

PRIORITY QUEUES AND CABIN

To cater to the needs of the elderly, less mobile and families with young children, all MRT stations will have priority queues by the end of 2019. This will be extended to all bus interchanges and Integrated Transport Hubs (ITH) by 2021. A priority cabin will also be tested on one MRT line by 2020 to better address the needs of more vulnerable commuters.

ACCESSIBILITY BY 2020



ALL BUS STOPS WILL BE BARRIER-FREE



ALL PUBLIC BUSES WILL BE WHEELCHAIR-ACCESSIBLE AND HAVE STROLLER RESTRAINTS

BY 2022



29 MORE PEDESTRIAN OVERHEAD BRIDGES WILL HAVE LIFTS INSTALLED



TAXI AND PUBLIC HIRE CAR OPERATORS WILL BE ENCOURAGED TO HAVE MORE WHEELCHAIR-ACCESSIBLE VEHICLES

SAFER AND MORE INCLUSIVE INFRASTRUCTURE

As we promote active mobility, we also continue to develop suitable infrastructure – from barrier free paths to sheltered walkways – to ensure a smooth and inclusive journey. Safety is a major priority, such as a novel “Look up” trial in Ang Mo Kio to get pedestrians to look up from their mobile phones.

- 47 pedestrian overhead bridges have been installed with lifts island-wide, with plans to equip 29 more by 2022
- 200km of covered walkways completed in 2018 under the Walk2Ride scheme, linking key amenities and residences within 400m of MRT stations and 200m of LRT stations
- 150km of covered walkways between MRT stations, residential areas and amenities will be added by 2040
- To encourage pedestrians to take their eyes off their mobile phones when crossing the road, we installed “Look up” pavement markings at a pedestrian crossing leading to Ang Mo Kio MRT station

SILVER SUPPORT



BY 2021
2,300 BUS STOPS
across Singapore will be fitted with elderly-friendly seats.

BY 2020 20 SILVER ZONES

to be constructed, with a total of 50 Silver Zones ready by 2023. Silver Zones help make our roads safer for the elderly with features such as two-stage crossings that allow pedestrians to rest at the midpoint.



ENHANCING WORKFORCE FOR BETTER SERVICE

FAMILY-FRIENDLY TRANSPORT ADVISORY PANEL

Commuters spoke, we listened. The Family-Friendly Transport Advisory Panel proposed 22 recommendations in May 2018, after a 10-month study involving more than 3,000 commuters. Suggestions included rear door boarding for those with baby strollers, user-friendly stroller restraint systems and space on buses for at least two wheelchairs.

The recommendations were accepted by the Government, and some have already been implemented. For instance, a one-year trial for the stroller restraint system began in June 2017. First introduced on bus service 69, the stroller restraints were welcomed by commuters and will progressively be installed on all buses by 2020.

The panel, set up to look into how land transport can be more family-friendly, is co-chaired by Mr Richard Magnus, Chairman of the Public Transport Council; and Mr Sitoh Yih Pin, the Chairperson for the Government Parliamentary Committee for Transport. It includes eight other representatives from key stakeholder groups.

The people working in the transport industry are critical in shaping the services offered to commuters. They are constantly on the move – learning new skills to stay relevant as well as maintain high service standards.

The Land Transport Industry Transformation Map (ITM) launched in February 2018 is a blueprint that ensures the land transport industry continues to stay relevant through technology and a competent workforce. With innovation driving growth, the ITM will help us make the shift towards a smarter land transport system.

The ITM is complemented by the Skills Framework for Public Transport, jointly developed by SkillsFuture Singapore and the Public Transport Operators, to promote skills mastery and lifelong learning. Centralised academies – the Singapore Bus Academy and the Singapore Rail Academy, develop learning courses aligned with the Skills Framework to upskill, reskill and deepen the competency of the transport workforce.

APPRECIATING OUR STAFF

Our public transport workers play a big part in ensuring a smooth and safe daily commute. To thank them for their tireless work, we partnered with the Public Transport Operators, the National Transport Workers' Union and the Singapore

Kindness Movement on several initiatives to show our appreciation for their tireless work. A total of 445 outstanding transport service staff who demonstrated exemplary acts of service were also honoured at the 2018 Transport Gold Awards.

A bus captain assists a wheelchair user to alight from the bus. All buses will be wheelchair accessible by 2020.



Priority queues at passenger lifts have been rolled out at all MRT stations.



SG MOBILITY GALLERY

Singaporeans can now find out more about our land transport system at the SG Mobility Gallery. Officially launched on 19 September 2018 by Prime Minister Lee Hsien Loong, the gallery features seven exhibition zones on the different facets of Singapore's dynamic land transport system.

These zones include the Land Transport Hero Academy where children aged 7 and under can learn more about the unsung heroes of land transport, and a future mobility zone to discover what makes a transport system seamless.

Through Augmented Reality (AR) and Virtual Reality (VR), visitors can experience the day-to-day work of our public transport workers through a range of experiential activities. Visitors can also try their hand at planning an efficient and sustainable land transport system or assume the role of a land transport operations centre executive, to manage traffic flow along Singapore's road network through multi-sensory interactive exhibits. A glimpse into the future of our transport system is also possible via a 270-degree panorama projection, with a behind-the-scenes look at features of Singapore's future land transport system.

MOBILITY ASSISTANCE FOR THE VISUALLY IMPAIRED AND SPECIAL USERS (MAVIS)

Commuters with special mobility needs may soon have a helping hand when travelling on public buses. The mobile app MAVIS was trialed from January to July 2019 as part of our efforts to build a more inclusive transport system.

With MAVIS, visually impaired commuters hear audio announcements from a speaker near the boarding door of the bus, while those in wheelchairs can use it to check if there is room for them to board. Moving forward, we will look to implementing the app to the wider bus fleet.

MAVIS has been recognised by the International Association of Public Transport (UITP), a worldwide network that champions sustainable urban mobility. It won in the Diversity and Inclusion category at the 2019 UITP Awards.



Official launch of the Singapore Mobility Gallery.



Honouring our Transport Gold Awards recipients at the Istana.

HOW WILL TRANSPORT BE SMART AND SAFE?



GETTING AROUND SINGAPORE: The Tan Family in 2040

It is Saturday and the weekend is back! Lily's wish for the family to go on a picnic is about to come true. Armed with a huge, well-stocked picnic basket, the Tans book an on-demand autonomous electric shuttle to ferry them to the iconic Gardens by the Bay for an afternoon of fun and relaxation.

The kids enjoy the smooth and scenic ride as the autonomous shuttle safely navigates through traffic. Along the way, the shuttle, which operates on a shared basis by matching commuters heading in the same direction, picks up other passengers headed to Gardens by the Bay. The Tans arrive at their destination promptly, with plenty of time to spare for lounging on the green pastures together.

After a fun day at the park, they wind down at home full of happy memories and fulfilling encounters. It was also a day that was quietly enhanced by a comfortable, connected and efficient public transport system.



As of end 2018, Singapore has a road network stretching out to over 9,400 lane-kilometres. In terms of land area, roads take up almost as much space as housing.

Keeping the public safe on their daily commutes is a top priority. Over the years, we review our policies as necessary and introduced new initiatives to improve safety on our roads and public transport system. We have also embraced the latest technology to improve the commuting experience across all modes of land transport.

HARNESSING TECHNOLOGY AND DATA FOR GREATER EFFICIENCY

An efficient transport network is not built by chance. It requires an innovative land transport industry that leverages technological solutions to deliver a transport system that is even more efficient, safe, reliable and comfortable for everyone.

Today, we are looking at developing and adopting promising technologies such as autonomous vehicles, artificial intelligence (AI), and computational tools for big data, to enhance our land transport system.

IMPROVING TRAFFIC FLOW WITH AI

Green light all the way – this is the dream of most motorists. We are moving closer to smoother rides with a traffic light control system that leverages AI and real-time traffic data. With these, we aim to achieve better optimisation and network level efficiency in Singapore and reduce occurrences of drivers having to stop at a red signal; and pedestrians may be allocated more 'green-man' time to cross at intersections if traffic is sufficiently light.

We are collaborating with A*STAR's Institute for Infocomm Research (I2R) to develop a locally-built next generation smart traffic light control system. Called the CoopeRative and Unified Smart Traffic SystEm (CRUISE), this AI-powered system employs complex traffic control algorithms to adjust traffic signals in real-time for smoother traffic and pedestrian flow.

As part of a trial from September 2018 to end 2020, sensors have been installed near traffic intersections and pedestrian crossings between Corporation Road and Boon Lay Way for data collection and development of the algorithms.

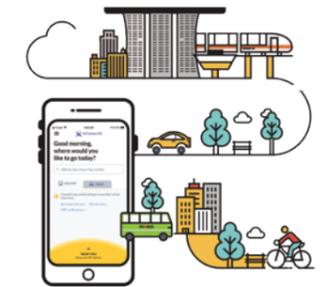
COMPREHENSIVE TRAFFIC DATA

Through the collection of near real-time traffic data, traffic information can be disseminated directly to motorists to help them better plan and optimise their travel routes. From next year, the progressive replacement of existing in-vehicle units (IUs) with new on-board units that harness Global Navigation Satellite System (GNSS) technology will provide motorists with access to timely and relevant traffic information.

SMART STREET LIGHTS

More than 95,000 street lights will be replaced with energy-efficient light emitting diodes (LED) by 2022. As LEDs glow brighter and produce light at a colour temperature closer to daylight, they offer better visibility for motorists and pedestrians.

We are also developing a Remote Control and Monitoring System (RCMS) with automated fault detection and alert capabilities, making the maintenance of street lights more efficient. The RCMS will allow LTA to remotely control the street lights in response to varying street lighting needs and weather conditions.



DIGITAL TRANSFORMATION

The revamped One.Motoring website was well-received for its user-friendly and mobile-responsive interface. The portal features a personalised dashboard for vehicle owners to view their details at a glance and easily access a range of popular digital services such as renewal of road tax.

More services and features have since been added. These include the transfer of vehicle ownership, transfer of PARF/COE rebates, transfer of Temporary Certificate of Entitlement (TCOE), and vehicle deregistration.

We have also revamped our MyTransport.SG mobile app for commuters and motorists. The refreshed app, which provides commuters with real-time transport information, offers new features such as a multi-modal journey planner, a 'Near You' personalisation function and a feature to report personal mobility device or personal mobility aid incidents.



The NTU-LTA-Volvo autonomous bus is the world's first 12m-long driverless electric bus.



Commuters undergoing security screening at Jurong East MRT station as part of the emergency preparedness exercise, 'Exercise Station Guard'.

E-TAXIS AND EV CAR-SHARING

Electric vehicles (EVs) pave the way towards cleaner air and quieter streets. Following a successful trial of 100 e-taxis which were deployed in mid-2017, HDT Singapore Taxi was granted a full-fledged taxi service operator licence in July 2018.

BlueSG, an electric car-sharing operator appointed by LTA and the Economic Development Board (EDB), rolled out its first batch of 80 cars and 120 charging points in December 2017. One year later, BlueSG's fleet has grown to 490 electric vehicles and 935 charging points. It plans to expand its fleet to 1,000 cars in Singapore, with 2,000 charging points by 2020. BlueSG has also committed to opening up 20 per cent of its charging points to privately owned electric vehicles. This will serve to lay the foundation for a nationwide public EV charging infrastructure to support the future proliferation of EVs.

AUTONOMOUS VEHICLES (AV)

We are moving closer towards the deployment of autonomous vehicles (AVs) on our roads. Current AV trials are making good progress, and we are planning for a pilot deployment of autonomous buses and shuttles in Punggol, Tengah and the Jurong Innovation District in the early 2020s.

Safety is of paramount importance to us. This is why we developed and launched the 2-hectare CETRAN AV Test Centre together with JTC Corporation and Nanyang Technology University back in 2017 to facilitate AV testing. The Centre's test circuit allows us to replicate the different elements of Singapore's roads including simulating traffic and lighting conditions at night. It is also equipped with a rain simulator and a flood zone, which can test the AV's navigation abilities under varying tropical conditions such as driving through heavy rain and partially flooded roads. The Centre also allows industry partners to test new mobility technologies and concepts, including vehicle-to-vehicle and vehicle-to-infrastructure communication.

We have also worked with the Singapore Standards Council, and industry partners, academics and government agencies, to develop a technical reference (TR) for AVs, TR 68. Launched on 31 January 2019, TR68 focuses on four areas (1) Vehicle Behaviour; (2) Vehicle Functional Safety; (3) Cybersecurity; and (4) Vehicular Data Types and Formats.

LTA and EDB jointly launched a Call for Collaboration (CFC) inviting interested parties to submit proposals on the pilot deployment of autonomous buses and shuttles in Punggol, Tengah and Jurong Innovation District. The CFC builds on AV trials conducted in Singapore in recent years. Through the CFC, LTA and EDB are keen to work with partners who can establish AV research and development, product development and commercial capabilities in Singapore, as well as pilot the deployment of AVs for public transport. The CFC closed on 31 July 2019.

FUSS-FREE FARE PAYMENT

Say goodbye to topping up your fare cards with the introduction of SimplyGo in April 2019. SimplyGo is an account-based ticketing system which allows commuters to pay their public transport fares using their Mastercard or Visa contactless cards at the MRT fare gates or card readers on buses. Akin to retail purchases, transport fares will be charged to your credit or debit cards. With this, commuters have been enjoying greater convenience on public transport.

Persons with disabilities can also look forward to a more fuss-free travel experience when using fare gates that will automatically open upon detecting a special radio frequency identification device (RFID) card in their possession. A trial of the hands-free fare gates system began at selected MRT stations in June 2018. Plans to extend the hands-free trial to buses are currently underway.

LOWER CARBON FOOTPRINT WITH CLEANER ENERGY FLEETS

We are going green by switching to a more environmentally-friendly public bus fleet which runs on cleaner energy.

We have introduced 50 new diesel hybrid buses which consume lesser fuel since December 2018, while 50 single-deck electric buses and 10 double-deck electric buses that produce low emissions will be deployed on our roads by 2020.

PREPARING FOR SECURITY THREATS

Our public transport system serves millions of commuters every day. LTA works with our public transport operators to detect and deter security threats. Commuters can also play a part by being vigilant and reporting any suspicious activities. Together, we can keep our public transport network safe and secure.

In November 2018, we initiated a six-month trial for enhanced security screening at selected MRT stations across all rail lines. As part of the trial, some commuters were required to use a walk-through metal detector and put their belongings through X-ray scanners, before entering the fare gates. Feedback from commuters and public transport operators have helped us improve security procedures to ensure commuters' journeys remain smooth.

MAKING ACTIVE MOBILITY PART OF YOUR JOURNEY

Walking, cycling or riding personal mobility devices (PMDs) are great ways to cover first and last-mile journeys. As active mobility becomes a way of life for many, we continue to refine our regulations, infrastructure, enforcement and education efforts to ensure that active mobility is a safe, convenient and sustainable mode of transport.

RULES AND REGULATIONS

We have been updating our legislation to ensure the safety of everyone who uses footpaths and shared paths, including pedestrians, cyclists, power-assisted bicycle (PAB), PMD, and personal mobility aid (PMA) users.

While most riders are considerate, we need to deter reckless riding and ensure that the devices used on public paths are safe.

INFRASTRUCTURE

We are also building infrastructure to support active mobility modes.

MANDATORY REGISTRATION OF E-SCOOTERS, IN ADDITION TO POWER-ASSISTED BICYCLES

BAN ON SALE OF NON-UL2272 PMDS TO IMPROVE FIRE SAFETY

BAN ON USE OF PMDS, BICYCLES & PABS IN VOID DECKS AND COMMON PROPERTIES IN HDB ESTATES OF 15 TOWN COUNCILS



* PMAs refer to personal mobility aids such as motorised wheelchairs and mobility scooters.

MORE CYCLING PATHS

- By 2025: Cycling paths will be expanded from 440km to 750km.
- By 2030: Cycling paths will triple the current length compared to today.

Starting with Ang Mo Kio, our first "Walking and Cycling Town", we will reclaim road space to build cycling paths where it is necessary for connectivity, by reducing the width of roads or taking back an entire road lane.

\$50 MILLION FUND TO IMPROVE INFRASTRUCTURE

Widening of footpaths

Installation of speed regulating strips on paths and warning signs

2020

214,000 → 267,000

MORE BICYCLE PARKING SPACES

- All public housing is within a five-minute walk to a bicycle parking facility. Bicycle parking facilities are also conveniently located within a five-minute walk from almost all private residential estates and key amenities such as polyclinics, community centres, schools and town centres.
- By 2020: Bicycle parking spaces will increase from 214,000 to 267,000

PEDESTRIAN-ONLY ZONES TRIAL

Dismount and push bicycles and PMDs within five towns and neighbourhood centres

SCHOOL-ZONE TRIAL ON FOOTPATHS

New markings and speed-regulating strips

Installation of enhanced visual cues on the ground

PROMOTING RESPONSIBLE PARKING

QR-code Parking System for Bicycle Sharing from 14 January 2019 to encourage responsible parking habits and manage the disamenities brought about by indiscriminate parking of shared bicycles.

ENFORCEMENT

We take a firm stand against users who flout rules, and compromise the safety of others who use public paths. Our Active Mobility Enforcement Officers (AMEOs) have been very active on the ground to generate awareness on gracious sharing of paths, deter reckless riding behaviour as well as taking enforcement actions against errant riders. To reinforce their efforts, we will double our enforcement resources to 200 by end 2019.

Our enforcement efforts are also complemented by the use of technology. A new feature on the MyTransport.SG app was launched on 31 July 2019 where the public can send photos or videos to provide feedback on hotspot locations and/or errant riding behaviour.

We are also working with the Government Technology Agency to trial mobile closed-circuit television (CCTV) cameras at hot spots, to detect and identify errant active mobility device users with the help of video analytics and radar detection technologies. The 18-month trial started on 31 July 2019.

PUBLIC EDUCATION

We have intensified our public education efforts to inculcate safe riding practices. A key effort is the Safe Riding Programme (SRP), which was launched in February 2018. We have brought the SRP to schools and communities to extend our outreach and promote a safe path sharing culture.

Active Mobility Patrol (AMP) volunteers from the grassroots and non-governmental organisations on the ground will also continue to facilitate a safe commuting environment for all users. The number of AMP teams have grown to 62 within three years, with over 1,000 volunteers across the country.

SINCE MAY 2018

> 4,900
ACTIVE MOBILITY INFRACTIONS DETECTED

> 2,100
NON-COMPLIANT DEVICES IMPOUNDED

AWARDS

2018 MINISTER'S INNOVATION AWARD - DISTINGUISHED AWARD

The Automatic Track Inspection (ATI) System combines precise defect detection with high processing speeds to provide regular and economical track inspection, in real-time. The ATI system was developed alongside our train contractor, utilising past experiences of track maintenance and catering for future demands of rail operations. This innovation allows LTA to improve rail reliability by providing early warning to defects that can potentially cause train disruptions. It will also help to reduce maintenance downtime by triggering early warning alarms for required maintenance before failure.

2018 MINISTER'S INNOVATION AWARD - DISTINGUISHED AWARD

Resurfacing of road tunnels with the conventional Hot Mix Asphalt (HMA) requires full tunnel closures due to the immense amount of heat and fume emissions during resurfacing. To mitigate inconveniences caused to motorists and for their safety, the team conducted two trials using Warm Mix Asphalt (WMA) including one at the KPE tunnel, which proved superior over the use of HMA. Benefits include lower heat and fume emissions, energy savings during production, a better working environment and the earlier opening of the work zone. It is no longer necessary to do full tunnel closure during resurfacing works, which saved cost and time.

BCA GREEN MARK CHAMPION AWARD

The award is a validation of LTA's outstanding commitment towards promoting corporate social responsibility and developing a substantial number of buildings and infrastructure projects that are environmentally sustainable. Recent developments which achieved BCA's highest Green Mark Platinum award include the Kim Chuan Depot Extension (KCDE) and the East Coast Integrated Depot (ECID) (Rail). The KCDE features an environmentally sustainable design which saves at least 30% in energy while the rail depot integrates energy-saving features including a highly efficient water-cooled chilled plant, solar energy and an efficient lighting system. The ECID (Rail) has an energy efficient water-cooled chilled plant, a solar absorption chiller, and an energy efficient lighting system that improves the lighting power budget by 40%. The depot's other features include the use of a rooftop solar photovoltaic system, MERV 14 air filter and UV light for air handling units, recycling and reusing of train wash water, and buildings designed with natural ventilation spaces.

BCA DESIGN AND ENGINEERING SAFETY AWARD 2019 (CIVIL ENGINEERING) - MERIT

Creative engineering solutions devised to overcome challenging site constraints of constructing EW30 Gul Circle Station and Viaducts for Tuas West Extension have led the project on to clinching the BCA design and engineering safety award for professional engineers. The project saw the construction of a rail viaduct that crosses over an existing road viaduct at Ayer Rajah Expressway at a height of 21m over busy live traffic.

OTC INSTITUTE WORKPLACE PARTNERSHIP AWARD (PLATINUM)

LTA and the Amalgamated Union of Statutory Board Employees (AUSBE) jointly won the award by Ong Teng Cheong Labour Leadership Institute (OTCi) for sustained efforts in strengthening understanding and cooperation between the management and union through programmes organised by OTCi.

PARTNER OF LABOUR MOVEMENT AWARD 2019

This award recognises LTA's contributions to good labour-management relations by deepening the strong tripartite relationship among the union, public transport operators and LTA, as well as developing initiatives to improve public transport workers' welfare.

PROJECT MANAGEMENT INSTITUTE (SINGAPORE CHAPTER) PROJECT OF THE YEAR 2018-19

The award recognises the outstanding results and demonstration of excellence in the field of project management for engineering and construction or business and information system projects.

1ST RUNNER-UP FOR ENGINEERING & CONSTRUCTION CATEGORY (>S\$20 MILLION PROJECT VALUE)

The Thomson-East Coast Line (TEL) Marina Bay Station and Tunnels (under Contract T226) project's use of innovative ground freezing and mining works to overcome difficulties in underpinning Live MRT tunnels were instrumental to the win.

SPECIAL RECOGNITION AWARD FOR ENGINEERING & CONSTRUCTION CATEGORY (>S\$20 MILLION PROJECT VALUE)

The award commends the construction of TEL Outram Park station (under Contract T222) and its associated tunnels undercrossing 300m of Live MRT tunnels of the East-West Line.

SINGAPORE STRUCTURAL STEEL SOCIETY (SSSS) STRUCTURAL STEEL EXCELLENCE AWARDS 2018 - BEST SMALL PROJECT (MERIT AWARD)

The Tuas West MRT Extension Mainline & Elevated Road Viaduct was awarded the Merit Award for various design and construction achievements that were noted during project construction. This included a first-of-its-kind elevated six-car twin-track rail viaduct that is integrated with the stations, as well as an innovative modular roof structural system designed using a 3-D 'Diagrid' framing system which is both economical and aesthetically pleasing.

UITP AWARD FOR DIVERSITY AND INCLUSION

The innovative Mobility Assistance for the Visually Impaired and Selected users (MAVIS) mobile application won the 2019 International Association of Public Transport (UITP) award. The MAVIS trial provides enhanced bus trip information and audio cues to wheelchair users and the visually handicapped. Once a user has entered their trip into the app, the bus Fleet Management System will inform the bus captain when a special user will be boarding or alighting the bus. The app has also clinched the UITP Asia-Pacific Special Recognition Award.

CONTRACTS AWARDED IN FY2018/19

JURONG REGION LINE / THOMSON-EAST COAST LINE

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
J1019	Jin Choon Civil Engineering Pte Ltd	Sewer Diversion at Boon Lay and Jurong West
J1020	Jupiter Builder Pte Ltd	Services Diversion and Associated Works (Package 1)
J1026	Jin Choon Civil Engineering Pte Ltd	Services Diversion and Associated Works (Package 2)
T2180	China Railway First Group Co., Ltd. Singapore Branch	Trackwork A&A for Thomson-East Coast Line (TEL) Stage 2 and 3
T2188	Eng Lam Contractor Co (Pte) Ltd	Construction of Covered Linkways to Thomson-East Coast Line (TEL) Stage 1, 2 And 3 Stations
T279B	Harsco Rail	Rail Grinding Vehicle for Thomson-East Coast Line (TEL)
T371A	Kone Pte Ltd	Design, Supply and Installation of Lifts for Thomson-East Coast Line (TEL) Stages 4 & 5 and Commuter Facilities
T371B	Kone Pte Ltd	Design, Supply and Installation of Escalators for Thomson-East Coast Line (TEL) Stages 4 & 5 and Commuter Facilities

NORTH EAST LINE EXTENSION / CIRCLE LINE 6

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
752B	Alstom Transport (S) Pte Ltd / Alstom Transport S.A.	Signalling System for North East Line Extension (NELe)
755B	Thales Solutions Asia Pte Ltd	Integrated Supervisory Control System for North East Line Extension (NELe)
756B	ST Engineering Electronics Ltd.	Data Configuration for Maintenance Management System for North East Line Extension (NELe)
760B	NEC Networks & System Integration Corporation (Singapore Branch)	Communications System for North East Line Extension (NELe)
761	ROOTS Communications Pte Ltd	Facility for Commercial Info-Communications Services for North East Line Extension (NELe)
7057B	ST Engineering Electronics Ltd.	To Design, Manufacture, Delivery to Site, Install, Test and Commission of the Access Management System (AMS) for the North East Line Extension (NELe)
831D	Koyo Engineering (S.E.Asia) Pte. Ltd.	Supply and Installation of Mechanical Services for Kim Chuan Depot Extension for Circle Line 6 (CCL6)
832D	Puretech Engineering Pte Ltd	Supply and Installation of Electrical Services for Kim Chuan Depot Extension for Circle Line 6 (CCL6)
836A	Tangshan Baichuan Intelligent Machine Co; Ltd	Depot Equipment for Kim Chuan Depot Extension
838B	CRRC Zhuzhou Locomotive Co., Ltd.	Locomotives for Circle Line Stage 6 (CCL6) and Existing Lines

850E	China Railway 11 Bureau Group Corporation (Singapore Branch) / China Civil Engineering Construction Corporation Branch Office Singapore / Gates PCM Construction Ltd. Consortium	Trackwork for Circle Line 6 (CCL6) and Depot Extension & North East Line (NEL) Mainline and Depot Extension
852F	ST Engineering Electronics Ltd.	Platform Screen Doors for Circle Line Stage 6 (CCL6) and North East Line Extension (NELe)
853E	Siemens Mobility Pte. Ltd./ Siemens Aktiengesellschaft Consortium	Power Supply System for Circle Line Stage 6 (CCL6) and North East Line Extension (NELe)
861E	ST Engineering Electronics Ltd.	Facility for Commercial Info-Communication Services for Circle Line Stage 6 (CCL6)

RAIL ENHANCEMENT

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
R1006	Siemens Mobility Pte Ltd / ST Engineering Electronics Ltd. Consortium	Rail Enterprise Asset Management System (Rail EAMS)
R151	Bombardier (Singapore) Pte Ltd	Trains for North-South / East-West Lines
R1601	ST Engineering Electronics Ltd.	Train-Borne Communications System for New North-South / East-West Lines Trains
R152	Siemens Pte Ltd / Engie Services Singapore Pte Ltd Consortium	Track Circuit System for North-South and East-West Lines (NSEWL)
R155	Power Automation Pte Ltd	Supervisory Control System Addition and Alteration Works for North-South and East-West Line Power Supply Upgrading
152F	Thales Solutions Asia Pte Ltd	Simulation Facility for North-South and East-West Lines
R153	Meiden Singapore Pte. Ltd.	Power Supply Upgrading for North-South East-West Line - High Voltage Power Supply System and Associated Equipment
R153A	Meiden Singapore Pte. Ltd.	Power Supply Upgrading for North-South East-West Line - Traction Power Supply System, Power SCADA and Associated Equipment
1503	China Civil Engineering Construction Corporation Branch Office Singapore - Gates PCM Construction Ltd (JV)	Pasir Ris Rail Turnback
1582	SMRT Services Pte. Ltd.	Upgrade of Train-Borne Travel Information Systems for North-South East-West Line (NSEWL) Trains
7086	Chee Yam Contractor Pte Ltd	Design and Build of Enhancement Works at Sengkang MRT & LRT Interchange Station
7087	NCS Communications Engineering Pte Ltd	Communications System and Station Travel Information System (STIS) for the Enhancement Works at Sengkang MRT and LRT Interchange Station
TOTAL SUM AWARDED FOR RAIL PROJECTS		\$1.8 BILLION

NORTH-SOUTH CORRIDOR

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
N101	GS Engineering & Construction Corp.	Design and Construction of North-South Corridor (Tunnel) between ECP and Victoria Street
N102	Ssangyong Engineering & Construction Co Ltd / Wai Fong Construction Pte Ltd Joint Venture	Design and Construction of North-South Corridor (Tunnel) between Victoria Street and Kampong Java Road
N103	Leighton Contractors (Asia) Limited (Singapore Branch) / Yongnam Engineering & Construction (Private) Limited Joint Venture	Design and Construction of North-South Corridor (Tunnel) between Kampong Java Road and Suffolk Walk
N105	Penta-Ocean Construction Co Ltd - Bachy Soletanche Singapore Pte Ltd Joint Venture	Design and Construction of North-South Corridor (Tunnel) between Suffolk Walk and Novena Rise
N107	Samsung C&T Corporation	Design and Construction of North-South Corridor (Tunnel) between Toa Payoh Rise and Marymount Lane
N108	China Railway First Group Co., Ltd. Singapore Branch	Design and Construction of North-South Corridor (Tunnel) between Marymount Lane and Pemimpin Place
N109	Hwa Seng Builder Pte Ltd - Chye Joo Construction Pte Ltd - Ho Lee Construction Pte Ltd Joint Venture	Design and Construction of North-South Corridor (Tunnel) Between Pemimpin Place and Sin Ming Avenue
N109A	Shanghai Tunnel Engineering Co. (Singapore) Pte Ltd	Design and Construction of North-South Corridor (Tunnel) between Sin Ming Avenue and Ang Mo Kio Avenue 3
N110	Lum Chang Building Contractors Pte Ltd	Design and Construction of North-South Corridor (Tunnel) between Ang Mo Kio Avenue 3 and Ang Mo Kio Ave 9
N111	Ssangyong Engineering & Construction Co., Ltd	Design and Construction of North-South Corridor (Tunnel and Viaduct) between Ang Mo Kio Avenue 9 and Sungei Seletar
N160	Singapore Technologies Electronics Limited	Communications System for North-South Corridor
N165	Siemens Mobility Pte Ltd - Att Systems (S'pore) Pte Ltd Consortium	Integrated Traffic and Plant Management System for North-South Corridor
N1031	WorleyParsons Pte. Limited	Qualified Person (Supervision) Services for North-South Corridor Contract N103
N1032	Fosta Pte Ltd	Instrumentation and Monitoring for North-South Corridor Contract N103
N1051	WorleyParsons Pte. Limited	Qualified Person (Supervision) Services for North-South Corridor Contract N105
N1052	Fosta Pte Ltd	Instrumentation and Monitoring for North-South Corridor Contract N105
N1061	ECAS-EJ Consultants Pte Ltd	Qualified Person (Supervision) Services for North-South Corridor Contract N106
N1062	Geosmart International Pte. Ltd.	Instrumentation and Monitoring for North-South Corridor Contract N106
N1071	WorleyParsons Pte. Limited	Qualified Person (Supervision) Services for North-South Corridor Contract N107
N1072	Cast Laboratories Pte Ltd	Instrumentation and Monitoring for North-South Corridor Contract N107
N1081	R.J. Crocker Consultants Pte Ltd	Qualified Person (Supervision) Services for North-South Corridor Contract N1081

N109A1	LYL Consultants Pte Ltd	Appointment of Qualified Person (Supervision) for Contract N109A
N109A2	Fosta Pte. Ltd.	Supply, Installation and Monitoring of Instruments for Contract N109A

ROAD CONSTRUCTION / DEVELOPMENT

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
DE120	Samwoh Corporation Pte. Ltd.	Enhancement of Tampines Avenue 10 between Tampines Avenue 5 and Tampines Expressway
DE122	Jin Choon Civil Engineering Pte Ltd	Commuter and Road Infrastructure Works on Bedok North Avenue 1 between Bedok North Street 1 and New Upper Changi Road
DE123	Eng Lam Contractor Co (Pte) Ltd	Widening of Tampines Road between Kallang Paya Lebar Expressway (KPE) and Tampines Avenue 10
DE132	CHC Construction Pte. Ltd.	Commuter and Road Infrastructure Works at Woodlands Avenue 1/ Avenue 2 and Woodlands Avenue 5/ Avenue 12
DE135	Jin Choon Civil Engineering Pte Ltd	Construction of New Road at Punggol
DE136	Chan & Chan Engineering Pte Ltd	Road Works at Tanah Merah Coast Road
DE139	Huatong Contractor Pte Ltd	Earthworks at Lim Chu Kang Area
RC111	United E & P Pte. Ltd.	Road Works at City Centre
RC118	Hwa Seng Builder Pte Ltd	Construction of Viaduct from TPE to PIE (Westbound) and Upper Changi Road East

COMMUTER FACILITIES ENHANCEMENT / PUBLIC TRANSPORT

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
PL193	Avenue Engineering Pte. Ltd.	Construction of Cycling Path Network
PL198	JS Metal Pte Ltd	Design and Construction of Cycling Path Network
PL201	AECOM Singapore Pte. Ltd.	Engineering Consultancy Services for the Design of Cycling Path Network
PL203	CPC Construction Pte Ltd	Design and Construction of Cycling Facilities
PT193	Tat Hin Builders Pte Ltd	Proposed Design and Construction of Bus Terminal and Associated Works at Marina Centre
PT322	ST Engineering Land Systems Ltd.	Procurement of Euro 6 Double Deck Diesel Buses
PT323A	BYD (SINGAPORE) PTE. LTD.	Procurement of Electric Buses (E-Buses)
PT323B	ST Engineering Land Systems Ltd.	Procurement of Electric Buses (E-Buses)
PT323C	Zhengzhou Yutong Bus Co; Ltd / Nari Group Corporation (Consortium)	Procurement of Electric Buses (E-Buses)

TRAFFIC OPERATIONS / MAINTENANCE

CONTRACT NO	CONTRACTOR / CONSULTANT	DESCRIPTION
TR282	CHC Construction Pte Ltd	Upgrading of Mild Steel Railing (Package 1)
TR283	Gim Tian Civil Engineering Pte Ltd	Upgrading of Mild Steel Railing (Package 2)
TR289	Megastone Holdings Pte Ltd	Upgrading of Roads, Road Structures and Road-Related Facilities
TR291	Double-Trans Pte. Ltd	Construction of Silver Zones
TR295	Megastone Holdings Pte Ltd	Traffic Schemes in Marina Centre for Motor Sport Event
TR299	Certis CISCO Auxiliary Police Force Pte. Ltd.	Provision of Auxiliary Police Officers, Security Officers and Towing Services for F1 Event (Traffic Control)
TR300	Eng Xian Construction Pte Ltd	Term Contract for Road-Related Facilities, Road Structures and Road Safety Schemes
TR302C	Fonda Global Engineering Pte Ltd	6-Year Term Contract for the Installational and Commuter Facilities Equipment for Central Zone
TR302E	ATS Traffic Pte Ltd	6-Year Term Contract for the Installation and Maintenance of Street Lighting and Commuter Facilities Equipment for East Zone
TR302N	Guthrie Engineering (S) Pte Ltd	6-Year Term Contract for the Installation and Maintenance of Street Lighting and Commuter Facilities Equipment for North Zone
TR302W	Fonda Global Engineering Pte Ltd	6-Year Term Contract for the Installation and Maintenance of Street Lighting and Commuter Facilities Equipment for West Zone
TR305	Gim Tian Civil Engineering Pte Ltd	Functional Maintenance of Road Structures and Facilities
TR306	Gim Tian Civil Engineering Pte Ltd	Road Structure and Facilities Maintenance Contract
TR309A	Highway International Private Limited	Road Maintenance Contract for South East Sector
TR309B	Yun Onn Company (Private) Limited	Road Maintenance Contract for South West Sector
TR310A	Eng Lam Contractors Co (Pte) Ltd - United E & P Pte. Ltd. Joint Venture	Road Maintenance Contract for Expressway
TR310B	Eng Lam Contractors Co (Pte) Ltd - United E & P Pte. Ltd. Joint Venture	Road Maintenance Contract for North East Sector
TR310C	Avenue Engineering Pte. Ltd.	Road Maintenance Contract for North West Sector
TT231	Sopra Steria Asia Pte. Ltd.	Upgrading of I-Transport System
TT235	Tyco Fire, Security & Services Pte Ltd	Maintenance of Integrated Traffic and Plant Management System
TT238	ST Electronics (Info-Comm Systems) Pte Ltd	Maintenance of Expressway Monitoring and Advisory System (EMAS)
TOTAL SUM AWARDED FOR ROADS AND OTHER PROJECTS		\$7.1 BILLION

CONTRACTS TO BE AWARDED IN FY2019/20

RAIL

190	Design and Construction of Integrated Trains Testing Centre
1900	Advance Works for Integrated Train Testing Centre
831E	Environmental Control and Tunnel Ventilation Systems for Circle Line Stage 6 (CCL6) Mainline and North East Line Extension (NELe)
832E	Electrical Services for Circle Line Stage 6 (CCL6) Mainline and North East Line Extension (NELe)
833E	Fire Protection System For Circle Line Stage 6 (CCL6) Mainline and North East Line Extension (NELe)
CR1069	Road Diversion and Canal Works
CR1070	Water Main Diversion and Associated Works
CR1076	Alteration and Addition Works to East-West Line, Pasir Ris Station
CR1077	Construction of Temporary Road
CR1078	Sewer and Water Diversion Works (Package A)
CR1079	Sewer and Water Diversion Works (Package B)
CR1080	Sewer and Water Diversion Works (Package C)
CR1086	Sewer and Water Diversion Works (Package D)
CR1087	Sewer and Water Diversion Works (Package E)
CR1088	Temporary Bus Parking and Driver Facility (TPDF)
CR1089	Sewer Diversion Works (Package F)
CR1097	Appointment of Qualified Person (Supervision) for Cross Island Line Phase 1 Advance Works
CR1098	Supply, Installation and Monitoring of Instruments for Cross Island Line Phase 1 Advance Works

CR2001	Advance Engineering Study for Cross Island Line Phase 2 (CRL Phase 2) - Mainline Package A
CR2002	Advance Engineering Study for Cross Island Line Phase 2 (CRL Phase 2) - Mainline Package B
CR2007	Mechanical and Electrical Engineering Services for Rail Project
J101	Design and Construction of Tengah Depot and Associated Facilities for Jurong Region Line (JRL)
J102	Design and Construction of Choa Chu Kang (CCK) Station, CCK West Station, Tengah Station and Viaduct including Alteration and Addition (A&A) Works to Existing CCK Station for Jurong Region Line (JRL)
J103	Design and Construction of Hong Kah Station, Corporation Station and Viaduct for Jurong Region Line (JRL)
J105	Design and Construction of Jurong West Station, Bahar Junction Station and Viaduct for Jurong Region Line (JRL)
J106	Design and Construction of Boon Lay Station and Viaduct including Addition and Alteration to the Existing East-West Line (EWL) Boon Lay Station for JRL
J107	Design and Construction of Gek Poh Station, Tawas Station and Viaduct for Jurong Region Line
J110	Design and Construction of Jurong East Station and Viaduct, including Addition and Alteration Works to the Existing Jurong East Station for JRL
J150	Trackwork for Jurong Region Line (JRL)
J151	Trains for Jurong Region Line (JRL)
J156	Maintenance Management System for Jurong Region Line (JRL)
J168	Access Management System for Jurong Region Line (JRL)
R1012	Design and Construction of Stabling and Maintenance Workshop Extension at Bishan Depot
R150	Trackwork for Bishan Depot, Ulu Pandan Depot and Pasir Ris Rail Turnback
R151D	Disposal of Decommissioned Trains
R176	Maintenance Wagons for NSEWL
R801	Power Supply Replacement and Upgrading for Bukit Panjang Light Rail Transit
R153D	Sale of Decommissioned Power Equipment and Scrapped Cables
R7005	Condition Assessment of North East Line (NEL) and Sengkang-Punggol Light Rail Transit Operating Assets
RS126	Replacement of Transit Ticketing Machines
T2192	Security Services for Thomson-East Coast Line (TEL) for Contracts T215 to T228
T279D	General Maintenance Vehicles for Thomson-East Coast Line (TEL)
T2916	Addition and Alteration to Existing Circle Line (CCL) Marina Bay Station
T316	Construction of Underground Infrastructure

ROADS AND OTHERS

N1011	Qualified Person (Supervision) Services for North-South Corridor Contract N101
N1012	Instrumentation and Monitoring for North-South Corridor Contract N101

N1021	Qualified Person (Supervision) Services for North-South Corridor Contract N102
N1022	Instrumentation and Monitoring for North-South Corridor Contract N102
N1082	Instrumentation and Monitoring for North-South Corridor Contract N108
N1091	Qualified Person (Supervision) Services for North-South Corridor Contract N109
N1092	Instrumentation and Monitoring for North-South Corridor Contract N109
N1101	Qualified Person (Supervision) Services for North-South Corridor Contract N110
N1102	Instrumentation and Monitoring for North-South Corridor Contract N110
N1111	Qualified Person (Supervision) Services for North-South Corridor Contract N111
N1112	Instrumentation and Monitoring for North-South Corridor Contract N111
N112	Design and Construction of North-South Corridor (Viaduct) between Sungei Seletar and Yishun Avenue 5
N113	Design and Construction of North-South Corridor (Viaduct) between Yishun Avenue 5 and Woodlands Avenue 10
N115	Design and Construction of North-South Corridor (Viaduct) between Woodlands Avenue 10 and Admiralty Road West
PL219	Thomson-East Coast Line (TEL) Advertising Non-Fare Operator
PL220	Thomson-East Coast Line (TEL) Retail Non-Fare Operator
DE113	Commuter and Road Infrastructure Works at Hillview, Dairy Farm and Tuas Area
DE133	Proposed Multi-Storey Sengkang West Bus Depot
DE137	Proposed Commuter Infrastructure Enhancement
DE142	Proposed Multi-Storey Gali Batu Bus Depot
DE143	Commuter and Road Infrastructure Works in Pasir Ris and Loyang
DE145	Enhancement and Construction of Bus Stop Infrastructure
PT342	Procurement of 3-Door Euro 6 Double Deck Diesel Buses
PT372	Proposed Design and Construction of Bus Interchange and Associated Works at Tampines North
TR227	E&M System Maintenance for Road Tunnels
TR315	Construction of Silver Zones
TR322	Safety Inspection for Roads and Road-Related Facilities
TR323	Walking Inspection for Roads and Road-Related Facilities
TR330	Painting to Parapets and Tunnel Walls
TR336	Operation and Maintenance of Closed-Circuit Television (CCTV) Enforcement Camera System
TT240	Upgrading of Short Tunnel System
TT241	Comprehensive Maintenance of Parking Guidance System

FY2018/19 FINANCIAL HIGHLIGHTS

STATEMENT OF COMPREHENSIVE INCOME

At the Authority level, the net deficit for FY18/19 is \$130m, after netting off government grants. This is contributed by net deficit in the General fund (\$33m), net deficit in Restricted fund – Railway Sinking Fund (\$111m), offset by net surplus in Restricted fund – Bus Contracting (\$14m).

FY18/19	General Fund S'M	Railway Sinking Fund S'M	Bus Contracting S'M	Total S'M
Operating Income	886	3	912	1,801
Management Fee from Government	658	0	0	658
Bus Fare Revenue	0	0	834	834
Other Operating Income	228	3	78	309
Operating Expenditure	(2,157)	(131)	(1,925)	(4,213)
Operating Deficit	(1,271)	(128)	(1,013)	(2,412)
Other Gains - Net	11	17	3	31
Deficit before Government Grants	(1,260)	(111)	(1,010)	(2,381)
Government Grants	1,227	0	1,024	2,251
(Deficit)/Surplus before Contribution to Consolidated Fund	(33)	(111)	14	(130)

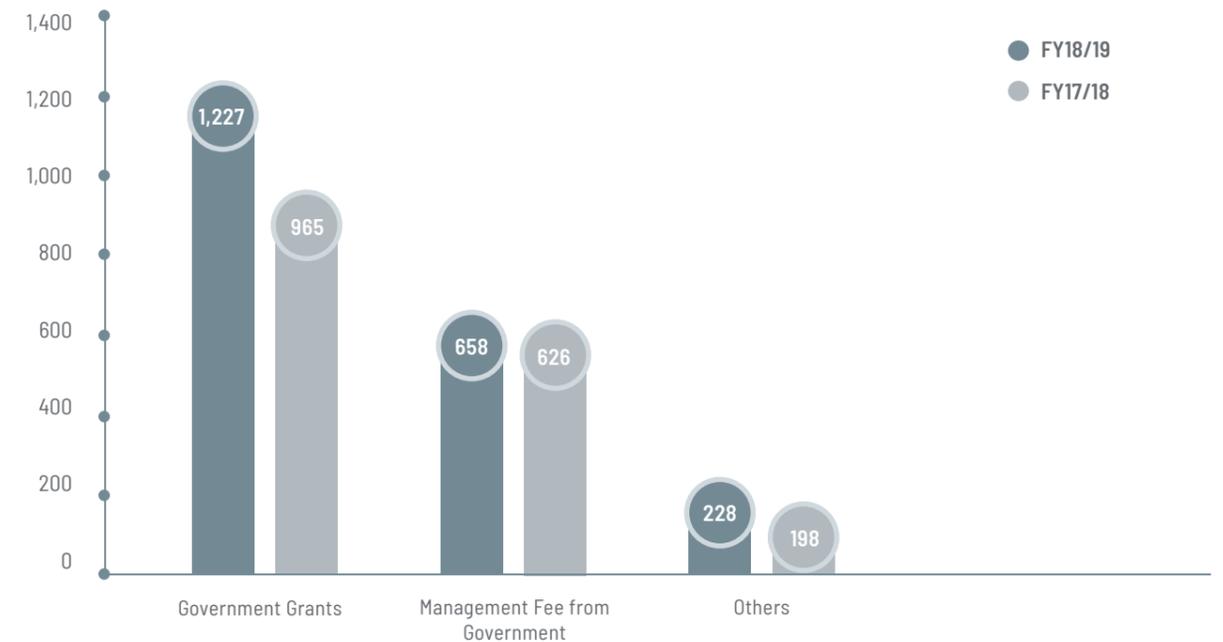
FY17/18	General Fund S'M	Railway Sinking Fund S'M	Bus Contracting S'M	Total S'M
Operating Income	824	0	904	1,728
Management Fee from Government	626	0	0	626
Bus Fare Revenue	0	0	832	832
Other Operating Income	198	0	72	270
Operating Expenditure	(1,881)	(101)	(1,770)	(3,752)
Operating Deficit	(1,057)	(101)	(866)	(2,024)
Other Gains - Net	8	2	2	12
Deficit before Government Grants	(1,049)	(99)	(864)	(2,012)
Government Grants	965	0	875	1,840
(Deficit)/Surplus before Contribution to Consolidated Fund	(84)	(99)	11	(172)

The full Financial Statements is available at <https://www.lta.gov.sg/content/ltaweb/en/publications-and-research/reports/financial-statements.html>

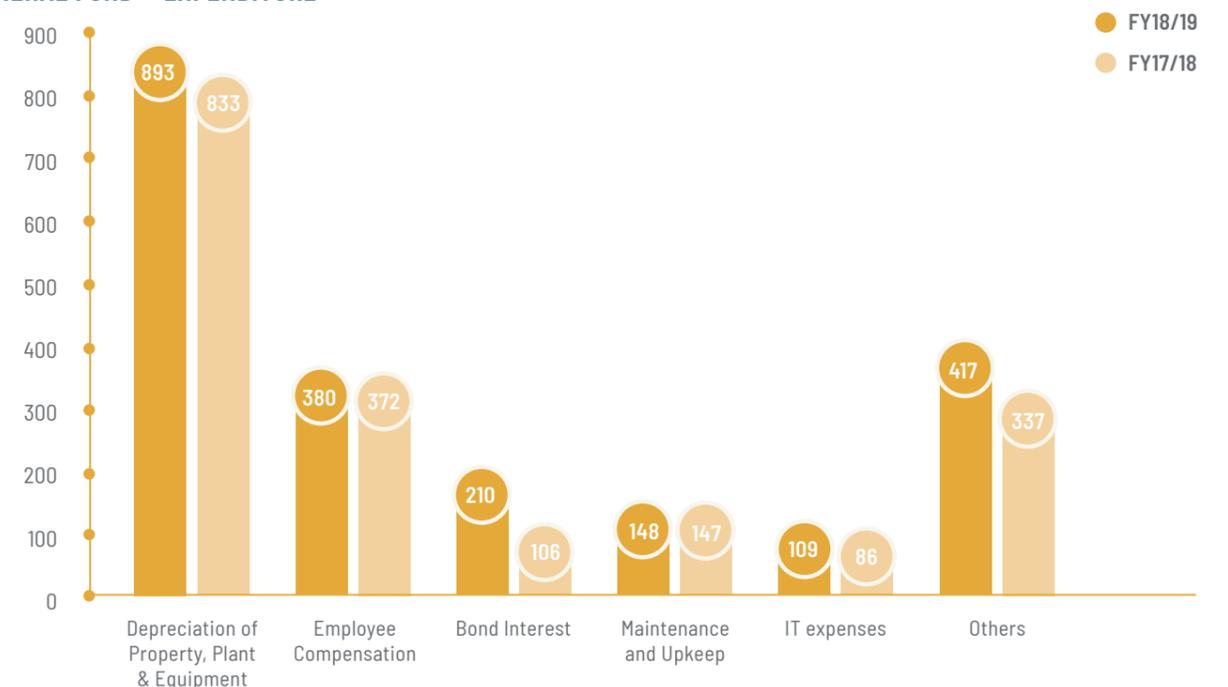
GOVERNMENT GRANTS, OPERATING INCOME AND EXPENDITURE

The Authority recognised income amounting to \$2,909m from Government, comprising Government grants of \$2,251m and Management fee of \$658m. Of the total amount recognised, \$1,885m went into General fund, and \$1,024m went into Restricted fund – Bus Contracting. The Authority's total operating income of \$1,801m in FY18/19 is an increase of \$73m (4%) over FY17/18's income of \$1,728m. The Authority's total operating expenditure of \$4,213m in FY18/19, an increase of \$461m (12%) over FY17/18's expenditure of \$3,752m.

GENERAL FUND – GRANTS & INCOME

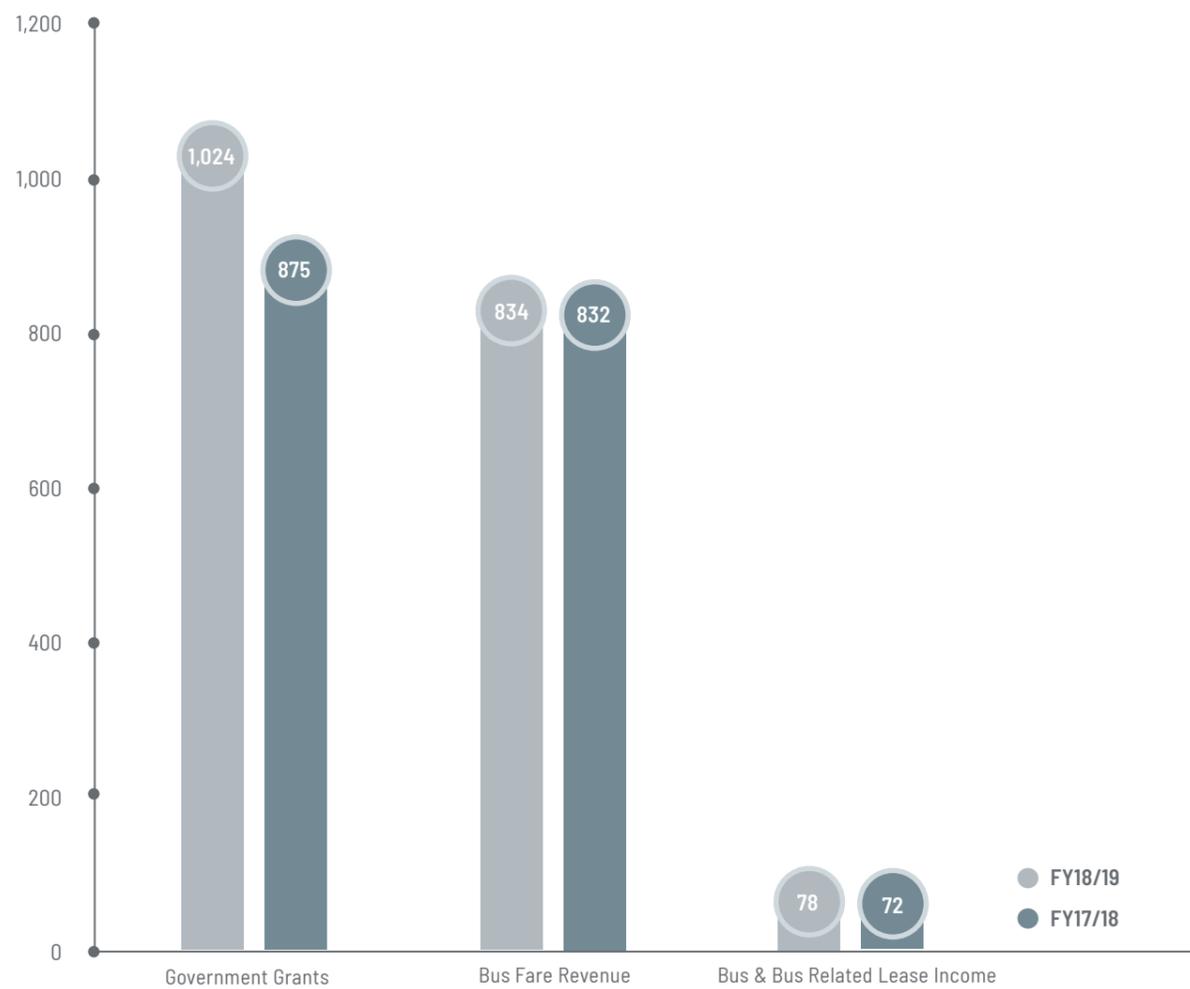


GENERAL FUND – EXPENDITURE

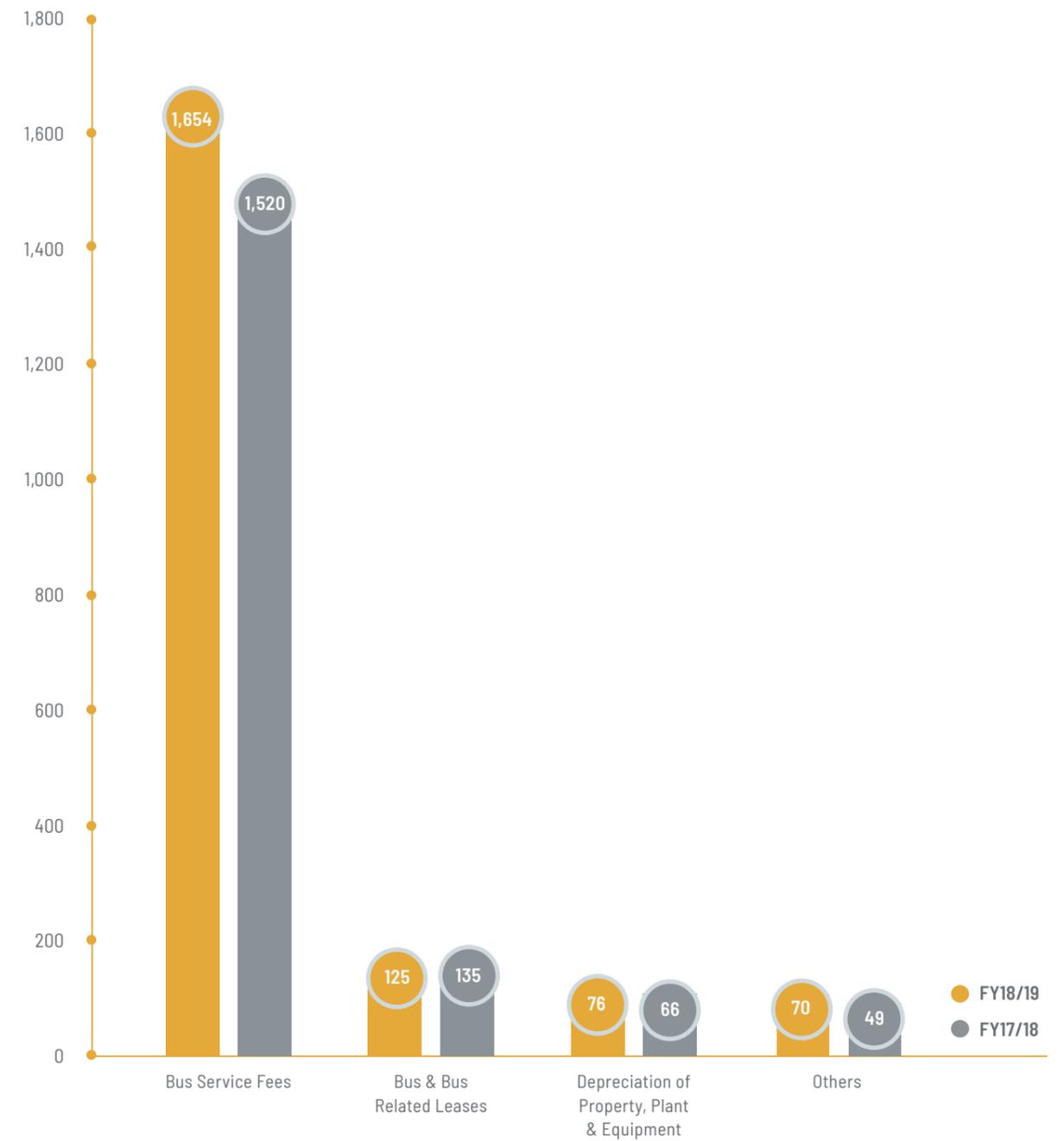


FY2018/19 FINANCIAL HIGHLIGHTS

BUS CONTRACTING – GRANTS & INCOME



BUS CONTRACTING - EXPENDITURE



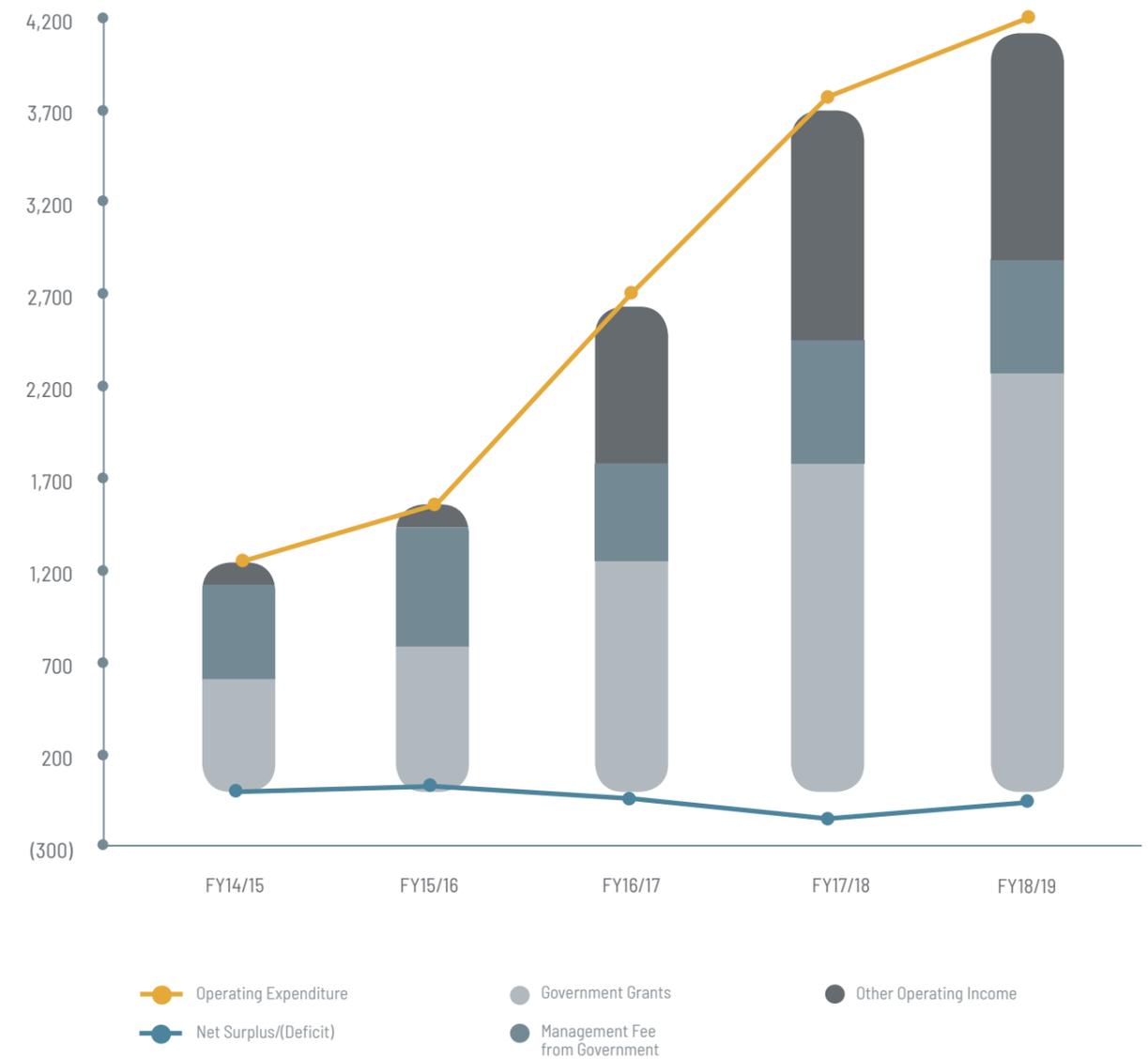
FY2018/19 FINANCIAL HIGHLIGHTS

BALANCE SHEET

	FY18/19 \$'M	FY17/18 \$'M	Variance \$'M
Property, Plant & Equipment	52,096	47,906	4,190
Viaducts and Tunnels	10,229	10,236	(7)
Stations, Buildings and Structures	12,960	13,058	(98)
Rolling Stock	3,083	3,059	24
Buses & Bus Related Assets	876	787	89
Construction-In-Progress	17,008	12,719	4,289
Others	7,940	8,047	(107)
Other Non-Current Assets	36	35	1
Current Assets	16,010	8,526	7,484
Assets	68,142	56,467	11,675
Equity	5,324	4,171	1,153
Borrowings	8,975	4,975	4,000
Deferred Government Capital Grants	48,146	44,160	3,986
Other Non-Current Liabilities	2,021	1,359	662
Current Liabilities	3,676	1,802	1,874
Equity & Liabilities	68,142	56,467	11,675

5-YEAR FINANCIAL SUMMARY

OPERATING INCOME, GOVERNMENT GRANTS, EXPENDITURE



W W W . L T A . G O V . S G



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