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#### Chairman's Message

## **Turning 25**: Looking Back To Move Forward



When I joined the Land Transport Authority (LTA) in April 2016, Singapore had just held its inaugural car-free Sunday two months before in the downtown area.

With the roads closed off to cars. the spaces were transformed as thousands turned up to stroll, skate and cycle in the city centre with their friends and family. Parents with young children came with mats and food for a picnic on the green lawns, while others joined in the fun with their pets.

Back then, going car-lite was a relatively new buzzword. Today, it is a key part of our urban mobility development as we imagine a future of transport that is more connected and accessible. Our vision is sketched out in our Land Transport Master Plan (LTMP) 2040.

How land transport has evolved is remarkable. As we look ahead to celebrating LTA's 25th anniversary, it is also a time to take stock of how far we have come, and chart our way forward.

LTA was established in 1995. At that time, the North-South and East-West Lines had just become fully operational, and we were working on adding more rail lines, including Light Rapid Transit systems in the heartlands, to boost connectivity deep in the residential estates.

Singapore has come a long way since then. We now have over 232 km of

rail lines criss-crossing the city-state. This will increase to 360 km with the addition of two upcoming rail lines - the Jurong Region Line and Cross Island Line. Rail reliability has improved too, with our trains travelling longer distances before encountering a delay of five minutes.

In 2019, we crossed the 1 million Mean Kilometres Between Failure target, a year ahead of schedule. This makes our rail network as reliable as top metros like Hong Kong MTR and Taipei Metro.

We are now standing at an inflection point of our land transport history, as we work towards a car-lite and sustainable land transport system. There are many possibilities for the transport of tomorrow. from integrated corridors that promote our Walk-Cycle-Ride (WCR) initiative to greener travel options.

#### **Roads That Connect Us**

We are making our roads friendlier to pedestrians, riders and commuters. The upcoming North-South Corridor (NSC) is a good example of how we have integrated various transport options.

The NSC was first conceptualised as a vehicular expressway, but we have since redesigned it to be Singapore's longest transit priority corridor. We are also developing our cycling network to support our WCR vision.

The Islandwide Cycling Network programme and the NSC make up a crucial part of our LTMP 2040, which envisions a transport network that is convenient, well-connected and supports healthy living.

#### **Green Goals And Growth**

Apart from greater connectivity, we are also working to make our public transport sector more energy efficient. On this front, we have been making clear strides towards our goal of a 100 per cent cleaner, greener public bus fleet by 2040.

We have 50 diesel hybrid buses plying the roads since last year, and 60 fully electric buses will be deployed progressively. These fully electric buses will help us reduce emissions by up to 7,840 tons of carbon dioxide emissions a year - equivalent to the amount generated by 1,700 cars.

We will also be moving towards having all our vehicles run on cleaner energy by 2040, with electric vehicles (EVs) playing a key role towards this vision. To support this, the public EV charging infrastructure will be expanded to 28,000 charging points by 2030. Policies to incentivise the purchase of fully electric cars will also be introduced. LTA will continue to work on the implementation details towards achieving this vision.

#### **Riding Out The Crisis** Together

As we commemorate our silver jubilee, we are mindful that it comes during a global pandemic that brought much of the world to a standstill for several months.

Every day, public transport workers continued to operate trains and buses, man stations and interchanges, and carry out maintenance and engineering works. Thousands of taxi and private hire car drivers still plied the roads, as did food delivery workers on roads and paths. Together with the public transport operators, we ramped up our cleaning regimes during the Circuit Breaker, which we continue to maintain.

At the same time, we continued to maintain our roads and transport facilities such as bus stops and

interchanges, to ensure they can be safely used by motorists and commuters.

We monitored the COVID-19 situation on the ground closely, and refined our land transport policies accordingly. We implemented precautionary measures and made adjustments to the train and bus frequencies and routes. We also worked with the Pointto-Point (P2P) operators, the National Taxi Association and National Private Hire Vehicles Association to outline steps to protect our P2P drivers and their passengers.

#### **Forging Ahead With Renewed Vigour**

The pandemic has shown that we have a responsive and adaptable team at LTA, and a land transport system that can withstand shocks.



I am certain we will bounce back with renewed vigour to pursue the vision sketched out in LTMP 2040-to build an inclusive, connected and car-lite system that is safe and reliable. We continue to provide substantial grants to develop our rail network, including the Thomson-East Coast Line, as well as through the Bus Contracting Model, to ensure that public transport meets Singapore's evolving needs.

This is a journey we embarked on with you, a journey towards a futureready and integrated land transport system. Here's to more seamless and sustainable commutes and travels!

#### Chief Executive's Message

## Standing Strong And United In A Crisis



2020 has been eventful and unforgettable, a year marked by COVID-19. As a nation, we faced unprecedented challenges, including a two-month Circuit Breaker when many activities ground to a halt. However, this is not the case at LTA. We had to ensure that essential workers could continue to make their journeys as efficiently and safely as possible, while keeping our public transport workers safe too.

I am proud of how our people rallied together and stepped up to the task. We faced the pandemic and the new normal together, calmly and decisively by prioritising the interests of commuters. Over 700 LTA staff were out during the Circuit Breaker, toiling to keep Singapore moving safely, 350 volunteered to help in Whole-of-Government initiatives, while others diligently worked from home to ensure our transport system continues to function smoothly. I must also thank our partners, the operators, industry players and public service agencies, who worked with us in a truly united effort to keep Singapore moving.

LTA turned 25 this year, and while the mood may be muted, we should celebrate how far we have come. We have achieved many milestones which should spur us on to face the next chapter in the LTA story.

#### Rising To The COVID-19 Challenge

The pandemic tested our ability to be nimble and creative in developing policies to address rapidly changing situations.

Our Transport Ambassadors were out on the frontlines encouraging commuters to maintain safe distancing, and to refrain from talking on public transport, in order to keep them safe during their transient journeys on trains and buses. Cleaning and maintenance of our trains, buses, taxis and transport nodes were stepped up. These have become the norm and will continue to keep us safe.

Other transport sectors were also badly affected during the pandemic when most people stayed home. Together with our industry partners, we introduced two P2P Support Packages (PPSP) in February and March 2020, and a further extension of the PPSP in September 2020 which complemented the tripartite care package for taxi and private hire car drivers who were placed on quarantine to tide them through this difficult period. LTA was also part of a multi-agency effort to support the private bus industry through a Private Bus Support Package.

#### Leaping Forward With Rail Reliability

COVID-19 aside, rail remains the backbone of our land transport system and we have much to celebrate this year.

I am delighted to share that our Mean Kilometres Between Failure, which measures how long trains travel before a downtime, has continued to exceed 1 million train-km since July 2019. The Circle Line recorded the more recent best result with 3.4 million train-km in the same period.

The credit must go to our dedicated rail operator teams who enabled the Early Closures and Late Openings which gave our engineers more time to maintain and upgrade their networks.

We are more than halfway through the renewal of the six core systems on the North-South and East-West Lines. New trains will progressively enter service from 2022, while we are working towards completing the renewal works for the track circuit and power supply systems by the early 2020s.

We are also building an Integrated Train Testing Centre, the first-of-itskind in Southeast Asia, which will be the cornerstone of Singapore's strategy to sustain rail reliability and deepen core rail engineering capabilities. The first phase is scheduled to open by end 2022.

#### Enhancing Connectivity Through Infrastructure

Our rail network continued to expand with the opening of Canberra Station on the North-South Line on 2 November 2019. It is the second station in Singapore to be added to an existing, operational line and will save residents living nearby 10 minutes' journey time to the city.

The first phase of the Thomson-East Coast Line, comprising Woodlands North, Woodlands and Woodlands South MRT stations, was launched in January 2020. We also announced the alignment and station locations for the Cross Island Line – Punggol Extension, connecting Pasir Ris to Punggol. These bring us closer to our Land Transport Master Plan 2040 vision of greater connectivity and accessibility across our island.

#### The Greener Way To Travel

Our goal towards a car-lite society that is greener and healthier is taking shape with our Islandwide Cycling Network programme and other infrastructure expansions. We are tripling the cycling path network from 460km today to about 1,300km by 2030. To make sure everyone can enjoy these amenities, we have taken decisive policies, and stepped up enforcement and regulations to ensure active mobility remains viable and safe for all path users.

Work is also in progress for the 21.5km North-South Corridor project which will offer greater connectivity for those living in the North to the city centre. It will also be our longest transit priority corridor yet, and bring us one step closer to our Walk-Cycle-Ride vision.

#### Transforming Manpower With Future-Ready Skills

LTA has been harnessing technology to provide a future-ready land transport system, and it is critical that our manpower is ready and up to the task. We strive to achieve this with the Land Transport Industry



Transformation Map, a roadmap where one of the key focus areas lies in skills maintenance, upgrading and reskilling in preparation for the evolving land transport landscape.

We also continue to work closely with the National Transport Workers' Union (NTWU) to look after the safety and well-being of public transport workers. This includes regular engagement with workers, employers and unions to understand the challenges and issues they face in their day to day operations.

I am immensely proud of our LTA team. COVID-19 has shown that we can, and we will, work together to make sure Singapore keeps moving efficiently and safely. And it is on this note that I hand over the LTA driver's seat to the new Chief Executive, Mr Ng Lang, on 1 September. It is never easy to say goodbye, but every farewell marks a new beginning. I will remember my LTA colleagues fondly.

## **Board of Directors**



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National Transport Workers' Union

Executive Secretary, United Workers of **Electronics & Electrical** Industries

Director. U Associate, NTUC



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Ministry of Transport

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Board Member, Workforce Singapore





**Deputy Chief Executive** Officer and Chief Planner, Urban Redevelopment Authority

Member, Science Centre Board

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Chartered Accountant

Board Member and Audit Committee Chairman, Urban Redevelopment Authority & Singapore Institute of Technology

#### Ms Deborah Ho

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Investment Committee Member, LKY Investment Fund





#### Mr Mohd Sa'at Bin **Abdul Rahman**

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Mr Lew Yii Der Group Director, Safety & Contracts

Mr Alvin Soong Director, Safety & Contracts

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#### SECRETARIAT

**Mr Peter Quek** Group Director, Information Technology, Cybersecurity & Digital Services

#### dul Rahman

#### SECRETARIAT

Ms Helen Lim Group Director, Corporate Communications

Dr Chuai Chip Tiong Chief,

Quality Service Manager Office, Community & Customer Engagement

#### SECRETARIAT

#### Mr Yee Boon Cheow

Group Director, Rail Asset, Operations & Maintenance

Mr Leow Meng Fai 2 Deputy Group Director,

Rail Asset, Operations & Maintenance

## **Senior Management**



Ngien Hoon Ping Chief Executive Land Transport Authority (Until 31 August 2020)



Ng Lang Chief Executive Land Transport Authority (From 1 September 2020)



Chua Chong Kheng Deputy Chief Executive Infrastructure & Development



Jeremy Yap Deputy Chief Executive Public Transport, Policy & Planning



Goh Teck Seng Deputy Chief Executive Corporate & Development





Sim Wee Meng Senior Group Director Rail and Group Director Rail Infrastructure & Expansion



Yeo Teck Guan Senior Group Director Public Transport



**Chan Boon Fui** Group Director Active Mobility



Paul Fok Chief Engineer (Civil)

Frederick Wong Chief Advisor (Contracts & Commercial)







Helen Lim Group Director Corporate Communications

## **Senior Management**





Esther Wee Chief Financial Officer



Ang Heng Chief Human Resource Officer



Winston Cheng General Counsel



Peter Quek **Group Director** Information Technology, Cybersecurity & Digital Services



Venktaramana s/o V Vijayaragavan Group Director North-South Corridor



Lina Lim Group Director Policy & Planning



Dr Chuai Chip Tiong Chief Quality Service Manager Office, Community & Customer Engagement



Yee Boon Cheow Group Director Rail Asset, Operations & Maintenance



## **Senior Management**



Wong Wai Keong Senior Advisor Rail Systems Asset



Yap Boon Leong Group Director Road & Commuter Infrastructure Development



Yap Cheng Chwee Senior Advisor Road Projects



Dr Chin Kian Keong Chief Engineer Road & Traffic



Lew Yii Der Group Director Safety & Contracts





Leong Kwok Weng **Chief Engineer** Systems



Lam Wee Shann Group Director Technology & Industry Development



Ng Kee Nam Group Director Thomson-East Coast & Cross Island Lines



Chandrasekar s/o Palanisamy Group Director



Traffic & Road Operations



Alvin Chia Group Director Vehicle Services

## **Organisation Structure**



#### Helen Lim

**Group Director** Corporate Communications

#### Peter Quek

**Group Director** Information Technology, Cybersecurity & Digital Services

#### Dr Chuai Chip Tiong

Group Director QSMO, Community & Customer Engagement

#### Lam Wee Shann

Group Director Technology & Industry Development







As the train doors open at Orchard MRT station, passengers wearing masks exit carriages about an arm's length from each other. Waiting to enter are others who try to give one another as much space as they can. This has become normal, considerate behaviour in a time defined by COVID-19.

Nearby, Transport Ambassadors keep a watchful eye and direct commuter flow to prevent long lines from forming. As the nation reopens, the Transport Ambassadors and public transport workers continue to remind commuters to mask up, scan SafeEntry QR codes for contact tracing and refrain from talking in trains and buses.

Everyone, from commuters to staff on the ground, knows they play a part in keeping land transport and Singapore safe.

Together, Singapore has stayed strong and united during the Circuit Breaker period and gradual reopening to a new normal. There are stories of neighbours looking out for each other and initiatives to deliver food and aid to the needy. Commuters help other commuters, and public transport workers go beyond the call of duty to assist those who are unsure of what to do.

At the Land Transport Authority (LTA), we have been on the frontlines of the SGUnited effort, ensuring the safety of commuters who continued to travel daily to provide us with essential services, and public transport workers who still had to work to keep Singapore moving.

Against this challenging backdrop, LTA commemorates our 25<sup>th</sup> anniversary in 2020. Our celebrations have been more subdued but we

are nonetheless very proud of what we have achieved by rallying partners and stakeholders to keep public transport reliable, resilient, connected and safe for all commuters.

As we safeguard the present, we also look to transforming transport for the future. As envisioned in the Land Transport Master Plan 2040 or LTMP 2040, we are creating '20-minute towns and a 45-minute city', where daily amenities and jobs are easily accessible. Beyond this, we must continue to work with the community in creating a greener and more sustainable transport ecosystem that supports the active and healthy lives we all aspire to lead.

## **Keeping Commuters** Moving

While most of the country stayed home during the Circuit Breaker period, our trains, buses, taxis and private hire cars (PHCs) continued plying the roads and rails to ferry essential workers. Safety was our utmost priority, and we continue to be vigilant even as Singapore slowly reopens.

#### **Doubling Up On Safety**

For those who still had to commute for essential reasons during the onset of the pandemic, safe distancing and personal hygiene were key pillars of our safety-first approach. Our orange and green safe distancing stickers were installed on all trains and buses during the Circuit Breaker as a reminder to commuters who were adjusting to new norms. Posters were put up in MRT stations and at bus interchanges reminding commuters

to wash their hands frequently, and to wear masks and see a doctor if they are feeling unwell.

As more commuters resumed taking public transport in Phase Two, a series of safe management measures were put in place. We encouraged them to be socially responsible and refrain from talking during their journeys to avoid spreading droplets. Hand sanitiser dispensers were made available at stations and interchanges, and public announcements were made at bus interchanges, train stations, and on buses and trains to reinforce the messages.

In addition, commuters were encouraged to scan the SafeEntry QR code and download TraceTogether to help in contract tracing, when taking trains, entering bus interchanges, or riding street-hail taxis.







talk on the phone or to each other

We can all do our part to help keep Singapore saf -

## **Supporting Health And Safety Efforts**



Source: SBS Transit

Ensuring safe measures on thousands of buses, trains, taxis and PHCs required a concerted effort from everyone. We reinforced these measures with additional manpower and guidelines.

## More Eyes On The Ground

During the Circuit Breaker period and with the implementation of safe distancing measures on our public transport network, Transport Ambassadors were deployed to selected MRT stations and bus interchanges to remind commuters to adhere to measures such as wearing of masks, following marker/sticker demarcations and maintaining safe distances from others.

As Singapore gradually reopens, the presence of Transport Ambassadors at public transport nodes supports the implementation of safe management measures on public transport.

Transport Ambassadors supplement our operators' manpower and are an invaluable additional resource on the ground. The enrolment of transport workers from the aviation sector and taxi companies as Transport Ambassadors also helps them to supplement their loss in income.

#### Temperature Taking, Masking And Cleaning

By now, we have become accustomed to practicing good personal hygiene to keep ourselves safe. On our part, LTA is doing all we can to keep transport safe for commuters, public transport workers, and Point-to-Point Transport (P2P) drivers.

Self-check temperature kiosks were set up at selected MRT stations and bus interchanges to facilitate temperature taking, and wearing a mask became compulsory on all public transport. Our Public Transport Operators (PTOs) doubled their cleaning efforts by regularly sanitising handrails, disinfecting cabins, and wiping seats. They also coated frequently touched surfaces with anti-microbial chemical coating to improve efficacy and efficiency of the cleaning regime.

For PHC and taxi drivers, we set up screening stations for them together with the P2P operators and associations where they could take their temperatures twice daily, and introduced guidelines on how to keep their vehicles clean.



Source: SBS Transit



#### **Riding Restrictions**

To avoid unnecessary mixing of individuals and households. carpooling services were prohibited during the Circuit Breaker period. As ridership increased when Singapore entered Phase Two of its reopening, the ban was partially lifted with safety measures in place. Carpooling services that are matched through ride-hail platforms have been reallowed since Phase 2 of Singapore's reopening.

#### Liberalising P2P **Delivery Services**

There was a surge in demand for delivery services during the circuit breaker, as dining-in was not allowed. Many also turned to online shopping as physical shops were closed. At the same time, P2P ridership fell significantly during the circuit breaker as many refrained from going out and most employees were working from home. LTA temporarily liberalized the P2P regulations to allow the use of taxis and PHCs for delivery services. This has provided drivers with an additional source of income while helping to fulfil the surge in demand for delivery services.

## Help For The Industry

With the decline in demand for taxis and PHC drivers, LTA, together with the Government and associations, stepped in to assist drivers with a series of support packages and measures to defray costs and provide income relief.

#### **Moving To Secure The** P2P Industrv

In February 2020, the Government, taxi operators, and private-hire companies launched a \$77 million Point-to-Point Support Package (PPSP) to help P2P drivers cope during this difficult period.

As COVID-19 raged on, the Government rolled out two further tranches of the PPSP to provide continued support to taxi and PHC drivers.



One-time waiver of \$100 Outward Conversion Fee for PHC drivers who wish to convert their vehicles out of the PHC scheme. This will allow them to enjoy lower insurance premiums and ease their transitions to other jobs.



Six-month extension of the P2P operator licence fee waiver.



The Government also provided up to \$2,000 in special relief for every unhired taxi for a period of six months.



Enhanced training support for taxi and PHC drivers. SkillsFuture Singapore covers up to 90 per cent of the fees for selected courses. This helps drivers upskill during this downtime.



**For Needy** 

**Drivers** 

A \$2.7 million Government & NTUC

did not qualify for the SRF.

Driver Care Fund for needy drivers that



#### Postponement of Licensing

Framework Postponement of the implementation of the Street-hail Service Operator Licence

and Ride-hail Service Operator Licence to September 2020. This allowed operators to focus on assisting drivers and address more pertinent operational challenges at hand.







#### **Third Tranche** of the PPSP (PPSP3)

#### Total: \$141 million

## **Extended Licence**

## For Upskilling



SRF Extension

Six-month extension of the SRF to March 2021 of \$106 million. Taxi operators also pledged to match rental rebates of up to \$29 million.



#### Extended Licence Fee Waiver

Extension of P2P operator licence fee waiver by a further three months.



#### **Extension Of** The Unhired Taxi Relief

Extension of Special Relief for unhired taxis by a further six months to March 2021.



Extended P2P **Delivery Services** 

Extension of the liberalised regulations for P2P deliveries by a year to end September 2021.

## \$23 million in aid

for private bus operators

## \$200 one-off allowance

for P2P drivers

#### **Tripartite Care** Package

As guarantined P2P drivers worried about declining income, the National Private Hire Vehicles Association and National Taxi Association worked with LTA to create a tripartite care package. It included:

- One-off allowance of \$200 to alleviate a portion of income loss for drivers
- Full rental fee waivers for drivers

As part of the second Budget, the Government also provided \$23 million in aid for private bus industry operators. Existing private bus owners were granted a one-year road tax rebate while Class 2 Bus Service Licence holders received a nine-month waiver/refund for their licence fees. There was also a sixmonth waiver of parking charges at government-managed facilities.

#### Adapting To Evolving Needs

We took into account the evolving needs of motorists, and made adjustments such as suspending all ERP charges from 6 April to 26 July 2020. With the resumption of economic activities, we are monitoring the traffic situation closely to adjust ERP rates and manage congestion.

As private car inspections were suspended at the Authorised Inspection Centres, we also extended inspection deadlines by 6 months for owners whose periodic private car inspection deadlines fell between 7 April and 30 June 2020, and waived





seal inspection for Off-Peak Cars whose road tax due dates fell within the same period. With the closure of LTA-Authorised Scrapyards and Export Processing Zones, vehicle owners were given extended deadlines to allow them more time to dispose of their deregistered vehicles. Commercial vehicle owners were also given extensions to register their replacement vehicle under the Early Turnover Scheme.

To ensure that motorists had access to critical transactions, our vehicle services remained accessible online and we encouraged users to use our digital services.



# Reinvigorating Rail



As Singapore rallied together to overcome the global pandemic, our rail networks also remained resilient and reached new milestones in reliability – a resounding result of constant renewal and maintenance over the years as ridership grew.

This was a concerted effort by LTA and rail operators through the updating and upgrading of older networks as well as using technology to monitor and maintain rail performance.

With rail forming the backbone of our public transport system, reliability remains the cornerstone of an efficient, safe and convenient network. At the same time, enhancing connectivity through rail expansion is equally vital for a seamless journey.

We continue to close the distance between more locations. In the coming years, we will open new stations and lines almost every year, complemented by a new wayfinding system that will help commuters navigate the rail network with ease.

By the 2030s, the rail network will grow to about 360km, up from 232km now. We are committing over \$60 billion for expansion and renewal in the next decade, bringing the city closer with a more connected rail network.



## **Striding Ahead In Reliability**

As new lines and stations are added to meet rising ridership demands, older networks also require rejuvenation to keep them running well. In 2012, we embarked on a massive multi-year rail renewal plan to enhance systems, tracks and trains on our two oldest lines – the North-South and East-West Lines (NSEWL).

As a result, commuters are experiencing the benefits of an improved and more reliable rail system across our whole network. Trains are travelling much longer distances before experiencing a delay of more than five minutes, as measured by the Mean Kilometres Before Failure (MKBF).

#### **MKBF Milestone**

We continue to sustain high levels of rail reliability performance exceeding 1 million train-km, placing us among the best performers globally.

Age is no barrier to train performance. The top spot went to the Circle Line, which registered a MKBF of 3.4 million train-km in the same period. All other MRT lines have also done well. With strong teamwork between regulator and operators, we look forward to continually improving our MKBF in the future.



#### Reaching The One Million MKBF Target



#### Since July 2019

### exceeding 1 million train-km



equivalent to travelling more than 20 times around the Earth





#### **Renewing Our Older** Lines

The stellar MKBF results, in particular for older lines, did not happen by chance. It has been a long journey, but we are on track to completing the \$2.5 billion multi-year renewal programme for the six core systems of the NSEWL. Three projects are now completed.

Now in its second phase, we are currently renewing our track circuits, power supply systems, and looking forward to introducing the 106 replacement trains into passenger service from 2022 as we progressively decommission our first, second and third generation NSEWL trains from June 2020.

We have substantially completed the replacement of track circuits along the North-South Line stations and commenced the replacement works

#### along the East-West Line stations. As for the power supply system, 180km of power cables have been installed and all 64P touch voltage protection relays have been replaced with new voltage limiting devices.

will see us through. So far, more than 900,000 man hours have been invested in this massive renewal programme by LTA, NSEWL's train operator SMRT, and various contractors. To speed up the remaining works, we have increased engineering hours with the Early Closure and Late Opening of train stations.

#### **Renewal Of NSEWL's Six Core Systems**







#### **Replacement of** 106 Old Trains

Better rides with 106 new generation trains with condition monitoring capabilities

## **Enhancing Reliability** With Technology

Technology continues to play a vital role in transforming our rail networks. Our relentless pursuit to enable a reliable, safe and efficient system is built on this. As we renew our rail networks, we also equip more trains with real-time condition monitoring systems across our existing lines, so that faults can be detected and fixed in a timely manner.

Trains are equipped with Automatic Track Inspection (ATI) systems, which continuously monitor track health through sensors and smart analytics. With the enhanced data collection, this paves the way to a new system of predictive maintenance where problems can be rectified before they occur.

Our local operations and maintenance (O&M) capabilities are also developed to maintain the performance of rail

assets and keep our systems running robustly. With a stronger core of local rail engineers, we will be able to better maintain our expanding rail network and enhance reliability.

#### **New Testing And Simulation Facilities**

In February 2020, the first phase of the new Downtown Line simulation facility was opened at Gali Batu Depot. This is the second facility, after the first dedicated signalling simulation facility for the NSEWL opened at Bishan Depot in 2018.

The first facility has made breakthroughs on stabilising the NSEWL's new signalling system through improved software testing, and the second facility is expected to make further inroads in testing and simulation. We plan to develop more

facilities, with \$100 million earmarked over the next five years to build them for the Thomson-East Coast Line, North East Line and Circle Line.

#### **Growing Local Engineering Expertise**

As we expand our rail network, we continue to seek opportunities with local partners who will help the industry grow by improving our local rail maintenance and engineering capabilities. LTA has taken on the facilitator role to encourage closer cooperation between stakeholders in the rail industry.

In June 2019, we brought SBS Transit, SMRT and ST Engineering together to synergise their knowledge and expertise for railway maintenance, for cost-effective development of engineering capabilities for rail O&M.



Artist's Impression of the Integrated Train Testing Centre (ITTC)

This collaboration allows faster inhouse diagnosis and repairs of faulty electronic cards to reduce service downtime.

#### **Integrated Train Testing** Centre (ITTC)

With our constant focus on maintaining rail reliability, we require more facilities to increase our testing capacity outside limited engineering hours. In April 2020, a \$639.5 million contract was awarded for the design and construction of an ITTC that features 11km of test tracks.

Located at the former Raffles Country Club site in western Singapore, the 50-hectare test site will be a firstof-its-kind in Southeast Asia that provides integrated high-speed systems testing for new and existing MRT lines.







## **Expanding Our Rail** Connectivity

Beyond having a reliable rail system. every metropolis needs a highly connected and well-developed rail network to offer seamless mobility for commuters. Singapore is no exception, as it aims to make public transport a choice mode of travel.

For residents to enjoy commuting convenience, we have been expanding our rail network across the island. This year, we commenced operations on the Thomson-East Coast Line (TEL) while construction on two new lines will begin in the near future.

#### **Completed Rail Expansions**

#### Phase 1 of the Thomson-East Coast Line (TEL1)

The first phase of Singapore's sixth rail line started operations on 31 January 2020, servicing Woodlands North, Woodlands and Woodlands South stations.



Johor Bahru-Singapore Rapid Transit (RTS) Link

Students at the neighbouring Republic Polytechnic can now enjoy better connectivity, with an entrance to the station leading directly to the school. Woodlands North Station will also be the Singapore terminus for the RTS Link connecting to Bukit Chagar Station in Johor Bahru. RTS Link passenger services are targeted to commence in 2026.

The interchange station between the TEL and North-South Line (NSL) will improve connectivity for Woodlands residents and commuters.

A station designed to reflect the vibrant and diverse community.



#### Sembawang

## NSL New Station

Over 17,000 households live within a 10-minute walk from the station, and commuters can now save up to 10 minutes in travel time towards the city centre or Jurong East. More than 500 bicycle parking lots are also available for cyclists.

**Canberra Station on the** 

North-South Line (NSL)

Canberra Station – located between Sembawang and Yishun stations officially opened on 2 November 2019.

The station is constructed using environmentally-friendly building materials, products and services with extensive greenery incorporated in the design. It was the first to be accorded the Green Mark Platinum certification under the Building and Construction Authority's new Green Mark for Transit Stations (GM TS:2018).

As it is only the second station since Dover station on the East-West Line to be built on an existing rail line, we conducted detailed risk assessments and carried out appropriate safety measures such as:

- A robust project safety review process for the design and construction phases.
- A temporary Protection Enclosure to cover and protect the existing railway tracks and trains at the new station's site.



• Constructing a new 72m-long rail crossover track at the north of Canberra Station to connect the two existing tracks. This allowed trains to move from one track to the other, providing better operational resilience. Noise barriers were also installed at the new rail crossover.





(The station names are subject to confirmation)





#### Circle Line Stage 6 (CCL6)

The Circle Line will soon be a complete loop with the opening of three new CCL6 stations – Keppel, Cantonment and Prince Edward Road. Commuters can expect shorter travel times and more alternative routes away from congested interchange stations. To meet growing demands, we will add 23 more trains to increase our fleet from 64 to 87, and embark on a series of system enhancements to the existing CCL with SMRT.

#### North East Line Extension (NELe): Punggol Coast Station

Residents working in the upcoming Punggol Digital District will enjoy greater convenience with the new Punggol Coast Station, a 1.6km extension from the existing Punggol Station. Integrated with JTC's Business Park, it will enhance connectivity from Punggol North to the city centre and other parts of Singapore. The station will be NEL's 17<sup>th</sup> station.

#### Upcoming Rail Lines

#### Jurong Region Line (JRL)

Journeys to the West will become more convenient with the 24km JRL, Singapore's seventh MRT line. With 24 stations opening in three stages, the line is expected to serve both existing and future developments in western Singapore, as well as enhance connectivity to the Jurong region. First-and-last mile connectivity will be further strengthened in tandem with the station construction.

In November 2019, the contract to design and construct Tengah Depot was awarded to China Railway 11 Bureau Group Corporation (Singapore Branch) at \$739.5 million. As Singapore's 10<sup>th</sup> MRT depot, the 44.5-hectare site is designed for stabling and maintenance of 100 fourcar trains and 600 buses as well as their maintenance facilities.

- In February 2020, a \$416.5 million contract to design and manufacture 62 three-car trains was awarded to Hyundai Rotem Company.
- In July 2020, three systems contracts were awarded. One, the provision of the signalling system and half-height platform screen doors for the JRL to Siemens Mobility Pte. Ltd. – Siemens Rail Automation, S.A.U. Consortium, amounting to \$215.5 million. Two other contracts were awarded for the provision of the Integrated Supervisory Control System and the Communications System for the JRL to ST Engineering Electronics Ltd, at a combined value of \$146.6 million.







#### Cross Island Line (CRL) and **CRL-Punggol Extension**

The upcoming CRL which spans more than 50km will bring recreational spaces such as Changi Beach Park and Bishan-Ang Mo Kio Park closer to residents in central, north-eastern and eastern Singapore, benefitting more than 100,000 households. Constructed in three phases, Phase 1 of the CRL (CRL1) will be 29km long comprising 12 stations from Aviation Park to Bright Hill.

With its alignment and station locations announced on 10 March 2020, the 7.3km CRL-Punggol Extension will provide a direct link for commuters travelling between eastern areas such as Pasir Ris and Tampines North, and north-eastern areas such as Punggol and Sengkang. This will save significant travel time for more than 40,000 households living near the new stations. First-and-last mile connectivity will also be enhanced.



Artist's Impression of the Johor Bahru-Singapore Rapid Transit System (RTS) Link

A Concession Agreement for the Government of Malaysia and LTA (as Singapore's designated concession authority under the BA) to appoint RTS Operations Pte. Ltd. as the operating company (OpCo) for the first 30-year concession period.

In the RTS Link Project, LTA is also Singapore's infrastructure company (InfraCo), which will own, fund, build, maintain, and renew the RTS Link infrastructure and related infrastructure systems in Singapore's territory up to the international boundary. LTA is also given the regulatory powers under the Cross-Border Railways Act to regulate the RTS Link OpCo and ensure the safety and security of the RTS Link Service.

The successful resumption of the RTS Link Project underscores the deep and enduring bilateral relationship between both countries, and the collective desire to strengthen our win-win partnership. The RTS Link is targeted to commence service by end-2026. When completed, the RTS Link will ease Causeway congestion, improve connectivity, foster peopleto-people ties and generate shared economic and social benefits.

## Wayfinding: **Boosting The Commuter Experience**

With the expansion of our rail network, the time was ripe to revamp our MRT system map to help commuters navigate a more complex system with greater ease.

After a fruitful four-year design process, the new MRT System Map, along with a revamped transit signage system, was launched with the opening of TEL1.

The aim was to create a visually iconic and memorable System Map, to enable commuters to navigate the growing network with greater ease.

Along the way, we took in feedback from map designers, our Friends of Land Transport, and members of the public on the redesigned map.

#### **New MRT System Map**

Navigating the MRT network will be much simpler, thanks to the redesigned System Map launched in December 2019.

- The Circle Line serves as a focal point to help commuters quickly orientate themselves and plan their journeys.
- For the first time, the map features contextual elements such as prominent landmarks and water bodies to help commuters identify their corresponding stations.
- QR codes allow users to link to online fare calculators and downloadable maps in Singapore's four official languages for offline viewing.

### System Map







#### **New Signage System**

To help commuters better navigate within stations and networks, we introduced a revamped signage system that is easier to follow. The aim was to address current and anticipated challenges faced by our commuters.

We designed it to fulfil three simple yet crucial functions in wayfinding:

- 1. Provide commuters with reliable transit information throughout the station
- 2. Enable commuters to easily follow directional signs when moving around stations
- 3. Assure commuters that they have arrived at their destination station and exit

After more than five years of extensive research and testing, a system designed for all was born. It includes redesigned information signs that ensure greater consistency and legibility. New directional signs also have three times larger icons and greater visual contrast to keep commuters moving.

The team developed the "Inform, Direct, Confirm" principle for the new signage system, three critical steps that allowed us to measure wayfinding success. The new system is easier to maintain, which will establish consistent quality for commuters and provide cost savings in the long run.





We are building a transport system that can cater to different needs and make commuting safe, convenient and comfortable for everyone. We do this with more options, more connections, and more gracious behaviour.

Enhancing commuting experiences is another important aspect of our transport ecosystem. Integrated Transport Hubs (ITHs) are transforming towns by enabling commuters to seamlessly transfer between connecting buses or trains in comfort while shopping or dining at the shops within the hubs.

Complementing our rail network are our buses which serve four million commuters daily. Pre-pandemic, our Point-to-Point (P2P) services were making more than 750,000

daily trips. We are reinforcing these connections with more buses and shuttle services, and enhancing the P2P sector with a new regulatory framework to raise service levels and safety standards that will benefit everyone.

But a great transport system is only as good as the commuting experience. We are nurturing a gracious and caring public transport environment that is not just guicker and more convenient, but also more comfortable and enjoyable for everyone.

## Improving Connectivity, **Accessibility And Safety**

By integrating more infrastructure, connections are formed. Place an MRT station and a bus interchange at the same place, and transfers are that much quicker and more convenient. Build barrier-free premises, and moving from place to place becomes safer and easier for more commuters. Develop roads in new towns, and residents can reach their destinations with greater ease.

These integrated enhancements will result in more connectivity and greater safety for all.

#### **Yishun Integrated** Transport Hub (ITH)

Commuters in the North have greater convenience with the new Yishun ITH that was opened in September 2019, the tenth hub in Singapore. They will now have direct connections and transfers between the new airconditioned bus interchange, Yishun MRT Station and Northpoint City.

#### Phase 1 Of Yio Chu **Kang Bus Interchange** (Expansion)

We continue to maximise existing spaces for greater passenger capacity. In December 2019, we fully opened the Yio Chu Kang Bus Interchange Expansion. Our work continues with the second phase, which involves upgrading the existing Yio Chu Kang Bus Interchange

#### Features Of Yishun Integrated Transport Hub (ITH)



Close to 600 bicycle parking

lots in the vicinity of the bus

connectivity.

interchange, to facilitate active

mobility and first-and-last mile

Fully barrier-free.



Priority queue zones with seats and a nursing room.



Reverse warning system to detect movement of buses from parking lots into the driveway.



The Public Transport Council has also set up Heart Zones the first within an ITH allowing commuters who require assistance to indicate their needs to others. A room is also set aside for commuters with special needs who require access to a quiet and calming space.





premise, where commuters can look forward to enhancements such as an improved alighting area. The upgrading works are expected to be completed in 2021.

Features:

- Barrier-free alighting areas, priority queue zones with seats, a nursing room and barrier-free toilets. These cater to the needs of the elderly, the less mobile and families with young children.
- 150 bicycle parking lots to facilitate active mobility and first-and-last mile connectivity.
- Environmentally-friendly features such as a green roof to keep the interchange cool, as well as more water-efficient fixtures and an energy-efficient air-conditioning system.
- Four electric minibuses with a wheelchair-lifting mechanism were introduced on Service 825 from October 2019. With this, all public bus services in Singapore are now wheelchair-accessible.

#### **Caring SG Commuters**

The Caring SG Commuters Committee was set up in January 2020, to foster a culture of inclusiveness for everyone in the shared environment of our public transport. It is chaired by Mr Richard Magnus, who is concurrently the Chairman of PTC, and comprises key industry players, as well as representatives from relevant ministries and agencies.



#### **Going Barrier-Free: Lifts At Pedestrian Overhead Bridges (POBs)**

Pedestrians will no longer need to climb stairs to cross overhead bridges at more locations. A total of 29 more POBs will be fitted with lifts by 2022, while work for another 27 POBs will then begin progressively. This will bring the total number of overhead bridges with lifts to 103.

We are prioritising efforts to build lifts at POBs in places that will most benefit seniors and commuters with mobility challenges, such as areas near public transport nodes, schools and healthcare institutions. These additional lifts will make journeys to public housing estates and public amenities barrier-free.

#### **Opening: Punggol Road Development** Project

Residents of both Pasir Ris and Punggol are now enjoying faster. hassle-free travel between the two towns with the opening of a new link road in November 2019. It will also ease current traffic flow along the Tampines Expressway (TPE).

Our goal of meeting future traffic demands from developments in the area will be fulfilled with the completion of the expansion of Kallang-Paya Lebar Expressway/ Tampines Expressway Interchange by 2021. This will improve traffic flow between both expressways and across key access points into Punggol Town.

## Enhancing Road Connections And Safety

#### **Red-Amber-Green** (RAG) Arrows

As of March 2020, RAG arrows have been implemented at more than 300 junctions across the island. RAG arrow signals aim to improve the safety of pedestrians and motorists by removing discretionary right-turns. Up to 1,200 traffic junctions will be enhanced with this feature by 2023.

#### In Progress: More Silver Zones

Elderly-related accidents have dipped by nearly 80 per cent in completed Silver Zones, since the scheme was

introduced in 2014, with road engineering features such as additional safer pedestrian crossing points, narrower roads and speed bumps.

We plan to roll out 50 Silver Zones across residential areas like Ang Mo Kio, Potong Pasir, Tampines and Yishun by 2023. This is part of ongoing efforts to focus on locations with a high proportion of senior residents or amenities frequented by them, so as to provide a safer road environment for seniors.

On top of reminding motorists to keep a lookout for elderly pedestrians, the Silver Zones also encourage seniors to remain vigilant when crossing roads. Plans are also underway to conduct trials to lower speed limits at specific Silver Zones.





Silver Zone with yellow rumble strips and 40km/h road marking.





Pinch point narrows the road and creates a short crossing distance.



#### **Enhanced Safety**

Parents who board buses with



#### **Safer Routes To Schools**

Proving you're never too young to be part of road safety projects, students from Pasir Ris Primary School, Concord Primary School and CHIJ St Nicholas Girls' School have been partnering LTA to co-design safer walking routes from key transport nodes to their schools.

Pupils from the three schools designed traffic signs to direct fellow students and caregivers to safer paths and to remind motorists to slow down and keep a lookout for children.

The best designs were then chosen in a design competition and implemented as road signs on the surrounding roads near the schools in January 2020. This helped to promote road safety awareness among the students. These measures supplement the efforts of the school marshals in ensuring students travel safely to school.





## **Taking You From Point To Point**

Taxis and private hire cars (PHCs) provide an alternative for commuters. As PHCs become ubiquitous on our roads, we introduced a new regulatory framework for the P2P sector in October 2020, following the passing of the "P2P Passenger Transport Industry Bill" in August 2019.

To ensure that commuters can continue to benefit from an evolving P2P sector. the new regulatory framework will focus on the following areas:

- Licensing of larger P2P service operators for greater regulatory oversight
- Safeguarding commuters and drivers through safety standards, and vehicle inspection requirements
- Supporting the development of an open and innovative P2P industry



## **Commuting With Ease**

While infrastructure upgrades result in faster commutes, everyone will have a part to play for all to enjoy pleasant commutes. We hope to work with commuters to shape our public transport system into one that is as pleasant as it is efficient.

#### "Please Offer Me a Seat" pilot:

Aimed at bridging the gap between commuters with invisible medical conditions and their fellow commuters, this visual identifier launched in October 2019 will make our public transport system more accessible and inclusive to everyone, regardless of their needs.

#### **One-year Priority Cabins Trial:**

Seniors, expectant mothers, parents with young children and people with special mobility needs can expect greater support on the NEL. The trial will involve the designation of two middle cabins in NEL trains as Priority Cabins. Commuters are encouraged to keep a lookout and give way or offer assistance to these vulnerable commuters when possible at the designated cabins.

**Priority use:** Since the third quarter of 2020, seniors, expectant mothers, wheelchair users and parents travelling with strollers have enjoyed priority



use of lifts, wide fare gates and entry to train cabins, at all MRT stations. Priority Queue Zones (PQZ) will also feature at all new bus interchanges and ITHs. Existing bus interchanges will also be progressively enhanced with PQZs from 2021, where possible.

Barrier-free travel: To build a public transport system catered for all, we have installed ramps, lifts, braille signs, tactile guidance and hearing enhancement systems. We have also made other improvements at bus



interchanges and MRT stations, to make it easier for those with additional mobility needs to move around.

**Gracious Commuting campaign:** 

The Thoughtful Bunch mascots are back with a new video that demonstrates how everyone can enjoy "more awesome rides". First introduced in 2014, the campaign aims to gently nudge passengers to be more gracious and considerate while out and about on their daily commutes.



## Chapter 4 Revitalising Active Mobility





A connected and vibrant city goes beyond the public transport system. We are building safe and accessible pathways in towns so residents can reach their destinations on roads or paths – on foot or riding on their active mobility devices like bicycles.

Towns are being connected by paths and park connectors that wind through lush greenery. Diverse groups of users enjoy these spaces, looking out for one another and ensuring they remain safe for everyone to enjoy. Transit priority corridors that bring the city closer are being built with cycling paths and pedestrian paths, integrating various modes of transport to make Walk-Cycle-Ride a daily reality.

This is how we are revitalising active mobility, boosting intra-town connectivity and helping commuters embrace a healthier lifestyle.



## Dedicating More Space For Public Transport, Active Mobility And Community Uses

As we develop our land transport system, we are dedicating more space for public transport, active mobility and community uses to enable seamless connections across towns. We plan to progressively implement transit priority corridors to improve the experience for motorists, bus commuters and active mobility users. These corridors will boost travel times and convenience with dedicated bus lanes, bus signal priority, and cycling paths.

Where feasible, we are converting existing road lanes into liveable spaces for community use.

#### North-South Corridor: Singapore's Longest Transit Priority Corridor

The North-South Corridor (NSC) is a vision of what the future of transport looks like: A cleaner and greener city, with more liveable spaces in our communities for everyone.

It will transform the way people travel between the Northern Region and the city, offering new forms of travelling and commuting along its 21.5km route. The NSC will integrate various transport modes, with continuous bus lanes and cycling trunk routes, and extensive pedestrian paths, overhead bridges,sheltered walkways and bus stops. Motorists and bus commuters will experience faster and smoother travels, while pedestrians and cyclists will benefit from a more connected infrastructure.

We awarded the final three civil contracts for the NSC in December 2019, and work is underway.

#### Changi Northern And Southern Corridor

As Changi gears up for massive developments in the next decade, we are working to enhance road and active mobility networks. The works include:

#### **Changi Northern Corridor**

A 3km stretch of cycling path will connect the northern part of Changi to the existing Park Connector Network. Bus lanes and viaducts will also be added between Tampines Expressway and Loyang Way. Most of these works will be completed in time for the opening of the first phase of the nearby Cross Island Line.

#### **Changi Southern Corridor**

With the development of Changi Airport Terminal 5, we will build a 3.5km cycling path to complement the existing Park Connector Network, and on-road cycling lanes to connect Tampines and East Coast to the airport.

We will also build new roads providing connectivity from the airport to Tanah Merah Coast Road and East Coast Parkway, while widening and realigning existing roads on the Pan Island Expressway and Xilin Avenue to ease traffic flow.



Artist's Impression of the North-South Corridor

#### Coleman, Armenian, And Waterloo Streets

From 2021, Singapore's civic district will see further transformation with Coleman Street, Armenian Street and Waterloo Street becoming car-lite areas with widened walkways and cycling paths. The extended cycling paths will form part of the proposed central area cycling network, which will be linked to the Marina Bay area and the eastern part of Singapore via East Coast Park.

## Walk, Cycle And Ride **Around Singapore**

## 2020: **460km**

of cycling paths across the island

## 2030: 1,300km of cycling paths

\* The evolving COVID-19 situation may have further impact on the cycling path network

across the island\*

More cycling paths are in the pipeline, with plans to develop the Islandwide Cycling Network programme from 460km today to 1,300 km by 2030.

Our aim is for eight in 10 HDB residents to be within minutes from a cycling path. This will give people more travel options and encourage a car-lite lifestyle.



#### **Ang Mo Kio**

Singapore's first walking and cycling town is being prepared for the final phase of works. When fully completed in 2023, the town will have around 20km of cycling paths and all residents will be within a five-minute walk to the nearest cycling path. This will provide greater connectivity from residential estates to major transport nodes and key amenities. We have repurposed two roadside car park lots to 20 bicycle parking lots in November 2019 and will be looking at expanding to more roadside car park lots.

#### Bishan

A 7.7km cycling path network is in the works for Bishan. It will link residents to major transport nodes such as the bus interchange and nearby MRT stations, as well as schools, neighbourhood and community centres and shopping malls.

The network will also connect Bishan residents to the adjacent Ang Mo Kio town, Toa Payoh town and the city via the Bishan-Kallang inter-town park connector. The cycling paths will be constructed next to covered linkways along Bishan Place, Bishan St 13, Bishan St 21 and Bishan St 22 to provide a pleasant walking environment for pedestrians.

access to an approximately 7km cycling path network when works are completed in 2022. The construction works will progressively be completed from now, and include the reclamation of Jelapang road to widen the footpath that will now include a cycling path. When completed, the cycling paths will link up to five schools in the area.

**Bukit Panjang** 



Bukit Panjang residents will have



#### **Central Area**

The landscape of Singapore's Central Area will be transformed in the next three years, with the addition of a comprehensive cycling network. Under the first phase of construction, Raffles Place, Tanjong Pagar and Shenton Way will have their own cycling paths by 2021. This will progressively expand to areas such as City Hall, Bugis, Dhoby Ghaut, Orchard Road, Little India, Jalan Besar and Newton.

When completed, cyclists will be able to connect seamlessly from the Central Area cycling network to various parts of Singapore including Queenstown, Bishan, Geylang, as well as the North-South Corridor's cycling trunk routes.

Infrastructure will also be ramped up to accommodate the increasing number of cyclists. Last year, around 100 bicycle parking lots were added near transportation nodes and amenities in 2019. We have repurposed two roadside car park lots to 20 bicycle parking lots in November 2019 and will be looking at expanding to more roadside car park lots.

#### **Tampines**

The first town with dedicated cycling paths, the Tampines cycling network will triple from 6.9km to 21km. It will link three MRT stations in the area: Tampines on the East-West Line, and Tampines East and Tampines West on the Downtown Line.

Cycling infrastructure connecting Tampines and the nearby towns of Simei and Pasir Ris, as well as Changi Business Park and the Singapore Expo Convention and Exhibition Centre, are in the works too. Other pedestrianfriendly features planned for the town include barrier-free ramps and zebra crossings.

#### **Toa Payoh**

Slated for completion in 2023, the cycling path network in Toa Payoh will span a total of 9km. Infrastructure such as bus stops will be redesigned to better accommodate cyclists and pedestrians. With the completion of the cycling network, residents will enjoy greater connectivity to the town centre and bus interchange, the Braddell and Toa Payoh MRT stations, as well as key amenities in the area.

#### **Taman Jurong**

A 10km cycling path network that connects residents in Taman Jurong to public amenities, the town hub and Lakeside MRT station will be ready in 2021. The network will be connected to the existing 15km cycling path network in Jurong Lake District, for seamless travel within the vicinity.

#### **Choa Chu Kang**

A 12km cycling path network that connects Choa Chu Kang, Yew Tee and Bukit Panjang towns in the next few years. With the completion of the cycling path network, residents will enjoy greater connectivity to the town centre, bus interchange, Choa Chu Kang and Yew Tee MRT stations, various LRT stations, as well as key amenities in the area.

#### To The City, From **Geylang And Queenstown**

A 150m stretch of cycling path is targeted to be added to Geylang, connecting Sims Avenue Park Connector to Geylang Park Connector. This addition will allow cyclists to travel all the way to the city centre on two wheels.

In Queenstown, we are building a 2.3km cycling path along Commonwealth Avenue, linking Alexandra Canal Linear Park to Ulu Pandan Park Connector. This continuous stretch will make it easy for cyclists to ride all the way to the heart of the city.





#### Woodlands

The town will have one of the largest intra-town cycling network, with the addition of 18km of cycling paths. The new paths will connect to Park Connector Networks, allowing residents to travel seamlessly and conveniently across four MRT stations: Admiralty, Marsiling, Woodlands and Woodlands South stations on the North-South Line and Thomson-East Coast Line.

## **Keeping Public Paths Safe**

As more people opt to travel around on their active mobility devices, a regulatory framework is required to enforce, maintain and promote the safe use of Active Mobility (AM) devices and the paths they traverse on. The Active Mobility Advisory Panel (AMAP) was set up in 2015 to develop a set of clear and consistent rules and code of conduct for the safe and harmonious use of paths by AM device users. Since the set up of AMAP, we have worked closely with panel members to establish guidelines and rules to improve safety on public paths and roads.

In December 2019, the Panel submitted its third review of recommendations, including imposing a minimum age of 16 for e-scooter users on cycling paths, and limiting riders to use their mobile communication devices in hands-free mode when they are on public paths and roads. The Ministry of Transport has accepted all recommendations.

#### **Safety Rules**

With new technology and developments, people are rapidly changing the way they live, work, and even commute requiring regulations to be updated to remain relevant. In the last two years, we have responded swiftly to strengthen our regulations to promote safe riding and a gracious pathsharing culture among the different road and path users.

# SEPTEMBER 2019 In view of the fire risk posed by system.

#### Active Mobility Act (AMA)

Following the commencement of the Active Mobility Act (AMA) in May 2018, there have been several amendments implemented and new policies introduced over the last two years.

#### • JANUARY 2019

LTA commenced the e-scooter registration regime on 2 January 2019. E-scooter owners intending to use their devices on public paths are required to register them with LTA before they can be used on public paths.

non-UL2272 PMDs, we offered an early disposal incentive for those who disposed of their devices from September to December 2019. Under the free disposal scheme, designated disposal points were set up by LTA-appointed e-waste recyclers across HDB estates to allow owners to dispose of their devices conveniently. The UL2272 standard is a safety standard that covers the PMD's electrical drive train system as well as battery

#### Unless supervised by adults, those under 16 years of age cannot ride an e-scooter on cycling paths





#### NOVEMBER 2019

To restore footpath safety for all users, we banned the riding of e-scooters on all footpaths from 5 November 2019. E-scooters can now be used only on cycling paths and Park Connector Networks.

#### **APRIL 2020**

We extended the footpath ban to include all motorised PMDs. This includes devices such as hoverboards and e-unicycles.

A mandatory inspection regime for registered e-scooters was also introduced to ensure they

are compliant with the criteria. New e-scooters to be used on public paths are also required to undergo and pass inspection under the regime before they can be registered. Retailers and businesses are only allowed to display, advertise, sell or rent e-scooters that have been inspected and certified.

4

In addition, we raised penalties for active mobility offences by riders, retailers and businesses.

Errant retailers that display, advertise and sell non-compliant devices will also face tougher penalties.





#### • JULY 2020

From 1 July, all motorised PMDs used on public paths are required to be certified to the UL2272 standard. This is a similar approach to power-assisted bicycles (PABs), which have had to comply with the EN15194 standard to ensure the devices meet technical safety requirements since 2016.

#### 1H 2021

From the first half of 2021, users of PABs and e-scooters have to take an online theory test on active mobility regulations before they can ride on public paths and roads.



### Shared Mobility Enterprises (Control and Licensing) Act

To address indiscriminate to address indiscriminate parking of dockless bicycle-sharing services, we required shared bicycle operators to be licensed under the Parking Places Act (PPA) in 2018. We set limits on their maximum fleet size, allowing the figures to grow if operators could demonstrate their ability to manage their fleet well.

We put in place a QR code parking system and a user ban system to encourage proper parking. Shared mobility device users must scan the QR code at designated locations to successfully end their trip. Legislative powers under the PPA were transferred to a new Shared Mobility Enterprises (Control and Licensing) Act which came into force in July 2020, to cover device sharing and rental operators, with different requirements for different classes of operators running active mobility device-sharing services.

#### Small Motorised Vehicles Act

We are tackling the supply of noncompliant devices upstream. From the first quarter of 2021, we will introduce an import control regime for motorised PMDs and PABs. This will complement other measure to tackle the supply of non-compliant devices, complementing other measures such as the prohibition of sale of non-UL2272 motorised PMDs from July 2019 and mandating inspection of e-scooters from April 2020. Those who wish to import motorised PMDs or PABs will have to obtain approval from LTA. This rule includes businesses as well as individuals who want to import the device for personal use. Those who fail to comply will face a fine and jail term.

#### **Enforcing Safety**

Our enforcement officers keep a look out for errant PMD users and retailers. This dedicated team of officers conduct regular islandwide patrols as well as targeted operations to uphold our regulations and keep road and public path users safe.

#### **Educating The Public**

Education is crucial to change mindsets about safety issues. Since 2017, we have conducted nationwide campaigns to increase awareness and understanding of the principles behind AM rules and code of conduct. Community engagement via Active Mobility Patrol Scheme volunteers, and safety education programmes in schools further educate existing and potential mobility users about the safe and responsible use of active mobility devices.

#### Safe Riding Programme (SRP)

Since 2018, we have ramped up efforts on active mobility safety education. Our SRP, which includes theory and practical components, covers active mobility rules and codes of conduct. Participants also go through a training circuit to teach them device-handling skills. The programme has been rolled out in schools, community clubs and foreign worker dormitories as well. It is also compulsory for reckless riders who have run afoul of the AMA to attend the SRP in order for them to compound their offence.

#### Keeping Children Safe on Footpaths With School Zone Markings

Safety comes first, especially when it comes to children. We began a trial of School Zone markings on footpaths outside schools in September 2019. These include speed-regulating strips and enhanced visual cues to alert cyclists and riders to watch out for the little ones. Following a successful trial, the School Zone markings on footpaths was rolled out islandwide from January 2020.







## Chapter 5 Reimagining Technology



The future of transportation is here, and we remain at the forefront of this technological advancement as we steer the nation towards a carlite society.

New transportation technologies such as autonomous vehicles and dynamically-routed autonomous buses will improve connectivity and convenience, as well as optimise the use of roads in land-scarce Singapore for a more sustainable future.

New technologies will also change how transport networks operate by providing insights and capabilities for better, real-time traffic management.

We continue to invest in public transport workers through constant skills upgrading, technologyenabled training and scholarships, in collaboration with industry partners. As we move towards a smart technology driven future. improving the capability of our workforce remains a key focus.

We are also one step closer to realising our goal of creating a sustainable land transport sector as we roll out low-emission public transport vehicles and introduce initiatives to encourage commuters to adopt cleaner commercial transportation options.

The road ahead is filled with exciting plans for a well-connected and efficient transportation system, as we reimagine how future technology will contribute to a smart and sustainable Singapore.

# 0

## Sustainable And Smart Transport

#### **Greening The Fleet: Diesel Hybrid And Electric Buses**

A smart transportation network is also eco-friendly. Embracing clean technology solutions provide key insights into improving commuters' lives and the effective use of resources for a cleaner, emission-free future.

Singaporeans can look forward to quieter commutes with cleaner air as we continue to reduce emission numbers by implementing green public buses and taxis.

In line with the Land Transport Masterplan 2040, new bus depots will be designed to support cleaner hybrid and electric buses as we gradually replace our existing diesel buses.

As of March 2019, 50 diesel hybrid buses are plying the roads. We also currently have 25 electric buses on our roads and will be deploying another 35 electric buses by 2021. When these electric buses are deployed, the carbon emissions from buses will be reduced by approximately 7,840 tons annually, which is equivalent to the annual carbon emissions of 1,700 passenger cars.

#### **Encouraging Uptake Of Private Electric Vehicles** (EVs)

Electric vehicles (EVs) received a boost when NEA and LTA introduced schemes to promote the adoption of cleaner commercial vehicles in March 2020. This included the introduction of the Vehicular Emissions scheme in 2018 to encourage the purchase of cleaner car models, Commercial Vehicle Emissions Scheme (CVES) and an enhanced Early Turnover Scheme (ETS), which will take effect from 1 April 2021. CVES encourages buyers



to choose commercial vehicle models that have lower emissions across the identified pollutant categories. while the enhanced ETS will increase the number of commercial vehicles eligible for the ETS incentive to encourage turnover to cleaner alternatives.

The road tax schedule was also revised for electric cars and taxis to better reflect the current trends in vehicular efficiency. The revised EV road tax structure will take effect from 1 January 2021.



2019 **Diesel Hybrid Buses** 

Deploying **Electric Buses Progressively** 

#### **Electric Vehicles Early Adoption Incentive**

It pays to go green. From 1 January 2021 to 31 December 2023, newly registered electric cars and taxis will receive a 45 per cent rebate off the Additional Registration Fees, capped at \$20,000. This will narrow the upfront cost gap between electric and regular internal combustion engine (ICE) cars.

#### Ramping Up Infrastructure And Keeping Up With Technology

Finding a charging point for your EV will soon become easier. By 2030, up to 28,000 charging points for EVs will be deployed at public car parks island-wide, up from the current 1,600 charging points installed today.

To encourage the adoption of of EVs, we have also included CHAdeMO – a fast charging method for electric cars, as an optional public charging standard.



We also enhanced the motorcycle registration regime to facilitate the introduction of higher-powered electric motorcycles on the roads from April 2020.

#### Electric Car-Sharing Programme

As we focus on creating an ecofriendly and sustainable transport system by 2040, we will be empowering commuters to adopt greener transport options.

Under a nationwide electric carsharing programme supported by LTA and EDB, BlueSG will deploy 1,000 EVs and build a total of 2,000 charging points nationwide. This includes 400 charging points which will be opened for public use.



**Smart Mobility, Empowering Cities** 

#### 26<sup>th</sup> ITS World Congress

The Land Transport Authority (LTA) and the Intelligent Transportation Society Singapore (ITS Singapore) co-hosted the 26<sup>th</sup> Intelligent Transport Systems (ITS) World Congress in 2019, the first Southeast Asian country to host this global summit that showcases the latest in smart transportation technology. Alongside the ITSWC, we also hosted the inaugural Autonomous Mobility Summit.





Apart from fostering partnerships, the international event highlighted Singapore's role as an important leader in the global transportation industry.

Themed "Smart Mobility, Empowering Cities", the congress drew close to 14,500 local and international participants from more than 90 countries who explored how smart transport systems can enhance a city's economic growth and improve the quality of life for residents.

#### Autonomous Vehicle (AV) Trials On The Roads

In 2019, we captured global attention by launching the world's first full size autonomous electric bus by NTU-Volvo which continues to be trialled around the Nanyang Technological University.

One year on, we now have nearly 30 AVs on public road trials in areas such as the National University of Singapore and Jurong Island. We have also expanded on-road testing to Western Singapore. Public safety continues to be the top priority for these trials. All AVs will undergo a thorough safety assessment before they are approved for on-road trials. They must also have a qualified safety driver who is ready to take immediate control of the vehicle should the need arise.

#### Pilot Deployment Of AVs In Three Towns

The power of AVs will soon be felt in the heartlands. We will pilot the deployment of autonomous scheduled buses and autonomous on-demand shuttles in Punggol, Tengah and the Jurong Innovation District in the early 2020s.

A Call-For-Collaboration was launched in 2019 and received interest from more than 20 companies globally.

#### Smoother Journeys With On-the-Go Technology

Launched in 2019, SimplyGo provided commuters with an easier and more convenient fare payment option for their public transport rides-through the use of their contactless bank cards, mobile wallets and NETS Tap contactless cards. This eliminates the need for upfront top-ups altogether. In September this year, a pilot was also launched to expand the use of SimplyGo to adult EZ-link CePAS cards.

Today, this technology also helps commuters minimise contact with surfaces, by reducing the need for commuters to perform top-ups at the ticketing machines, giving them peace of mind as they travel from place to place.

Commuters across Singapore use SimplyGo to pay for more than 300,000 trips on the public transport network daily. Commuters can also conveniently track their travel expenditure and history while on-the-go.

Payment options include contactless Mastercard®, VISA, NETS Tap, Apple Pay, Fitbit Pay, Google Pay™, Samsung Pay™ and Singtel Dash.

## **Transforming The Workforce**

With greater use of new technology in the industry, transport workers will require relevant skills to use new machines or systems.

We will continue to upskill and reskill our transport workers, as part of our vision to prepare them for changes in the transport sector and keep up with commuters' evolving needs. Our approach is to combine advanced technology with the human touch to elevate a better commuting experience.

#### Boosting Manpower Capabilities For Rail

As we continue to develop a steady pipeline of rail professionals, more will benefit from industry programmes to improve and deepen their skills.

Over 3,000 workers will benefit from the \$100 million Rail Manpower Development Package, which will see them undergo training in critical maintenance and emerging skills such as condition-based maintenance and data analytics to support the increasingly complex rail network.

Other key features of this package are the SGRail Industry Scholarship and sponsorships, which aim to attract and groom future leaders of the industry. These programmes will benefit nearly 400 students and staff.

#### Empowering Taxi And Private Hire Car (PHC) Drivers

With the rise of on-demand mobility, taxi and PHC drivers will continue to play a key role in the local transport ecosystem.

In 2019, about 4,600 taxi drivers from ComfortDelGro gained new skills as part of a SkillsFuture endorsed Digital Workplace training programme. They learnt how to improve productivity through mobile applications and the effectiveness of digital payments, among other topics.

Earlier this year, ride-hailing company Grab and the National Private Hire Vehicles Association also launched a Grab Driver-Partner Training Kit to educate drivers on safety and digital skills.

#### Preparing Our Bus Technicians For The Future

A key part of creating a world-class transportation system is having the right talent with the right skills.

In line with this, we awarded 126 bus technicians with the Certification of Technical Specialist (CTS) in 2019. Conferred by the Singapore Bus Academy and the Institute of Engineers Singapore, the CTS is an industry-recognised benchmark of technical skills and competencies.

Apart from improving the employability of technicians, this certification will professionalise the workforce in the bus sector. As we deploy more electric buses on the road and autonomous buses in the longer term, we will also equip the technicians with the necessary skills to maintain these buses.



#### Upskilling Bus Captains To Operate Autonomous Buses

Autonomous and dynamically-routed buses will play a vital role in improving connectivity, helping to achieve the LTMP 2040 vision of '20-minute towns and a 45-minute city'.

It will, however, require public bus employees to have the necessary skills to operate these new technology buses. To do so, we signed a Memorandum of Understanding with eight industry stakeholders in October 2019 to develop training programmes and upskill bus captains.

Signatories include the National Transport Workers' Union, ST Engineering, SBS Transit Ltd, SMRT Buses Ltd, Tower Transit Singapore Pte Ltd, Go-Ahead Singapore Pte Ltd, Workforce Singapore, and NTUC's Employment and Employability Institute.

#### Inaugural Land Transport Industry Day

The creation of an efficient public transport system does not happen overnight. It requires constant collaboration across several key sectors and players in building a strong, vibrant and strategic local ecosystem.

As part of proactive efforts in developing the land transport industry to be future-ready, the inaugural Land Transport Industry Day was held in August 2019 to promote greater engagement and foster stronger partnerships between stakeholders in the land transport industry. It was attended by about 300 leaders from the public transport and point-to-point operators, unions and associations.

Officiated by then-Senior Minister of State for Transport, Dr Janil Puthucheary, it was part of our efforts to continuously engage stakeholders who have contributed to the Land Transport Industry Transformation Map.



#### Public Transport Workers' Appreciation Day 2019

At the heart of our world-class transportation network lie our workers who ensure that transport systems run smoothly across the nation. Their efforts were recognised at the annual Public Transport Workers' Appreciation Day, which was first launched in 2017.

#### **Looking Ahead**

The transport of tomorrow is dynamic and ever-changing, requiring us to continuously reimagine how the future will be with new technology. We will continue to adapt and adopt these innovations as we move towards our vision of creating a convenient and connected transport ecosystem. Because at LTA, we don't just move people, we transform lives. And we will ride this out together.

## Awards

#### 2019 Data Arcade Tournament (Tableau Track) – Champion

The LTA team emerged as champions at the annual nation-wide visual analytics competition that attracted submissions from 599 public officers in 144 teams across 66 government agencies. We won the Tableau track, one of two competition tracks at the tournament organised by GovTech to level up public officers' data science capabilities and enhance work processes or service through datadriven approaches.

After a five-hour hackathon, our team's ability to mesh data in land transport and donation patterns stood out from the rest, achieving the goal of growing the pool of donors and volunteers for the National Volunteer and Philanthropy Centre. The team also offered insights on sustainable engagement with donors.

#### BCA Green Mark Award (Platinum), based on the BCA Green Mark for Transit Stations TS: 2018 (Pilot Version)

This award recognises Canberra Station for its biophilic design, which incorporates natural elements like green planting to connect station users with nature. Landscaping features including edge planting, green roof and vertical greenery provide visual relief and can be appreciated by commuters on the platform, at street level and also in the trains. Besides energy-efficient cooling and lighting systems, the wellventilated station was also built using eco-friendly materials.

Canberra Station is a two-level station that was added to the existing North-South Line in November 2019.

#### BCA Green Mark GoldPLUS Award 2019

This award for the expansion of Yio Chu Kang Bus Interchange is a validation of LTA's steadfast commitment to promote corporate social responsibility, and develop buildings and infrastructure projects that are environmentally sustainable. The interchange features a green roof with water-efficient irrigation, rainwater sensors and droughttolerant plants. It also uses only highly efficient LED lighting, which improves the lighting power budget by by 67 per cent.

#### BCA Universal Design Mark GoldPLUS (Design) Award 2019

The accessible, interconnected and user-friendly features of the upcoming Rapid Transit System (RTS) Link Woodlands North Station clinched this award, which recognises welldesigned and inclusive developments.

This fully-integrated station, part of the Johor Bahru-Singapore RTS Link bilateral project, will facilitate safe, secure and seamless transfers between local and international transport modes in Singapore.

Despite a high security design brief, the LTA's innovative incorporation of features such as barrier-free access and inter-connectivity at the station will create an inclusive living environment that meets the needs of both residents and visitors.

#### Minister's VFM Achievement Award 2019 – Distinguished Award

An innovative solution that significantly reduced the length of a bridge built over a canal mouth won LTA the highest accolade at the Minister's Value-for-Money Achievement Award 2019.

This remarkable engineering solution translated into savings of over \$60 million, without compromising on requirements from LTA and other agencies.

The original design, planned as a 300m-long bridge across an existing canal mouth to connect Tanah Merah Coast Road and Aviation Park Road, was deemed too costly and time consuming. The team then explored the idea of reclaiming the canal mouth so as to reduce the bridge length to 30m instead.



#### Prince Michael International Road Safety Awards 2019

The LTA's School Zone Road Safety Toolkit won this prestigious award that pays tribute to the most outstanding achievements in road safety initiatives around the world.

It is a recognition of LTA's long-standing dedication to improve road safety around school zones for over 25 years, with the toolkit introducing initiatives such as interactive signalling, speed reduction and highly visible road markings.

We also work closely with the Traffic Police and Singapore Road Safety Council to enhance pedestrian safety within these zones. The results are significantly positive: The number of accidents within these zones involving pedestrians of primary school-going age has dropped remarkably, from 173 in 1996 to zero in 2018.

## Contracts Awarded In FY2019/20

#### JURONG REGION LINE

Contract No	Contractor / Consultant	Description
J101	China Railway 11 Bureau Group Corporation (Singapore Branch)	Design and Construction of Tengah Depot and Associated Facilities for Jurong Region Line
J102	Shanghai Tunnel Engineering Co. (Singapore) Pte Ltd	Design and Construction of Choa Chu Kang Station, Choa Chu Kang West Station, Tengah Station and Viaduct including Addition and Alteration Works to the Existing Choa Chu Kang Station for Jurong Region Line
J103	Eng Lee Engineering Pte Ltd - Wai Fong Construction Pte Ltd Joint Venture	Design and Construction of Hong Kah Station, Corporation Station and Viaduct for Jurong Region Line
J105	China Railway 11 Bureau Group Corporation (Singapore Branch)	Design and Construction of Jurong West Station, Bahar Junction Station and Viaduct for Jurong Region Line
J106	China Communications Construction Company Limited (Singapore Branch)	Design and Construction of Boon Lay Station and Viaduct including Addition and Alteration to the Existing East West Line (EWL) Boon Lay Station for Jurong Region Line
J107	Sembcorp Design and Construction Pte Ltd	Design and Construction of Gek Poh Station, Tawas Station and Viaduct for Jurong Region Line
J108	John Holland Pty Ltd - McConnell Dowell South East Asia Pte Ltd Joint Venture	Design and Construction of Tengah Plantation Station, Tengah Park Station, Bukit Batok West Station and Viaduct for Jurong Region Line
J110	Daelim Industrial Co. Ltd	Design and Construction of Tengah Plantation Station, Tengah Park Station, Bukit Batok West Station and Viaduct for Jurong Region Line
J150	China Railway First Group Co., Ltd. Singapore Branch	Trackwork for Jurong Region Line
J151	Hyundai Rotem Company	Trains for Jurong Region Line
J1805	Bintai Kindenko Pte Ltd	Mechanical and Electrical Works for Mass Rapid Transit Stations

#### **CROSS ISLAND LINE**

Contract No	Contractor / Consultant	Description
CR120A1/ A2/B1	Shanghai Tunnel Engineering Co. Ltd	Supply of Earth Pressure Balance Machines for Cross Island Line 1 (for Subpackages A1,A2,B1)
CR120A3/ B2/C1/C2	China Railway Engineering Equipment Group Co., Ltd Singapore Branch	Supply of Earth Pressure Balance Machines for Cross Island Line 1 (for Subpackages A3,B2,C1,C2)
CR1069	Eng Lee Engineering Pte Ltd	Road Diversion and Canal Works
CR1070	CCECC Singapore Pte Ltd	Water Main Diversion and Associated Works
CR1076	JSM Construction Group Pte Ltd	Alteration and Addition Works to East West Line, Pasir Ris Station
CR1077	CCECC Singapore Pte Ltd	Construction of Temporary Road

CR1078	KTC Civil Engineering & Construction Pte Ltd	Sew
CR1079	CCECC Singapore Pte Ltd	Sew
CR1080	KTC Civil Engineering & Construction Pte Ltd	Sew
CR1086	Aik Leong Plumbing Construction Pte Ltd	Sew
CR1087	Chye Joo Construction Pte Ltd	Sew
CR1088	CCECC Singapore Pte Ltd	Tem
CR1089	Aik Leong Plumbing Construction Pte Ltd	Sew
CR2001	Arup Singapore Private Limited and Ong & Ong Pte Ltd	Adv (CR
CR2002	Arup Singapore Pte Ltd and SAA Architects Pte Ltd	Adv (CR
CR2005	AECOM Singapore Pte Ltd	Prov
CR2007	WSP Consultancy Pte. Ltd.	Med
CR2008	Witteveen+Bos South-East Asia Pte. Ltd.	Gro

#### **RAIL ENHANCEMENT**

Contract No	Contractor / Consultant	Desc
1406	PBT Engineering Pte Ltd	Imple
1508	T.Y. Lin International Pte. Ltd. and Architects 61 Pte. Ltd.	Adva New
1900	Huationg Contractor Pte Ltd	Adva
R150	Porr Bau GmbH Doha Branch / Gates PCM Construction Ltd	Tracl Rail
R176	GEMAC Engineering Machinery Co., Ltd.	Main
R1012	Gammon Construction Limited Singapore Branch	Desi Work
R1022	Puretech Engineering Pte Ltd	Repl
R7005	PYPUN-KD & Associates Limited / TRES Engineering Consultants Pte. Ltd. Joint Venture	Conc Light
RS126	ST Engineering Electronics Ltd. & SMRT Services Pte Ltd Consortium	Repl

ver and Water Diversion Works (Package A)

ver and Water Diversion Works (Package B)

ver and Water Diversion Works (Package C)

ver and Water Diversion Works (Package D)

ver and Water Diversion Works (Package E)

nporary Bus Parking and Driver Facility

ver Diversion Works (Package F)

vance Engineering Study for Cross Island Line Phase 2 L Phase 2) - Mainline Package A

vance Engineering Study for Cross Island Line Phase 2 L Phase 2) - Mainline Package B

vision of Services to Conduct Environmental Impact Study

chanical and Electrical Engineering Services for Rail Project

und Vibration Study

#### ription

lementation of Noise Barriers at Rail Viaduct Phase 3

anced Engineering Consultancy Services for the Proposed Station on Existing North-South Line

ance Works for Integrated Train Testing Centre

ckwork for Bishan Depot, Ulu Pandan Depot and Pasir Ris Turnback

ntenance Wagons for NSEWL

ign and Construction of Stabling and Maintenance kshop Extension at Bishan Depot

lacement of Sump and Ejector Pumps

dition Assessment of North East Line and Sengkang-Punggol t Rapid Transit Operating Assets

lacement of Transit Ticketing Machines

## NORTH EAST LINE EXTENSION / CIRCLE LINE 6 / THOMSON-EAST COAST LINE

Contract No	Contractor / Consultant	Description
831E	Shinryo Corporation	Environmental Control and Tunnel Ventilation Systems for Circle Line Stage 6 Mainline and North East Line Extension
832E	Shinryo Corporation	Electrical Services for Circle Line Stage 6 Mainline and North East Line Extension
833E	Deluge Fire Protection (S.E.A) Pte Ltd	Fire Protection System for Circle Line Stage 6 Mainline and North East Line Extension
7178	Sunray Woodcraft Construction Pte Ltd	Fitting-Out Works for North East Line Extension
T279D	Cyclosystem Pte Ltd	General Maintenance Vehicles for Thomson-East Coast Line (TEL)
T2916	Taisei Corporation	Addition and Alteration to Existing Circle Line (CCL) Marina Bay Station
T316	Shanghai Tunnel Engineering Co. (Singapore) Pte Ltd	Construction of Underground Infrastructures
T3161	Surbana International Consultants Pte Ltd	Appointment of Qualified Person (Supervision) for Thomson-East Coast Line Extension (TELe) Contract T316
T3162	Fugro Singapore Land Pte Ltd	Instrumentation and Monitoring for Contract T316
PL219	Asiaray Connect Limited	Thomson-East Coast Line Advertising Non-Fare Operator
PL220	SMRT Experience Pte. Ltd. / JR East Business Development SEA Pte. Ltd. / Alphaplus Investments Pte. Ltd. Consortium	Thomson-East Coast Line Advertising Retail Non-Fare Operator
TOTAL SUM A	WARDED FOR RAIL PROJECTS	\$4.7 BILLION

#### **NORTH-SOUTH CORRIDOR**

Contract No	Contractor / Consultant	Description
N112	China Civil Engineering Construction Corporation Branch Office Singapore -China Railway 11 Bureau Group Corporation(Singapore Branch) - Wai Fong Construction Pte Ltd Consortium	Design and Construction of North-South Corridor (Viaduct) Between SG Seletar and Yishun Ave 5
N113	Hyundai Engineering & Construction Co Ltd	Design and Construction of North-South Corridor (Viaduct) Between Yishun Ave 6 and Woodlands Ave 10
N115	Hyundai Engineering & Construction Co Ltd	Design and Construction of North-South Corridor (Viaduct) Between Woodlands Ave 10 and Admiralty Road West
N1011	Bureau Veritas Buildings & Infrastructure Pte. Ltd.	Qualified Person (Supervision) Services for North-South Corridor Contract N101

N1012	GeoApplication Engineers Pte. Ltd	Inst Con
N1021	AECOM Singapore Pte Ltd	Qua Cori
N1022	Tritech Engineering & Testing (Singapore) Pte Ltd	Inst Con
N1082	Geomotion (Singapore) Pte. Ltd	Inst Con
N1091	RCY Pte. Ltd.	Qua Cori
N1092	Geomotion (Singapore) Pte. Ltd	lnst Con
N1121A	Surbana Jurong Consultants Pte. Ltd	Qua Cori
N1121B	Alliance Consulting Engineers Pte Ltd	Qua Cori
N1121C	Fong Consult Pte. Ltd	Qua Cori
N1101	JIB Specialist Consultants Pte Ltd	Qua Cori
N1102	GeoApplication Engineers Pte. Ltd	Inst Con
N1111	YWL Engineering Pte Ltd and JIB Specialist Consultants Pte Ltd. Consortium	Qua Cori
N1112	GeoApplication Engineers Pte. Ltd	Inst

#### **ROAD & COMMUTER FACILITIES / PUBLIC TRANSPORT**

Contract No	Contractor / Consultant	Desc
AM101	Eng Xian Construction Pte Ltd	Expa
AM102	CHC Construction Pte Ltd	Desi
DE113	Hwa Seng Builder Pte Ltd	Com Dairy
DE133	Santarli Construction Pte Ltd - Zheng Keng Engineering & Construction Pte Ltd Joint Venture	Prop

trumentation and Monitoring for North-South Corridor ntract N101

alified Person (Supervision) Services for North-South rridor Contract N102

trumentation and Monitoring for North-South Corridor ntract N102

trumentation and Monitoring for North-South Corridor ntract N108

alified Person (Supervision) Services for North-South rridor Contract N109

trumentation and Monitoring for North-South Corridor ntract N109

alified Person (Supervision) Services for North-South rridor Contract N112

alified Person (Supervision) Services for North-South rridor Contract N113

alified Person (Supervision) Services for North-South rridor Contract N115

alified Person (Supervision) Services for North-South rridor Contract N110

trumentation and Monitoring for North-South Corridor ntract N110

alifed Person (Supervision) Services for North-South rridor Contract N111

Instrumentation and Monitoring for North-South Corridor Contract N111

cription

ansion of Public Bicycle Parking Spaces

ign and Construction of Cycling Facilities

nmuter and Road Infrastructure Works at Hillview, ry Farm and Tuas Area

posed Multi-Storey Sengkang West Bus Depot

DE137	Shincon Industrial Pte Ltd	Proposed Commuter Infrastructure Enhancement
DE142	Greatearth Corporation Pte. LtdGamuda Berhad Singapore Branch Joint Venture	Proposed Multi-Storey Gali Batu Bus Depot
DE143	Eng Lam Contractor Co (Pte) Ltd	Commuter and Road Infrastructure Works in Pasir Ris and Loyang
DE145	Singapore Engineering & Construction Pte. Ltd Shincon Industrial Pte. Ltd. Joint Venture	Enhancement and Construction of Bus Stop Infrastructure
PL212	Toh Kim Bock C-E Contractor Pte Ltd	Construction of Bukit Panjang Cycling Path Network
PL217	CCECC Singapore Pte Ltd	Construction of Cycling Path Network
PT342A	Alexander Dennis (Singapore) Services Pte. Ltd.	Procurement of 3-Door Euro 6 Double Deck Diesel Buses
PT342B	ST Engineering Land Systems Ltd.	Procurement of 3-Door Euro 6 Double Deck Diesel Buses
PT368	Guthrie Engineering (S) Pte Ltd	Provision of Passenger Information Display Systems at Bus Stops
PT372	W'Ray Construction Pte. Ltd.	Design and Construction of Bus Interchange & Associated Works at Tampines North
PT375	Tat Hin Builders Pte Ltd	Design and Construction of Bus Interchange & Associated Works at Venture Drive

#### **TRAFFIC OPERATIONS / MAINTENANCE**

Contract No	Contractor / Consultant	Description
TR227	CPG Facilities Management Pte Ltd	E&M System Maintenance for Road Tunnels
TR311	Highway International Private Limited	Planned Maintenance and Ad-Hoc Works for Roads and Road Related Facilities
TR315	Megastone Holdings Pte Ltd	Construction of Silver Zones
TR329	Kone Pte Ltd	Maintenance of Escalators and Lifts at Pedestrian Overhead Bridges and Underpasses
TR330	Gim Tian Civil Engineering Pte Ltd	Painting to Parapets and Tunnel Walls
TR336	ATT Systems (S'pore) Pte Ltd	Operation and Maintenance of Closed-Circuit Television (CCTV) Enforcement Camera System
TR339	Wilson Parking (Singapore) Pte. Ltd.	Provision of Traffic Wardens for Enforcement Duty
TR342	Tyco Fire, Security & Services Pte Ltd	Maintenance of KPE/MCE Integrated Traffic and Plant Management Backend
TT240	Siemens Mobility Pte Ltd.	Upgrading of Short Tunnel System
TT241	Globotron (S) Pte. Ltd.	Comprehensive Maintenance of Parking Guidance System
TOTAL SUM A PROJECTS	WARDED FOR ROADS AND OTHER	\$2.2 BILLION

## **Contracts To Be Awarded** In FY2020/21

#### RAILS

Contract	Description
190	Design and Construction of Integrated Train Testing Centre
1378	Design and Build of Enhancement Works to Existing MRT/LRT Stations and Associated Commuter Facilities
1530	Ventilation Enhancement Works at MRT Stations
1901	Appointment of Qualified Person (Supervision) for Contract 190
8398	Request for Proposal for Retrofitting Works at Bras Basah Station
8399	Condition Assessment and A&A Works for Sealed Spaces in MRT Stations and Tunnels
915A	Additions and Alterations including Construction of Entrance, Ventilation Shaft and Fitting-out Works for Hume Station
915A1	Appointment of Consultant for Supervision of Contracts 915A, 8398 and 7178
915A2	Supply, Installation and Monitoring of Instruments for Contract 915A
9175	Advance Engineering Study for the Proposed Downtown Line 2 Extension and a New Station on Existing North-South Line
J109	Design and Construction of Toh Guan Station, Jurong Town Hall Station, Pandan Reservoir Station and Viaduct for Jurong Region Line
J113	Design and Construction of Nanyang Gateway Station, Nanyang Crescent Station and Viaduct for Jurong Region Line
J120	Design and Construction of Integrated Transport Hub at Jurong East
J121	Design and Build of Mechanical and Electrical Services for Integrated Transport Hub at Jurong East
J152	Signalling System and Half-Height Platform Screen Doors for Jurong Region Line
J155	Integrated Supervisory Control System for Jurong Region Line
J156	Maintenance Management System for Jurong Region Line
J160	Communications System for Jurong Region Line
J168	Access Management System for Jurong Region Line
J177	Locomotives for Jurong Region Line
J1011	Qualified Person (Supervision) Services for Jurong Region Line (Phase 1)
J1012	Instrumentation and Monitoring for Jurong Region Line (Phase 1)
J1040	Supply and Installation of Biometric Authentication System



J1053	Accredited Checking Services with Enhanced Requirements (Package 2) for Jurong Region Line
J1093	Accredited Checking Services with Enhanced Requirements (Package 3) for Jurong Region Line
J1113	Accredited Checking Services with Enhanced Requirements (Package 4) for Jurong Region Line
N1050	Provision of Contract Administration Services for North-South Corridor
N1056	Project Management Services for North-South Corridor
P1090A	Advance Works for Utility Diversion (Package A)
P1090B	Advance Works for Utility Diversion (Package B)
CR101	Design and Construction of Changi East Depot
CR105	Design and Construction of Bored Tunnel between Aviation Park Station and Loyang Station
CR2010	Foundation Investigation Works for LTA Projects
T3060	Design of Mechanical and Electrical Engineering Services for Transport Infrastructure
T3066	Advanced Engineering Study for the Proposed Thomson-East Coast Line Extension
R178A	Fire Protection System Replacement Works
R179A	Multi-Function Vehicle for NSEWL
R179B	Track Tamping Vehicle for NSEW/
J1046	Term Contract for Trial Trenches
J1046 T232	Term Contract for Trial Trenches Construction of Station, Tunnels and CIQ Building for Rapid Transit System (RTS) Link
J1046 T232 T235	Term Contract for Trial Trenches Construction of Station, Tunnels and CIQ Building for Rapid Transit System (RTS) Link Construction of Viaduct and Tunnels for Rapid Transit System (RTS) Link
J1046 T232 T235 T2321	Term Contract for Trial Trenches         Construction of Station, Tunnels and CIQ Building for Rapid Transit System (RTS) Link         Construction of Viaduct and Tunnels for Rapid Transit System (RTS) Link         Appointment of Qualified Person (Supervision) for Contract T232 and T235
J1046 T232 T235 T2321 T2322	Term Contract for Trial Trenches         Construction of Station, Tunnels and CIQ Building for Rapid Transit System (RTS) Link         Construction of Viaduct and Tunnels for Rapid Transit System (RTS) Link         Appointment of Qualified Person (Supervision) for Contract T232 and T235         Supply, Installation and Monitoring of Instruments for Contract T232 and T235

#### **ROADS & OTHERS**

Contract	Description
DE117	Proposed Lift Shafts to Existing Pedestrian Overhead Bridges and Associated Commuter Infrastructure
DE1331	Appointment of Qualified Person (Supervision) for Contract DE133 & DE142
DE1431	Provision of Qualified Person (Supervision) Services for Contract DE143
DE156	Information Management System for Design, Construction and O&M
DE159	Roadworks at Lim Chu Kang Area
DE160	Enhancement to Loyang Avenue between Tampines Expressway and Pasir Ris Drive 3
DE162	Engineering Services for Utility Diversion at Changi Northern Road Corridor

	DE168	Architectural / Engineering Services for Multi-St
	DE170	Construction of Tengah Vehicular Interchange at
	DE175	Engineering Services for Road Works at ECP
	DE176	Commuter and Road Infrastructure Works in Ser
	DE177	Commuter Infrastructure Enhancement
	PD178	Consultancy Services (Architectural, Civil & Stru and Specialist Consultants) for LTA Project
	PL208	Construction of Ang Mo Kio Cycling Path Networ
	PL216	Design Consultancy for Walking and Cycling Enh
	PL218	Integrated Wayfinding System Consultancy Stud
	PT217	Bus Contracting - Bulim and Sembawang-Yishur
	PT396	Proposed Design and Construction of Bus Interc
	PT402	Replacement of Closed-Circuit Television (CCTV
	RS128	Provision of Automatic Fare Collection (AFC) Gat
	RS135	Provision of Bus Depot Equipment
	TR243	Construction of Facility Building
	TR307	Provision of Mechanical Services for Road Tunne
	TR308	Provision of Electrical Services for Road Tunnels
_	TR317	Upgrading of Selected Vehicular Underpasses
	TR332	Term Contract for Roads and Road-Related Facil
	TR340	Consultancy Services for Study and Design of Tr
	TR343	Maintenance and Installation of Traffic Lights Sy
	TR347	Provision of EMAS Vehicle Recovery Services an
	TR350	Tunnel Washing Services for Road Tunnels
	TR351	Provision of Auxiliary Police Officer Services for
	TR353	Maintenance of KPE / MCE Tunnel Systems
	TR356	Provision of Communications System for Road To
-	TR357	Provision of Traffic and Plant Management Syste
-	TR358	Road Maintenance Contract for South West Sect
	TT242	Maintenance of Traffic Monitoring Camera Syste

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## FY2019/20 Financial Highlights

#### **Statement Of Comprehensive Income**

At the Authority level, the net deficit for FY19/20 is \$107m after government grants. This is contributed by net deficit in the General fund (\$16m), net deficit in Restricted fund – Railway Sinking Fund (\$107m), offset by net surplus in Restricted fund – Bus Contracting (\$16m).

The Authority's total operating income of \$1,863m in FY19/20 is an increase of \$62m (3%) over FY18/19's income of \$1,801m. The total operating expenditure of \$4,336m in FY19/20 is an increase of \$123m (3%) over FY18/19's expenditure of \$4,213m.

FY19/20	General fund \$'M	Railway Sinking Fund \$'M	Bus Contracting \$'M	Rail Contracting (TEL) \$'M	Total \$'M
Management Fee from Government	676	-	-	-	676
Fare Revenue	-	-	862	0.2	862
Rail Transit System Licence Charge	-	20	-	-	20
Other Operating Income	220	-	85	0.1	305
Operating Income	896	20	947	0.3	1,863
Operating Expenditure	(2,141)	(170)	(1,977)	(48)	(4,336)
Operating Deficit	(1,245)	(150)	(1,030)	(48)	(2,473)
Other Gains - Net	8	43	8	-	59
Deficit before Government Grants	(1,237)	(107)	(1,022)	(48)	(2,414)
Government Grants	1,221	-	1,038	48	2,307
(Deficit)/Surplus before Contribution to Consolidated Fund	(16)	(107)	16		(107)

FY18/19	General fund \$'M	Railway Sinking Fund \$'M	Bus Contracting \$'M	Rail Contracting (TEL) \$'M	Total \$'M
Management Fee from Government	658	-	-	-	658
Fare Revenue	-	-	834	-	834
Rail Transit System Licence Charge	-	3	-	-	3
Other Operating Income	228	-	78	-	306
Operating Income	886	3	912	-	1,801
Operating Expenditure	(2,151)	(131)	(1,925)	(6)	(4,213)
Operating Deficit	(1,265)	(128)	(1,013)	(6)	(2,412)
Other Gains-Net	11	17	3	-	31
Deficit before Government Grants	(1,254)	(111)	(1,010)	(6)	(2,381)
Government Grants	1,221	-	1,024	6	2,251
(Deficit)/Surplus before Contribution to Consolidated Fund	(33)	(111)	14		(130)

#### **Government Grants, Operating Income And Expenditure**

The Authority recognised income amounting to \$2,983m from the Government, comprising Government grants of \$2,307m and Management fee of \$676m. Of the Government grants recognised, \$1,221m went into General fund, \$1,038m went into Restricted fund – Bus Contracting and \$48m to Restricted fund – Rail Contracting (TEL).

#### General Fund — Grants & Income



#### Bus Contracting — Grants & Income



#### **Bus Contracting - Expenditure**





\* Employee Compensation is net of capitalised in property, plant and equipment.





Bus & Bus Related Lease Income





## **5-Year Financial Summary**

#### **Balance sheet**

	FY19/20 \$'M	FY18/19 \$'M	Variance \$'M
Property, Plant & Equipment	56,412	52,096	4,316
Viaducts and Tunnels	10,922	10,229	693
Stations, Buildings and Structures	14,258	12,960	1,298
Rail Rolling Stock	3,065	3,083	(18)
Buses & Bus Related Assets	1,447	876	571
Construction-In-Progress	18,185	17,008	1,177
Others	8,535	7,940	595
Other Non-Current Assets	40	36	4
Current Assets	17,650	16,010	1,640
Assets	74,102	68,142	5,960
Equity	5,372	5,324	48
Deferred Government Capital Grants	51,955	48,146	3,809
Other Non-Current Liabilities	2,338	2,067	271
Borrowings	10,375	8,975	1,400
Other Current Liabilities	4,062	3,630	432
Equity & Liabilities	74,102	68,142	5,960

#### **Operating Income, Government Grants, Expenditure**







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