SUBURBAN RAIL LOOP

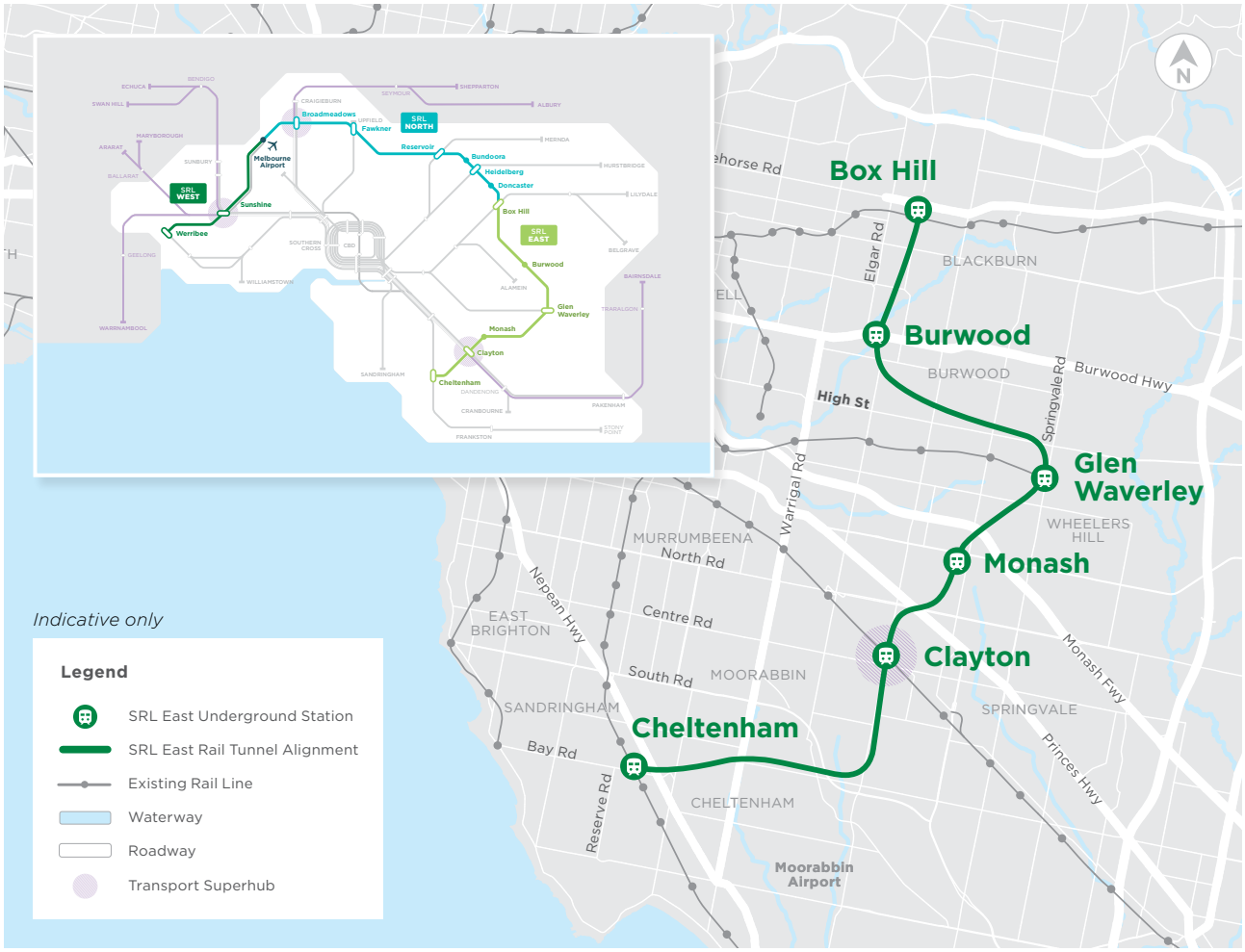
Building SRL East: Cheltenham to Box Hill

Suburban Rail Loop is a city and State-shaping project that will transform Victoria's public transport network and surrounding neighbourhoods.

Linking every major train line from Frankston to Werribee line via Melbourne Airport, Suburban Rail Loop will connect more Victorians to jobs, retail, education, health services and each other.

Delivered over several decades, Suburban Rail Loop will be the biggest infrastructure investment undertaken in Victoria.

The 26-kilometre SRL East corridor will be built as a standalone line that is integrated with the existing public transport network, with new underground stations at Cheltenham, Clayton, Monash, Glen Waverley, Burwood and Box Hill.



SUBURBAN RAIL LOOP AUTHORITY

VICTORIA'S BIG BUILD

VICTORIA State Government

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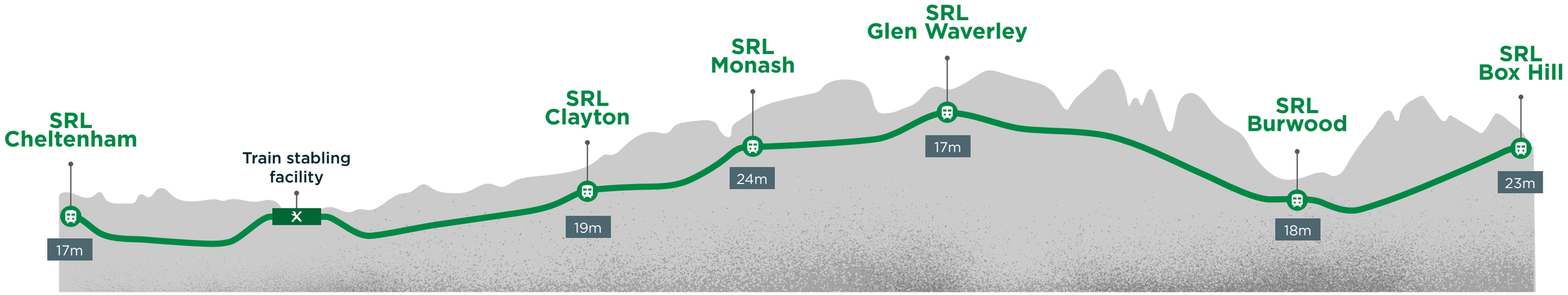


Indicative, subject to change. Station depths reflect the distance of the station platforms to ground level.

Building our newest rail line

SRL East will connect our growing heath, education, retail and employment precincts between Cheltenham and Box Hill.

SRL East will deliver:

— Twin 26-kilometre rail tunnels

— Four new stations with interchanges to existing stations at Cheltenham, Clayton, Glen Waverley and Box Hill

— A transport super hub at Clayton for regional passengers

— Two new Suburban Rail Loop stations at Monash and Burwood

— A stabling facility, operations centre and substation at Heatherton

— An emergency support facility at Mount Waverley, including an intervention and ventilation facility and back-up control centre

— A power supply substation at Burwood

Suburban Rail Loop will fully integrate with our existing public transport system, allowing passengers to easily transfer between other metropolitan rail lines as well as regional services at the transport super hubs at Clayton (SRL East), Broadmeadows (SRL North) and Sunshine.

Passengers outside Melbourne will no longer have to travel through the centre of the city to access jobs, retail, world-class universities and research facilities and medical services in our growing middle suburbs.

Frequent and easy to use services will provide passengers with a convenient and reliable 'turn-up-and-go' service.

Building the underground stations

New underground stations at Cheltenham, Clayton, Monash, Glen Waverley, Burwood and Box Hill will put passenger experience at the centre of design with convenient and efficient connections between existing stations and other transport modes.

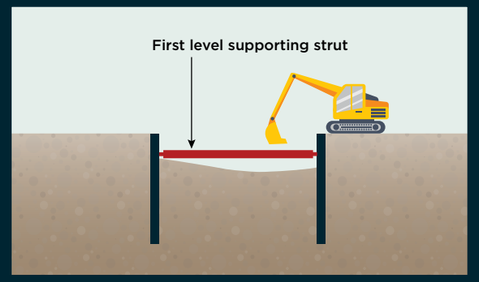
At street level, each new station will have its own distinct character reflecting the attributes of the surrounding area. Lifts and escalators will take customers to the station platforms below. Stations will be kept as close to the surface as possible to minimise travel times for passengers from street level to platform.

Each of the new stations will be built using the 'bottom-up' construction method, which involves excavating an open trench in the ground for the station box footprint.

Once the station footprint is fully excavated, a detailed sequence of construction and infrastructure is used to build the various levels and internal structures.

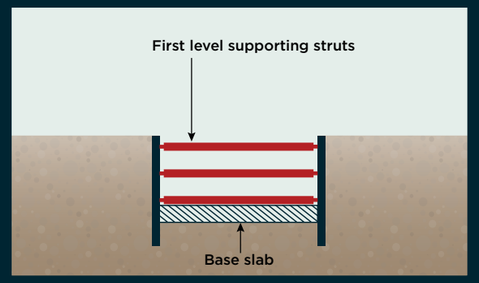
Construction moves progressively upwards until reaching the surface, where entrances and other surface infrastructure is constructed.

Station box construction



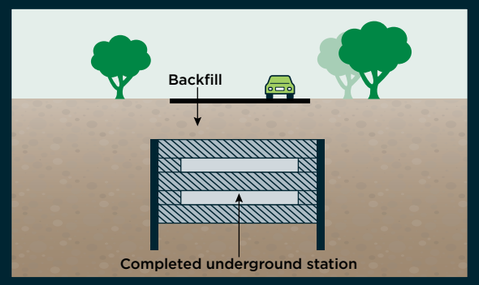
Excavation and installation of steel struts

As the name 'bottom up' suggests, this type of construction involves excavating a trench or rectangular hole in the ground for the station box footprint. Underground retaining walls are installed before excavation commences.



Construction of underground structures

Soil is excavated level by level. Struts are used to support the structure until the final depth is reached. A concrete slab is then installed at the base. Works move upwards, using concrete panels to form the various levels and internal structures.



Backfilling and reinstatement

The process continues upwards until the roof slab is completed. After the roof slab is completed, soil is backfilled to the top strut level before the strut is removed. This is followed by backfilling the top of the underground structure and reinstating the surface area.

Building rail tunnels

SRL East will feature twin 26-kilometre rail tunnels to minimise impacts at surface level.

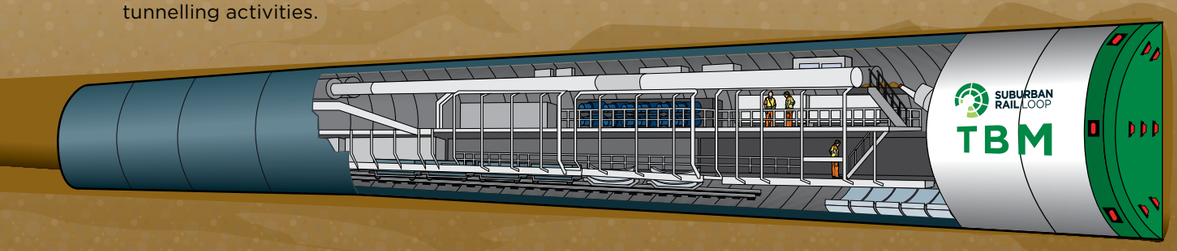
Tunnelling will involve the latest technology including custom-built tunnel boring machines (TBMs). The depth of the SRL East tunnels will vary depending on the topography. Tunnels will sit about 60 meters below ground at the deepest point, which is the equivalent of a 16-storey building.

TBM launch sites are proposed at the stabling facility site in Heatherton, and the station sites at Monash and Burwood. These sites will support tunnelling activities.

Different machines and excavation techniques will be used to support tunnelling works, with a focus on minimising disruption for local residents and businesses.

Hundreds of geological investigations are being undertaken to inform the alignment for SRL East.

This information is being used to understand local ground conditions, to determine the tunnels alignment, and to select the preferred construction methodology for different elements of the project.



Tunnel Boring Machines

The giant TBMs are lowered underground in sections to be assembled and launched. Powerful rotating cutterheads at the front burrow through soil and rock to create the new tunnel. The excavated material is either carried through the machine via a conveyer and transported above-ground or pumped out through a pipe to the surface for disposal. Soil will be safely disposed in line with Environmental Performance Requirements.

Hydraulic jacks push the TBM forward. As it moves forward, thick segments of pre-cast concrete are progressively installed behind the cutterheads. These concrete segments form a reinforced ring and are designed to fit together to create a permanent lining for the tunnel.

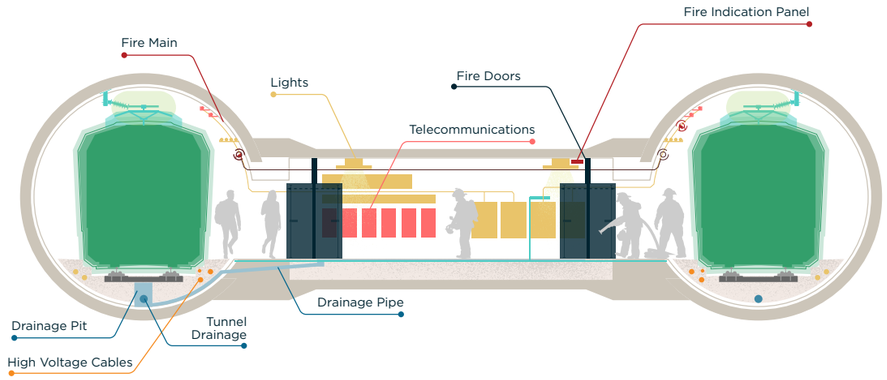
TBMs are controlled by an operator and maintained by a crew of up to 20 people. The machine will continue boring underground 24/7 until it ‘breaks through’ at its destination where it is retrieved. Once boring is complete and the lining is installed, the complex task of fitting out the new tunnel with services, rail tracks and other equipment can begin.

Cross passage construction

Cross passages will connect the twin rail tunnels at regular points along the SRL East route.

Cross passages will be built about every 250 metres along the 26-kilometre alignment between Cheltenham and Box Hill. Depending on ground conditions, surface level ground improvement works may be required at certain locations to facilitate cross passage construction.

These passages are an important safety feature that enable people, including emergency service personnel and passengers, to move from one tunnel to the other in the event of an emergency. They also accommodate rail systems and mechanical, electrical and plumbing equipment and drainage at points along the line.



LEGEND

- Emergency Access
- Fire Main
- Communications
- High Voltage
- Maintenance

Rail systems and supporting infrastructure

Suburban Rail Loop will be a separate dedicated rail line, meaning it can use state-of-the-art technology from around the world without having to retrofit systems and equipment into the existing network. This will enable for the provision of safer, more reliable and efficient services.

Rail systems include the design of signalling, train power systems and operational control systems for the new trains and tunnels.

SRL East works will be supported by a number of construction sites located at each of the stations and at other suitable locations along the alignment.

Building SRL East may require the use of some public space. Suburban Rail Loop Authority will work with its contractors to refine the construction approach to minimise impacts to public space and offset any loss during construction.

SRL East will require a range of supporting infrastructure:

— An emergency support facility which will include an intervention and ventilation shaft for emergency access and egress and a back-up control centre at Mount Waverley.

— A purpose-built train stabling facility for train storage and maintenance and an operational control centre at Heatherton which is expected to create more than 200 permanent local jobs.

— Power supply substations at Burwood and at the train stabling facility site in Heatherton to provide power to run the trains and operate the stations.

Crossrail, London

For just over three years, eight giant TBMs burrowed underneath the heart of London to construct 42 kilometres of new rail tunnels for Crossrail.

Similar to Crossrail, SRL East could see multiple custom-built tunnelling machines construct 26 kilometres of twin tunnel.

Initial Works

To ensure major construction for SRL East can get underway quickly with fewer disruptions, a range of Initial Works will be undertaken, including:

— **Utility relocation, installation and protection works:** moving and/or protecting above and below ground utility services including power, water, gas, sewer and telecommunications lines.

— **Minor road modifications :** widening intersections at select locations to improve access for construction vehicles.

— **Site establishment works :** preparing sites for construction including temporary construction facilities, site offices, car parking and equipment storage.

— **Site levelling and ground improvement works:** preparing for construction at the train stabling facility site in Heatherton.

Before works start, we will engage with residents and businesses about works planned in their area, what to expect and how any disruptions will be managed.

Strict requirements will manage construction impacts, including noise, dust and vibration.

Thompson-East Coast Line 1, Singapore

Communities in Singapore's north are already benefitting from the first stage of the Thompson-East Coast Line (TEL). Like Suburban Rail Loop, the full 43-kilometre TEL is being built in stages.

It will add 31 stations and seven interchanges to Singapore's rail network to improve connectivity and provide alternative travel options.

Inside the Metro Tunnel

Crossriver Rail, Brisbane

Brisbane's Crossriver Rail will deliver a new 10.2-kilometre rail line and unlock economic development and urban renewal in and around its five new station precincts.

Sharing a similar transformational vision, the six precincts in SRL East will create more opportunities for current and future generations.

Managing construction

Building SRL East under Melbourne's densely populated eastern and south eastern suburbs presents a range of engineering and construction challenges:

— Navigating existing underground infrastructure, including building foundations, deep basements and services such as water, gas and electricity

— Managing potential impacts on the road network and vehicle, pedestrian, cyclist and existing public transport movements

— Managing disruption to residents, traders and businesses

— Protecting heritage, community and environmental assets

— Managing the safe removal and disposal of large amounts of excavated materials

— Maintaining a safe environment for the community and our workers.

Measures to avoid, mitigate or manage adverse impacts will be prioritised for SRL East. These measures will form part of necessary environmental protections, statutory approvals and land access and acquisition considerations for the project.

Cities around the world routinely build underground rail systems in densely populated urban areas, including Melbourne's own Metro Tunnel, demonstrating that engineering and construction challenges can be overcome with careful planning, proven mitigation measures as well as smart construction methodology.

A concept image example of a Suburban Rail Loop station above ground

Have your say

Face-to-face and online engagement has been underway since mid-2019, with many hundreds of people taking the opportunity to find out more and to pass on their views.

We also want to hear from you. The community and stakeholders have a vital part to play in the development and delivery of Suburban Rail Loop.

Suburban Rail Loop Authority will continue to engage and consult widely, ensuring Victorians are kept informed and can regularly provide feedback.

To have your say and provide feedback on this transformational infrastructure project visit **suburbanrailloop.vic.gov.au**

Metro Tunnel, Melbourne

The Metro Tunnel will deliver 9-kilometre twin rail tunnels and five new underground stations to free up much-needed space in the City Loop so more trains can run more often across Melbourne.

The Metro Tunnel project used TBMs to dig its tunnels deep under Melbourne including the Yarra River and Swanston Street.

More information
To find out more about Suburban Rail Loop:

W suburbanrailloop.vic.gov.au

E contact@srla.vic.gov.au

1800 105 105 (24 hours a day, 7 days a week)

Suburban Rail Loop Authority
PO Box 4509, Melbourne, VIC 3001

Interpreter Service **(03) 9209 0147**

It should be noted that this information is current at the time of printing, however changes may occur. Please visit **suburbanrailloop.vic.gov.au** for the latest updates.

2021_SRL