



**SUBURBAN
RAIL LOOP**

Suburban Rail Loop Stage One Project Outline

10/11/2020

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Executive Summary

This Project Outline has been prepared by Suburban Rail Loop Authority (SRLA), an administrative office of the Department of Transport. SRLA is responsible for the planning and delivery of the Suburban Rail Loop (SRL), on behalf of the Victorian government, from Cheltenham to Melbourne Airport.

The purpose of this Project Outline is to provide information to the Minister for Planning (the Minister) for his consideration in deciding whether to declare works to construct and operate the first stage of the SRL from Cheltenham to Box Hill, as described in Section 3.1 of this document, as “public works” under Section 3 of the *Environment Effects Act 1978* (EE Act). The works to construct and operate the first stage of SRL are described in this document as the SRL Stage One works.

Strategic basis

SRL is a transformative, city-shaping program of investments and policy initiatives that would change the way people move around Melbourne, boost productivity and deliver urban renewal outcomes for Greater Metropolitan Melbourne. SRL is a key component of the Victorian Government’s vision for a 90 km orbital rail loop connecting major metropolitan train lines from Cheltenham to Werribee, linking priority growth precincts, major health, education and employment centres and providing a catalyst for urban renewal across Melbourne’s middle suburbs.

SRL would provide a framework to set Melbourne up as a polycentric city with 20-minute neighbourhoods linked by high quality public transport. The SRL program of rail investment and renewal of key activity centres is recognised as key to Melbourne’s development in both *Plan Melbourne 2017-2050: Addendum 2019* (the Addendum) and in the Planning Policy Framework of the Victoria Planning Provisions.

Given the significant scale and complexity of SRL, it is proposed to be developed in multiple stages. The first stage would entail a rapid rail service between Cheltenham to Box Hill (SRL Stage One). The remaining stages of SRL would be developed subject to separate planning and approval processes.

The SRL Stage One works

The proposed SRL Stage One works that are the subject of this Project Outline consist of the construction and operation of twin rail tunnels approximately 26km long, train stations at Cheltenham, Clayton, Monash, Glen Waverley, Burwood and Box Hill, a stabling yard at Heatherton, and a ventilation shaft. These proposed works are described in more detail in Section 3.1.

Other aspects of SRL that are not part of SRL Stage One include a package of initial works, station precinct planning and development, and the development of future stages of SRL. These other aspects of SRL are described in Section 3.2.

Potential environmental effects

This Project Outline includes a preliminary evaluation of whether the construction and operation of the SRL Stage One works are capable of having significant environmental effects. The preliminary evaluation provides guidance on the priority level for further investigations.

The preliminary evaluation presented in Section 5 indicates that the benefits of SRL and the SRL Stage One works are long-term and widespread across Melbourne and Victoria, and many of the construction impacts are typically localised at individual sites along the alignment. These impacts can be managed using conventional mitigation responses appropriate to a project of this type and scale.

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1. Introduction

This Project Outline has been prepared by the Suburban Rail Loop Authority (SRLA), an administrative office to the Department of Transport. The SRLA is responsible for the planning and delivery of the Suburban Rail Loop (SRL), on behalf of the Victorian government, from Cheltenham to Melbourne Airport.

The purpose of this Project Outline is to provide information to the Minister for Planning (the Minister) for his consideration in deciding whether to declare works to construct and operate the first stage of the SRL from Cheltenham to Box Hill, as described in Section 3.1 of this document, as “public works” under section 3 of the *Environment Effects Act 1978* (EE Act). The works to construct and operate the first stage of SRL are described in this document as the SRL Stage One works.

This Project Outline includes a preliminary evaluation of whether the construction and operation of the SRL Stage One works are capable of having significant environmental effects. The preliminary evaluation provides guidance on the priority level for further investigations.

2. Suburban Rail Loop

SRL is a transformative, city-shaping program of interconnected transport projects, precinct plans and precinct development projects supported by *Plan Melbourne 2017-2050 (2017)* (Plan Melbourne) and its vision of a well-connected, polycentric city. SRL would contribute to the Victorian Government’s vision of a 90 km orbital rail loop that would connect every major metropolitan train line from Cheltenham to Werribee and link priority growth precincts, as well as major health, education and employment centres and catalyse urban renewal across Melbourne’s middle suburbs.

The indicative route and proposed stations for SRL is depicted in Figure 1.

SRL will be delivered in stages over multiple decades, with Stage One providing new stations and rail between Cheltenham and Box Hill. A staged program allows a more manageable approach to delivery and improved management of disruption across Melbourne – keeping Melburnians moving whilst this city shaping program is delivered. There are additional benefits of delivering the program in stages, including supporting the domestic and international construction market to deliver on Australia’s pipeline of mega projects, and enabling delivery over multiple funding cycles and simultaneous delivery of the State’s broader pipeline of infrastructure projects.

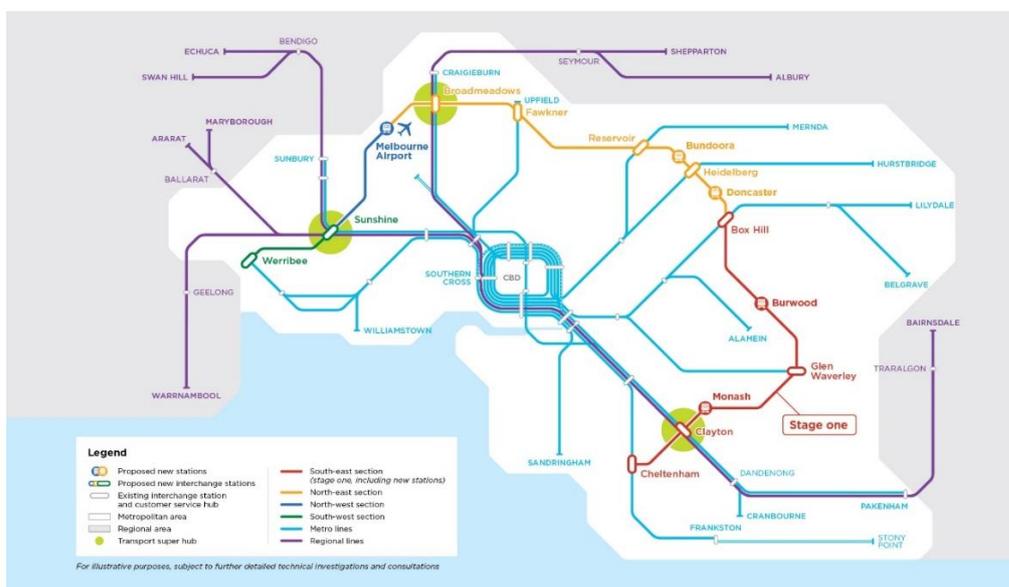


Figure 1 SRL indicative route

The Victorian Government announced Cheltenham to Box Hill as SRL Stage One because:

- It provides a connection to the Monash National Employment and Innovation Cluster (NEIC) and Box Hill Metropolitan Activity Centre (MAC). Monash is Melbourne's largest established NEIC, with a mix of education, research and industry organisations. It has approximately 75,000 jobs and is the largest concentration of employment outside the CBD.
- There is more immediate demand for orbital rail services. The demand for SRL is expected to be closely linked to residential, employment and tertiary education catchments across Melbourne. Melbourne's south-eastern suburbs currently have a greater density of population and employment than Melbourne's northern suburbs and include key tertiary education centres such as Monash and Deakin University (Burwood).
- There are more immediate opportunities to catalyse development in the south east, particularly in the Monash NEIC and the Box Hill MAC.

The SRL Stage One works that are the subject of this Project Outline are rail infrastructure elements which consist of the construction and operation of twin rail tunnels approximately 26km long, train stations at Cheltenham, Clayton, Monash, Glen Waverley, Burwood and Box Hill, a stabling yard at Heatherton, and a ventilation shaft. These proposed works are described in more detail in Section 3.1. Works are proposed to commence in 2022, subject to planning and other applicable approvals.

Future stages of SRL would be subject to separate approval processes as summarised at Section 3.2.3.

2.1. Need for SRL

A long-term program such as SRL is critical for both Victoria's economic recovery and its ongoing liveability. Despite the immediate impacts of COVID-19, Melbourne's population is still expected to grow significantly over the coming decades and the transport system will face continued pressure as the city continues to grow towards 8 million people. There are three key challenges associated with this growth:

- Melbourne's monocentric form is constraining economic growth
- Concentration of growth in inner and outer Melbourne is contributing to inefficient infrastructure and service provision
- Constrained housing options leads to inequitable access to jobs and services, entrenching disadvantage.

The Victorian Government announced SRL to address Melbourne's rapid population growth and public transport network pressures. SRL responds to the challenges by setting Melbourne up as a polycentric city with 20-minute neighbourhoods linked by high quality public transport, as envisioned in Plan Melbourne. The specific benefits of SRL are:

- Increased productivity and economic growth
- Improved connectivity
- Improvement to Melbourne's liveability and supporting thriving communities

These benefits are discussed further in Section 2.1.1.

2.1.1. Benefits of SRL

Through integrated precinct planning, land use changes and a new orbital mass rapid public transport service, SRL would enable economic recovery and enhance Victoria's productivity. Improved accessibility would enable businesses to draw on a deeper workforce pool to better match skills to jobs. Commuters would save time through better public transport accessibility to jobs and reduced stresses on the road network, improving productivity and economic outcomes for the State.

SRL precinct planning would promote liveable places that attract population and employment growth. Residents and workers would benefit from distinctive, high-quality design and good access to services and amenities. Locational disadvantage would be reduced, living affordability would improve and people would have better access to high-value, knowledge-based jobs. By supporting people to live and work locally, SRL would create healthy, connected and vibrant communities.

The key benefits of SRL are summarised in Table 1.

Table 1 Key economic, connectivity and liveability benefits of SRL

KEY BENEFIT	PATHWAY
Increased productivity through reduced journey times	<ul style="list-style-type: none"> SRL would enable Melburnians to be more productive by reducing commute times for workers By expanding the number of people within commutable distances of jobs, employers would be provided with greater access to a broader range of employees with varying skillsets, and employees would have improved access to a wider range of jobs More people would use public transport, easing road congestion on constrained parts of Melbourne's transport network and improving reliability across the broader transport network.
Enhancements in areas around new SRL stations across Melbourne's middle corridor would facilitate economic recovery and growth	<ul style="list-style-type: none"> SRL reduces reliance on Melbourne's current monocentric structure and unlocks the potential of emerging economic areas in Melbourne's middle corridor, catalysing Melbourne's move towards becoming a polycentric city The improved accessibility and targeted precinct initiatives would facilitate land use changes and enable greater employment density throughout Melbourne's middle suburbs Increased housing and job opportunities, combined with improved transport connectivity, would enable people to live closer to work, education, health and recreational services.
Jobs and services would be more accessible to the broader population and businesses would be more accessible to other businesses	<ul style="list-style-type: none"> SRL would provide greater accessibility to jobs and services by connecting key places throughout Melbourne's middle corridor Key education, research, and innovation precincts would be connected, facilitating knowledge sharing and collaboration. This would support Victoria's trajectory as a knowledge-based economy SRL would improve connectivity for regional Victorians, enabling better access to health, education and employment opportunities in suburban Melbourne.
More reliable, punctual and efficient travel	<ul style="list-style-type: none"> SRL would reduce travel times, crowding, and waiting times by restructuring travel patterns and reducing passenger volumes on the existing radial rail network Transport network resilience, punctuality, reliability and safety would be enhanced through the implementation of an independent rail network that is isolated from the disruptions experienced on the existing rail network.
Improve customer experience by increasing the capacity of Melbourne's transport network and improving passenger flows	<ul style="list-style-type: none"> SRL users, and users of Melbourne's broader public transport network, would experience a more efficient and cohesive transport system. Public transport capacity would increase The potential for rail-to-rail transfers and transfers between rail and other modes would facilitate connections between services, providing high quality customer experiences that minimise waiting and transfer times and encourage more people to use public transport Reduced demand on radial services at peak times would mitigate passenger crowding on trains and platforms.
Increase liveability of precincts in the middle corridor to increase people's ability to choose where they live	<ul style="list-style-type: none"> SRL would help increase housing capacity and diversity to improve housing affordability. People who live in the outer suburbs would have shorter distances to travel to access a wider range of jobs, services, cultural, and recreational facilities. SRL precincts would serve as a viable alternative to the CBD.
Support the creation of thriving and sustainable 20-minute neighbourhoods	<ul style="list-style-type: none"> SRL would create safe, sustainable and liveable precincts where communities are self-sufficient, and people can access essential services and amenities, such as education and health care, by taking a 20-minute walk, cycle or public transport trip.

2.2. Strategic Context

2.2.1. Plan Melbourne 2017-2050

Plan Melbourne is the Victorian Government's long-term planning strategy for the future development of Melbourne. Plan Melbourne continues to provide the strategic basis for the planned growth of the city even in COVID-19's wake. Plan Melbourne responds to the key challenges and opportunities facing Melbourne for the next 30 years, specifically:

- A growing population – Melbourne is projected to grow to 8 million people by 2050, with an additional 1.5 million jobs and 1.6 million dwellings required to support this growth.
- Remaining competitive in a changing economy
- Housing that is affordable and accessible
- Keeping up with the growing transport needs of the city - by 2050, Melbourne's transport network will need to handle an extra 10.4 million trips per day
- Climate change – the need for both mitigation and adaptation.

2.2.2. Plan Melbourne Addendum 2019

Plan Melbourne 2017-2050: Addendum 2019 was prepared to update growth projections for Melbourne and identify proposed major infrastructure projects including SRL. The Addendum states that SRL "supports the key principles that underpin Plan Melbourne and in particular: a globally connected and competitive city; a city of centres; social and economic participation; and infrastructure investment that supports balanced city growth." It is also aligned with "the relevant outcomes and directions set out in Plan Melbourne, such as supporting Melbourne to be a productive city that attracts investment (outcome 1) and ensuring Melbourne has an integrated transport system that connects people to jobs and services (outcome 3)."

The Addendum provides an update on projected population, housing and employment growth.

The Addendum identifies that Melbourne's public transport network needs to develop to support the distribution of population and employment in line with the estimates presented in Plan Melbourne 2017-2050 and the Addendum. The Addendum states "Melbourne needs a huge, well planned investment that enables the city to grow while meeting these transport challenges."

The Addendum identifies that significant growth and change will occur in key employment, health and educational centres to support development of a polycentric city. These changes would complement development of the orbital rail link provided by SRL. The policy basis for the project makes clear that SRL is the step change needed for Melbourne's travel and development patterns to accommodate a city of 8 million people by 2051.

Planning scheme amendment VC168 was introduced to implement the Addendum to facilitate the delivery of the SRL, and to ensure SRL is considered by responsible authorities and enable coordinated decision-making regarding land use and development that could affect the delivery of SRL. Specifically, amendment VC168 amended the Victoria Planning Provisions and all planning schemes to facilitate the delivery of SRL by:

- Including as a policy document at Clause 11.01-1S (Settlement).
- Introducing an SRL strategy at Clause 11.01-1R (Settlement- Metropolitan Melbourne). This strategy is to develop SRL "through Melbourne's middle suburbs to facilitate substantial growth and change in major employment, health and education precincts and activity centres beyond the central city at an appropriate scale to address the needs of Melbourne's rapidly growing population."
- Updating the Melbourne 2050 Plan to the Melbourne 2050 Spatial Framework at Clause 11.01-1R (Settlement- Metropolitan Melbourne).

- Including *Plan Melbourne 2017-2050: Addendum 2019* at Clause 72.08 (Background Documents).

2.2.3. Victoria's 30-Year Infrastructure Strategy

Infrastructure Victoria developed *Victoria's 30-Year Infrastructure Strategy* (the Infrastructure Strategy) in 2016. The Infrastructure Strategy contains recommendations covering all infrastructure sectors, from health and education, to water and energy. There are strong parallels and shared objectives between Plan Melbourne and the Infrastructure Strategy.

SRL would improve access to middle and outer metropolitan centres (Need 1 and 11 of the Infrastructure Strategy). This would include connections to Monash NEIC and Box Hill MAC in Stage One and La Trobe NEIC and Broadmeadows MAC in future stages. The Infrastructure Strategy acknowledges that Melbourne's current radial public transport network may limit the growth of these metropolitan centres. By building a complementary orbital rail system, SRL would overcome this limitation and provide for growing employment in these centres.

2.2.4. Victorian Infrastructure Plan

The *Victorian Infrastructure Plan 2017* outlines the Victorian Government's infrastructure priorities over the next five years and beyond. The Victorian Infrastructure Plan outlines a number of different infrastructure priorities and 'future directions', organised within nine sectors. The *Victorian Infrastructure Plan 2019 Project Pipeline Update* identifies SRL as a key transport project in building for Melbourne's future.

The Victorian Infrastructure Plan also specifically identifies how middle suburbs will need to be supported to accommodate greater diversity in the future, whilst Melbourne's growth areas will require new public transport, as well as other infrastructure investments such as schools and hospitals. SRL addresses this through providing transport infrastructure through middle ring suburbs to connect Victorians to health, education and employment centres.

3. Project Description

3.1. Proposed Works

The SRL Stage One works being considered in this Project Outline are the construction and operation of the rail and supporting infrastructure presented in Figure 2 and summarised below:

- Twin-bore rail tunnels between Cheltenham and the proposed Southern Stabling Yard in Heatherton, and from the Southern Stabling Yard to Box Hill, travelling beneath Clayton, Monash University, the Monash Freeway, Glen Waverley, Burwood and Box Hill
- Six new stations constructed at Cheltenham, Clayton, Monash, Glen Waverley, Burwood and Box Hill, with interchanges to existing railway stations at Cheltenham, Clayton, Glen Waverley and Box Hill
- The Southern Stabling Yard would include stabling and maintenance for all trains on SRL Stage One, an operational control centre and associated facilities such as train wash and substation
- Rail tunnel portals at either side of the Southern Stabling Yard which comprise dive structures and a tunnel portal at the interface with the rail tunnels
- A substation in the vicinity of the proposed Burwood Station
- An intervention and ventilation shaft between Glen Waverley and Burwood stations

A more detailed description of the works is provided in the following subsections. SRLA proposes to assess these works as the preferred solution to achieve project objectives without assessing alternative station locations. Note that development of the design is ongoing, which may result in changes.

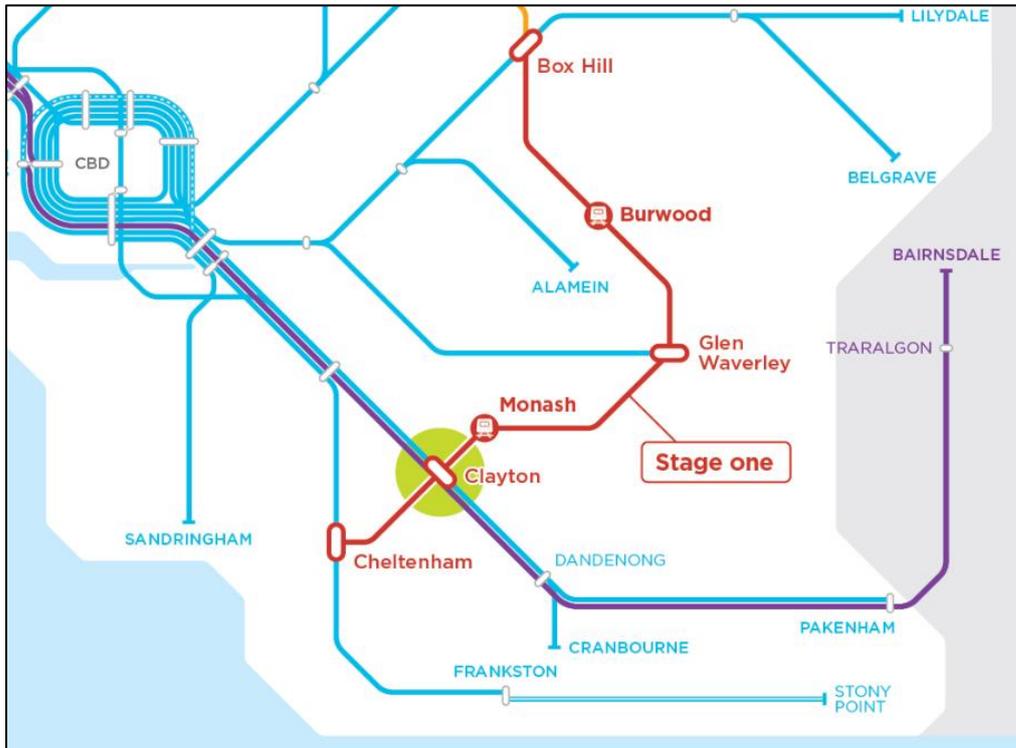


Figure 2 SRL Stage One overview

3.1.1. Rail and Tunnel Works

The SRL Stage One works consist of constructing and operating approximately 26 km of twin rail tunnels of similar diameter to tunnels on the Metro Tunnel Project. The tunnels would begin at Cheltenham, traverse the southern suburbs before surfacing at the Southern Stabling Yard, enabling a connection to the stabling and maintenance areas. The railway then returns underground before travelling towards Clayton and the Monash University. From there, the alignment passes under the Monash Freeway before extending in a north easterly direction to Glen Waverley. The alignment then passes in a north west direction to Burwood and finally to Box Hill.

It is proposed to typically construct the rail tunnels using Tunnel Boring Machines (TBMs). TBMs are an efficient method of excavating tunnels, that has been effectively and safely used on other major infrastructure projects in Melbourne. TBM launch and support sites are proposed to be established at the Southern Stabling Yard, Monash and Burwood locations. Tunnel access shafts are proposed to separate tunnel construction operations from adjoining station construction and fit out. TBM launch and support activities are proposed to operate 24 hours a day. As a safety feature, cross passages will be constructed along the tunnel alignment to allow people to move from one tunnel to the other in the event of an emergency. Ground conditions will need to be suitable to enable safe cross passage construction.

Temporary and permanent land occupation would be required for the delivery of SRL Stage One works. This would include the acquisition of interests of public and private land at surface level for the proposed stations and construction areas, and underground strata. Some temporary occupation may be required to construct SRL Stage One.

3.1.2. Station Works

The SRL Stage One works consist of the establishment of six new stations, four of which would provide a direct connection to the existing rail network.

Each station is proposed to be constructed using the “bottom up” method, although alternative construction methods may also need to be considered depending on the local ground conditions or other matters.

Under the “bottom up” method, piles would be installed around each station footprint to limit water ingress and ensure rock and soil stability. Stations would then be excavated to the depth of the rail alignment in an open trench construction, with temporary propping or ground supports to ensure safe excavation. Once each station is fully excavated, it would be made watertight to manage groundwater infiltration. The permanent structural and civil elements would then be progressively constructed upwards until reaching the surface, where entrances and ancillary surface infrastructure would be constructed.

Changes to road networks would be required at all surface locations during construction, including short- and long-term changes to road alignments and road capacities. Some roads may need to be closed for the works. Access and exit points would be required for construction vehicles from the surface construction locations.

3.1.2.1. Cheltenham Station

Cheltenham is a Major Activity Centre in the City of Kingston, located approximately 18 km south of Melbourne’s CBD. The proposed SRL station at Cheltenham is located north of Bay Road between the Frankston railway line and the Nepean Highway in Sir William Fry Reserve. The City of Bayside is located to the west of the Frankston railway line.

The surrounding area is characterised by a mixture of retail and commercial land to the south (Southland Shopping Centre), residential land to the east and west, and public land uses. Connection to existing public transport services including Southland Station would be provided. As the terminus

for SRL Stage One a crossover area, where trains can cross between tracks, would be built at the eastern end of the station within Sir William Fry Reserve.

The station construction works would require occupation of part of Sir William Fry Reserve, and acquisition and demolition of a limited number of commercial properties. Sir William Fry Reserve was created during the 1980s on land previously occupied by the Highett gasworks. The reserve currently includes a skatepark, public amenities (such as toilets) to the north and public car parking.

3.1.2.2. Clayton Station

Clayton is a Major Activity Centre in the City of Monash, located approximately 18 km south east of Melbourne's CBD. It forms part of the Monash NEIC. The proposed SRL station at Clayton is located to the north of the existing Cranbourne and Pakenham railway line, between Clayton and Madeleine Roads. Connection to existing transport services including the existing Clayton Station would be provided.

The surrounding area is characterised by a mix of commercial, residential and health land uses. The Monash Medical Centre and Monash Children's Hospital are regionally significant health facilities. The retail strip along Clayton Road is vibrant between Centre Road and the existing railway line. North of the existing railway land use along Clayton Road changes to a mix of retail, religious and community facilities and medical facilities.

The station construction works would require the acquisition and demolition of commercial and residential properties. The construction phase of the recent level crossing removal included disruptions to the local area and relocation and restoration of the historic Clayton railway station building (Victorian Heritage Register Place H1667). The new viaduct and elevated railway station opened in 2018, with the main entrance of the station on the eastern side of Clayton Road.

3.1.2.3. Monash Station

Monash NEIC is in the City of Monash, located approximately 18 km south east of Melbourne's CBD in Notting Hill. Monash University is the cornerstone of the NEIC. The proposed SRL station at Monash is located to the north of Normanby Road and east of Howleys Road in Notting Hill. The area is characterised by a mix of education, health, commercial and residential land uses. Existing transport connections include local bus services and a new bus interchange is proposed to facilitate better local public transport connection.

Monash University, located directly south of the proposed station location, was established in 1958 with classes commencing on the site in 1961. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has a presence on Normanby Road, west of the proposed station. The land surrounding the university transitioned from rural to commercial land following the university's opening. Most development in the commercial land is low rise, although some residential colleges associated with the university are taller.

The station construction works would require the acquisition and demolition of commercial and educational properties. There are several large trees near where the proposed station would be located.

3.1.2.4. Glen Waverley Station

Glen Waverley is a Major Activity Centre in the City of Monash, located approximately 19 km east of Melbourne's CBD. The proposed SRL station at Glen Waverley is located south of the existing Glen Waverley Station, south of Coleman Parade and between Kingsway and Myrtle Street, primarily in an existing surface car park.

The surrounding land use is characterised as a mix of retail and commercial to the west along Kingsway, residential to the east and educational to the north. An existing multi story carpark on Bogong Avenue is located directly to the south of the proposed station location.

Connection to existing public transport services including Glen Waverley Station would be provided. Occupation of surface car parking and acquisition and demolition of a limited number commercial, community and residential properties would be required to construct the station.

3.1.2.5. Burwood Station

Burwood is in the City of Whitehorse, located approximately 14 km east of Melbourne's CBD. Deakin University is located on the north side of Burwood Highway. The proposed SRL station at Burwood is located south of the Burwood Highway between Gardiners Creek and McComas Grove.

The area is predominantly residential, with significant education uses north of Burwood Highway and light industry to the south and west. Existing public transport connections include Route 75 tram along Burwood Highway and local bus services.

The station construction works would require the acquisition and demolition of a commercial property and residential properties, and occupation of the Sinnott Street Reserve.

The creek in this vicinity is a concrete channel and forms part of an open space corridor. A utility depot occupies a large part of the proposed station site, restricting access to the creek corridor from the east. The site is highly modified and does not support any state or Commonwealth listed threatened flora or fauna, nor are any threatened ecological communities present. Planted trees and the limited area of native vegetation in the vicinity of the SRL station would provide habitat for common fauna species including birds and arboreal mammals.

3.1.2.6. Box Hill Station

Box Hill is a MAC in the City of Whitehorse, located approximately 14 km east of Melbourne's CBD. The proposed SRL station at Box Hill straddles south and north of Whitehorse Road, west of Station Street and east of Market Street. As the terminus for SRL Stage One, a crossover area to allow trains to turn back would be built north of the station, extending under Box Hill Gardens.

The area is characterised by a mixture of commercial, retail, residential, health and educational land uses. The area is currently undergoing change with numerous high-rise residential or office developments in either planning or delivery. Existing public transport connections include tram route 109, Box Hill Station and a large bus interchange. A direct underground connection to the existing Box Hill Station would be provided. The station construction works would require the acquisition and demolition of commercial and residential properties north and south of Whitehorse Road, together with occupation of a portion of Box Hill Gardens.

SRLA anticipates the terminus of SRL Stage One at Box Hill would form the start of future stages of SRL (see Section 3.2.3).

3.1.3. Southern Stabling Yard Works

The proposed Southern Stabling Yard would be the primary location for the stabling and maintenance of all SRL Stage One trains. It would also house the SRL operations control centre and associated facilities such as train washing and a substation.

The tunnels would rise to the surface to allow trains to access the Southern Stabling Yard before returning underground. The Southern Stabling Yard works would involve the acquisition and demolition of a limited number of commercial and residential properties, followed by site levelling, ground improvement, and the construction of rail sidings and other buildings and infrastructure to maintain and repair SRL trains and to otherwise support the operation of SRL. Old Dandenong Road would be permanently truncated for the proposed Southern Stabling Yard.

The Southern Stabling Yard lies in the Green Wedge A Zone, north of Kingston Road in Heatherton, primarily in an area used as a landfill and formerly for sand mining. A Public Acquisition Overlay covers a large part of the site to provide public open space as part of the Chain of Parks concept.

The site is highly modified and is not considered to support any state or Commonwealth listed threatened flora or fauna.

The Dingley Bypass is located to the east and residential properties are located to the west. To the north of the site is a rehabilitated former landfill, and to the south are golf courses, agricultural properties and low-density residential dwellings.

3.1.4. Intervention and Ventilation Shaft Works

The proposed Intervention and Ventilation Shaft works consist of the excavation and fit out of a shaft at a location between the SRL stations at Glen Waverley and Burwood. The purpose of the Intervention and Ventilation Shaft is to provide an emergency service access and passenger egress point to the surface from the rail tunnels. The structure would also house tunnel ventilation infrastructure to ensure that enough ventilation of the tunnel sections is achieved. The electric trains using the railway would not generate vehicle emissions that would be emitted from the Intervention and Ventilation Shaft.

SRLA is presently considering locations between the SRL stations at Glen Waverley and Burwood for an Intervention and Ventilation Shaft. The development and operation of an intervention and ventilation shaft has the potential to impact on nearby residential or commercial properties. Final site selection will prioritise minimising impacts on residential properties over impacts on commercial property.

At this stage, SRLA considers that only the length of tunnels between the SRL stations at Glen Waverley and Burwood require an intervention and ventilation shaft on the SRL Stage One alignment.

3.1.5. Substation Works

The substation works consist of the construction and operation of two proposed zone substations, with one proposed to be located at the Southern Stabling Yard site and one proposed to be located near the SRL station at Burwood.

3.1.6. Operations Overview

SRL Stage One would provide train services across a span of approximately 20 hours a day, 5 days a week and 24 hours a day, 2 days a week. The service would be a modern, metro style service operating at speeds up to 100 km/h. Trains would operate on Alternating Current (AC) power supply serviced by the zone substations outlined in Section 3.1.5. Maintenance and train cleaning operations at the Southern Stabling Yard are proposed to occur 24 hours a day, 7 days a week.

3.2. Other Works

3.2.1. SRL Stage One Initial Works

If an EES is required for the SRL Stage One works, some works and activities (“Initial Works”) would need to commence before completion of the EES process to enable the delivery of SRL Stage One in a timely manner and to minimise disruption to business, residents and road users. It is proposed these works do not form part of the declared ‘public works’ because these Initial Works do not alone have a significant effect on the environment, and the cumulative effects of the Initial Works and the balance of the SRL Stage One works can be assessed in the EES.

These Initial Works would comprise works and activities that are comparable, in scope and scale, to renewal and maintenance work activities that are common place in Melbourne and other urbanised areas, and as such would not have a significant effect on the environment.

Prior to the commencement of any of these Initial Works, SRLA would seek any required planning, heritage, utility or road management-related consents. Where required, SRLA has identified it would need to seek the following approvals to facilitate Initial Works:

- planning approval granted under the *Planning and Environment Act 1987*, as required by the relevant planning schemes; and/or
- cultural heritage management plans under the *Aboriginal Heritage Act 2006*, as required by the relevant regulations; and/or
- consents granted under the *Road Management Act 2004*, from local councils or VicRoads depending on the location and nature of the initial works to be undertaken.

The conditions contained in any consents granted to SRLA would be documented in an environmental management plan (EMP) and complied with at all times. SRLA would seek any approvals in consultation with the appropriate Victorian agencies and transport network operators to ensure the Initial Works are undertaken in a coordinated manner that minimises potential disruption to the community.

Should the SRL Stage One works not proceed, the Initial Works would all still deliver benefits to the State. Site establishment and ground improvement works would result in enhanced infrastructure and State-owned land being more developable, and could subsequently be developed or sold. The construction power upgrades would deliver additional capacity to the network in the south east, which is at or approaching capacity and would need to be upgraded to support urban growth.

Initial works fall into three classes:

Design and investigation activities

The first class consists of activities and works associated with designing SRL Stage One works and assessing its effects for the purpose of preparing an EES (if required), such as geotechnical and environmental investigations, site surveys, and establishing the location of existing utilities and services. These works are required to inform further assessment of SRL Stage One (see Section 5 for further discussion of proposed assessments).

Activities to minimise disruption to the community

The second class consists of works and activities relating to utilities, power upgrades and site access that are essential prerequisites to the commencement of construction of SRL Stage One. The early completion would result in reduced impacts to local communities because of streamlined traffic management arrangements and minimising works occurring during noise-sensitive periods. These works include:

Power upgrades:

- Installation of new underground power infrastructure
- Upgrades and modifications to existing network connections
- Upgrade to existing fibre optic infrastructure.

Utility relocations:

- Relocation, protection and/or termination of utility infrastructure (electricity, water, sewer, gas, fuel, communications and other)

Vehicle access upgrades to facilitate construction vehicle movement:

- Modifications to existing or creation of new vehicle access.
- Modifications to existing road infrastructure.

Activities that would improve or remediate land

The third class consists of activities that would allow the improvement of land that requires remediation or improvement regardless of whether the SRL Stage One works proceed. The proposed Southern Stabling Yard site is on unconsolidated fill, and ground improvement trials are required to understand site condition and settlement rates. Initial works at the proposed Southern Stabling Yard includes:

- Site improvement works including earthworks, site levelling, soil management, site drainage and flood mitigation.
- The ground improvement trials which would be subject to noise and vibration monitoring to inform mitigation measures to be employed during the comprehensive ground improvement works
- Hoarding/fencing and site compound setup (including site offices, storage and laydown areas, internal roads, construction carparking) to facilitate these initial works.

3.2.2. Precinct Planning and Development

One of the key SRL objectives, beyond the significant transport benefits, is to drive investment, job growth and economic activity in employment, health and education centres outside Melbourne's CBD. To this end, six precincts have been identified along the SRL Stage One corridor at Cheltenham, Clayton, Monash, Glen Waverley, Burwood and Box Hill.

Precinct structure plans for each precinct would be prepared in consultation with stakeholders and communities. Precinct structure plans for precincts would consider green space, services, amenity, housing mix and other infrastructure that might emerge to ensure these communities are even better places to live, work and learn as our city grows.

The precinct structure plans would be subject to a separate approval process. Site-specific developments in the precincts have not yet been identified and the works associated with those developments have been excluded from this Project Outline. Future changes associated with precinct developments and initiatives would be assessed using appropriate planning instruments.

3.2.3. Future Stages: Box Hill to Melbourne Airport

As described in Section 2, due to the scale and complexity of the SRL program, SRL is to be delivered in stages over multiple decades. There is no concept or reference design, or site investigations being undertaken for the future stages, and these are not envisaged in the short-to-mid-term.

The future stages of SRL have therefore been excluded from this Project Outline. The baseline alignment may be revised as part of future investigations when design work and consultation is undertaken. SRLA anticipates the terminus of SRL Stage One at Box Hill would form the start of future stages of SRL.

3.3. Project Schedule and Delivery

Indicative timing for the delivery of SRL Stage One is as follows:

- 2019 – 2020
 - Investment Case preparation
 - Geotechnical investigations
 - Development of reference project
 - Community and stakeholder engagement
 - Project Outline and submission to the Minister for Planning
 - Public works declaration by the Minister for Planning

- 2021
 - Final scoping requirements issued by the Minister for Planning
 - Community and stakeholder engagement
 - Preparation of EES (if required) and planning approval documentation
 - Start of procurement process
 - EES exhibition and inquiry (if EES required)
- 2022
 - Community and stakeholder engagement
 - Completion of EES assessment (if required) and planning approval
 - Contract award and commencement of construction.

The SRL Stage One works are expected to be under construction in 2022 subject to planning and environmental approvals.

4. Relevant Legislation

4.1. Commonwealth Legislation

A referral would be submitted to the Commonwealth Department of Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for a determination of whether the SRL Stage One works is a 'controlled action' that requires assessment and approval under the EPBC Act. A self-assessment has demonstrated little interaction with threatened species, ecological communities or other Matters of National Environmental Significance (MNES). The referral focus is the proximity to Commonwealth land, particularly the CSIRO land near Monash station.

4.2. State Approvals

It is envisaged that a Planning Scheme Amendment would be sought to allow for the use and development of land for the SRL Stage One works under the *Planning and Environment Act 1987* and the relevant planning schemes. The Planning Scheme Amendment would comply with and address the requirements of relevant Ministerial Directions, including in particular:

- Ministerial Direction on the form and content of planning scheme amendments
- Ministerial Direction No.9 Metropolitan Planning Strategy, which would require the Amendment to address and responds to Plan Melbourne and the Addendum
- Ministerial Direction No. 19 which addresses requirements for Planning Scheme Amendments that may significantly impact the environment, human health and amenity.

The *Transport Integration Act 2010* (TIA) is Victoria's principal transport Act, bringing together the whole transport portfolio under one statute. TIA aims to create an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible state. The objectives and principles set out within TIA need to be considered and embedded into the SRL Stage One works.

In addition, the delivery of the SRL Stage One works is anticipated to require approvals, consents and to comply with the following Acts:

- *Aboriginal Heritage Act 2006*
- *Crown Land (Reserves) Act 1978*
- *Environment Protection Act 2017*
- *Flora and Fauna Guarantee Act 1988* (FFG Act)
- *Heritage Act 2017*
- *Land Act 1958*
- *Major Transport Projects Facilitation Act 2009* (MTPF Act) (note SRLA would not seek to use assessment and approval powers under Parts 3 and 8 of the Act)
- *Pipelines Act 2005*
- *Rail Management Act 1996*
- *Road Management Act 2004*
- *Water Act 1989*

5. Preliminary Evaluation

The SRL Stage One works support and implement key elements of the Plan Melbourne Addendum and is anticipated to bring a widespread and profound positive legacy to Melbourne and Victoria. The works are also expected to have a range of effects on several environmental, social and economic assets, values or uses.

This section presents a preliminary evaluation of the potential environmental effects of the SRL Stage One works and identifies priorities for further investigation. The purpose of providing this information is to contribute to an appreciation of the potential nature and magnitude of the environmental effects of the SRL Stage One works, and the relative significance of those effects.

The proposed SRL Stage One works outlined in Section 3.1, and the urban context of the works, have been considered when completing the preliminary evaluation of the potential for environment effects. The evaluation has been informed by existing condition assessments (Table 2) for various disciplines undertaken on an investigation area of 300 m to either side of the proposed tunnel alignment of the SRL Stage One

Table 2 Existing condition assessments

Study Area	
Aboriginal Heritage	Human Health
Air Quality	Landscape and Visual Amenity
Arboriculture	Land Use Planning
Business	Noise
Contaminated Land	Retail Economics
Ecology	Social
Electromagnetic Interference	Surface Water
Geology	Traffic and Transport
Groundwater	Vibration
Historical Heritage	

Based on this preliminary evaluation, priorities for further investigation have been assigned as follows:

- Low priority – considered a low priority for additional assessment due to the information obtained to date through existing conditions assessments, the presence (or lack thereof) of the environmental value and the likelihood of the project impacting on the environmental value. These are summarised in Table 3 and Table 4.
- Medium priority – potential impacts are considered to be known and of a magnitude that could be managed through the implementation of conventional mitigation measures. Additional assessment would be required, to understand the full magnitude of potential impact and to assess the efficacy of proposed mitigation solutions. These are summarised in Table 3.
- High priority – are either likely to have a significant impact on an environmental value, or further investigation is required in order to assess the potential impacts. Additional work would also be required to inform mitigation strategies to ensure acceptable residual effects are achieved. These are summarised in Table 3.

Table 3 and Section 5.1.1 provides a summary of the potential issues using the above definitions, to identify a targeted list of issues that SRLA considers require further investigation

Table 3 Summary of existing conditions and potential impact

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
Aboriginal Cultural Heritage	<p>Most of the proposed investigation area has been subject to extensive disturbance, although there are some limited areas which do not appear to have been subject to the same levels of disturbance. While these areas are not necessarily mapped as being areas of cultural heritage sensitivity, they would be the focus of more intensive survey (and possibly excavation) as they provide an opportunity to assess potentially less impacted shallow subsurface deposits in relation to Aboriginal cultural material.</p> <p>Preliminary assessment indicates that there is the potential for Aboriginal heritage to be present at Cheltenham, Monash, Burwood and Box Hill, but a low likelihood at Southern Stabling Yard, Clayton, Glen Waverley and the tunnel alignment.</p> <p>The Cultural Heritage technical adviser identified that the majority of station areas have had landforms removed, and replaced by urban development with significant historical disturbance. It is considered that where areas of cultural heritage are identified they would be able to be mitigated through the implementation of conventional mitigation measures in a CHMP.</p>	<p>As the proposed activity is considered a high impact activity under Section 47 (Constructing specified items of infrastructure) of the <i>Aboriginal Heritage Regulation 2018</i> (AH Regs) and several areas of cultural heritage sensitivity occur within the proposed project area (under Section 25 – Registered cultural heritage places, Section 26 – Waterways, Section 34 – Koo Wee Rup Plain, and Section 41 – Sand Sheets of the AH Regs), a Cultural Heritage Management Plan (CHMP) is mandatory in regards to the <i>Aboriginal Heritage Act 2006</i> (Section 46). A CHMP would also be mandatory if the Minister for Planning requires an EES for the SRL Stage One works.</p>	Not identified	Not expected	CHMP mandatory
Air Quality	<p>A preliminary assessment of Air Quality involving a desktop analysis of the existing environments using publicly available sources has been completed. The air quality along the alignment is consistent with a predominantly urban environment. The investigation concluded that some areas of the Project would already experience elevated background concentrations of NOx, CO, PM₁₀ and PM_{2.5} due to localised traffic congestion.</p>	<p>Given the duration of intensive construction activities, together with the proximity to sensitive receptors and areas of high population density, there is the potential for the construction of the SRL Stage One works to impact local air quality through dust and combustion-related emissions. However, provided conventional management and mitigation measures are implemented, it is unlikely that air emissions would have extensive or major effects on the health, safety or wellbeing of a community.</p>	Construction activities cause negative impact on air quality.	Line wide where open excavations or spoil movement would occur	Medium priority
		<p>The SRL Stage One works would involve the use of electric trains, which means that the emission of air pollutants associated with operating trains along the SRL tunnels would be negligible in comparison to the potential construction-related air emissions and impacts.</p>	Operational activities cause negative impacts on air quality	Investigations will focus on ventilation at stations and the intervention and ventilation shaft	Low priority
Arboriculture	<p>An arboricultural assessment has been completed, and a value has been assigned to each tree or tree group assessed as part of this study. This assessment provided a useful basis to understand the significance of each tree when undertaking site planning. Algerian Oaks (<i>Quercus canariensis</i>) identified near to the Box Hill surface works were identified as of Very High Arboriculture Value due to their age and significant size. The Algerian Oaks are in the western portion of Box Hill Gardens and their tree protection zones are avoided by the design of SRL. Mature, high value trees were identified elsewhere through the gardens, and elsewhere along the alignment.</p> <p>The value of mature trees throughout the established eastern suburbs is recognised by several tree controls enacted through relevant Planning Schemes. Where practicable, the design and construction of the SRL Stage One works would seek to avoid impacts to mature trees.</p>	<p><i>The Guidelines for the removal, destruction or lopping of native vegetation 2017</i> outlines the three-step approach, Avoid, Minimise and Offset. SRLA is committed to avoidance of native vegetation through the design process. Where trees cannot be avoided, mitigation measures would be determined in accordance with relevant standards including:</p> <p>Australian Standard 4970-2009 Protection of Trees on Development Sites: Tree Protection Plans would be prepared for protection of retained trees based on the Australian Standard. Design would seek to avoid impacting on trees, through avoidance of works within Tree Protection Zones.</p>	Impact to native or remnant vegetation, or trees of significance.	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Southern Stabling Yard, • Monash Station, • Burwood Station • Box Hill Station. 	Medium priority

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
Business and retail economics	<p>The construction of the SRL Stage One works would have potential effects on economic well-being due to the direct and indirect displacement of business and commercial activities. Indirect displacement of business and commercial activities could be caused through disruption as a result of construction activities in the area. These impacts would be experienced at a local level where surface level development is proposed (i.e. stations and stabling yard) and include impacts on businesses at Cheltenham, Southern Stabling Yard, Clayton, Monash, Glen Waverley, Burwood and Box Hill.</p>	<p>SRLA is committed to stakeholder consultation to reduce the effects of the SRL Stage One works as low as practicable, but further investigation and consultation is required to determine the nature and extent of potential impacts on economic wellbeing, and the most effective ways to reduce those impacts. The assessment would also consider the positive impacts of the SRL Stage One works on the retail environment at the localities with major shopping centres (Cheltenham, Clayton, Glen Waverley and Box Hill).</p>	<p>Displacement of businesses due to acquisition of commercial/industrial land</p> <p>Disruption of business activities as a result of construction activities</p>	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Cheltenham Station • Southern Stabling Yard • Clayton Station • Monash Station • Glen Waverley Station • Burwood Station • Box Hill Station. 	<p>High priority</p> <hr/> <p>Medium priority</p>
Ecology	<p>The SRL Stage One works would be in a predominantly urbanised environment that has already been developed. Site inspections undertaken by a suitably qualified ecologist mapped 0.37 ha of an Endangered EVC in the vicinity of the surface works at Southern Stabling Yard (Plains Grassy Woodland) and Burwood (Swampy Riparian Woodland) and less than 1 ha of native vegetation of any kind within the proposed station footprints or Southern Stabling Yard.</p> <p>The extent of clearing of native vegetation is expected to be less than 10 hectares due to the urbanised environment. This has been reinforced by perimeter inspections of private land and review of aerial photography which indicates that these sites are highly unlikely to support extensive areas of native vegetation.</p> <p>The site inspections also identified that as most of the project area is subject to urban development it is unlikely to provide potential habitat for threatened species. However, there is the potential for minor foraging habitat for the Swift Parrot (planted flowering gums at Southern Stabling) and the Grey-headed Flying-fox (overflies the corridor). The planted flowering gums, which are not considered to be critical foraging habitat, are located along the western and northern perimeters of the Southern Stabling site. Only a minor proportion of the gums are intended to be removed. The Swift Parrot is listed as Critically Endangered and the Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act, and both species are also listed as threatened under the FFG Act.</p> <p>The Swift Parrot and Grey-headed Flying-fox both forage broadly and breed outside of any are expected to be impacted by surface works. Several surface works areas e.g. Clayton, Glen Waverley and Box Hill are highly developed and so do not support habitat for these species. Limited habitat in the form of mature trees is present at Cheltenham, Southern Stabling, Burwood and Monash. Consequently, it is very unlikely that the SRL Stage One works have the potential to result in long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of these or any other threatened species within Victoria.</p> <p>One Wetland of International Importance (Edithvale-Seafood Wetlands) is located approximately 8 km south east to the nearest part of the Project, the Southern Stabling Yard. SRL is not expected to have a direct impact on this, due to its remoteness. No other listed wetlands would be impacted by the Project.</p>	<p><i>The Guidelines for the removal, destruction or lopping of native vegetation 2017</i> outlines the three-step approach, Avoid, Minimise and Offset. SRLA is committed to avoidance of native vegetation through the design process.</p>	Not identified	Not expected	Low priority

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	The areas surrounding the location of the proposed SRL Stage One works support several sites with aquatic habitat including Karkarook Park, Sir William Fry Reserve, Namatjira Park, an old quarry site, Monash University and Gardiners Creek. Listed migratory species including the Eastern Great Egret and the Glossy Ibis may forage within these wetlands. However, none of the sites within areas expected to be impacted by surface works are considered to meet the definition of 'important habitat' as defined under the EPBC Act, so the SRL Stage One works is unlikely to have a direct significant impact on migratory species.				
Electro Magnetic Interference (EMI)	EMI is disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling, or conduction. An EMI review of sensitive receivers identified Monash University, Monash Medical, CSIRO and Deakin University as key sensitive receivers along the alignment. The risk of EMI impact during construction is the temporary impact from the operation of TBMs. Electrical fields associated with train operations is the key risk following construction.	<p>The potential impacts associated with EMI have been substantially mitigated through the adoption of an AC Power supply. The magnetic field induced by AC current is substantially less than that of Direct Current, which has been used by Metro Tunnel.</p> <p>Mitigation measures would be determined with regard to guidelines from relevant organisations including:</p> <ul style="list-style-type: none"> • International Commission on Non-Ionising Radiation Protection (ICNIRP) • Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) • State of Victoria Department of Health and Human Services • Energy Networks Australia (ENA) <p>Whilst the technology selected has reduced the anticipated impacts significantly when compared to Metro Tunnel Project, refinement of design would seek to avoid potential impacts to sensitive receptors.</p>	Generation of EMI during operation and the impact of any EMI on sensitive receivers.	Line wide, however the investigation would focus on key stakeholders identified through the existing conditions assessment.	Medium priority
			Generation of EMI during construction activities associated with the operation of TBMs and operation of trains during operation.	Likely to focus on research facilities (CSIRO, Monash University, Deakin University) and medical facilities (Monash Medical Centre)	Medium priority
Greenhouse Gas	SRLA's preliminary assessment is that it is unlikely that the operation of the SRL Stage One works would produce emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, due to its operation as an electrified rail network.	The State of Victoria has committed through ratification of the <i>Climate Change Act 2017</i> to achieving net zero carbon emissions by 2050. This is to be achieved through several measures, including moving to clean electricity supply, including 40% renewable energy by 2025 and 50% by 2030.	Not identified	Not expected	Low priority
Geology & Ground Movement	<p>The SRL Stage One works are unlikely to have extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term.</p> <p>Due to the length of the alignment, the works would be constructed in variable naturally occurring sedimentary features, from Brighton Group in the south to the Melbourne Formation in the north of the alignment.</p> <p>The works are proposed to be constructed through an area that has a very low susceptibility to landslide, erosion and other land degradation processes. No parts of the SRL Stage One works are within areas affected by planning controls relating to land degradation (Erosion Management Overlay). Furthermore, given the SRL Stage One works are predominantly constructed below ground, it is very unlikely to affect the stability of existing slopes.</p> <p>There is potential for erosion of soils when they are temporarily exposed during construction through water runoff or wind. These risks are normal for projects involving earthworks and are readily managed through conventional construction practices including dust suppression and silt barriers.</p>	<p>A geological and groundwater model(s) would be developed to inform tunnel and trench design and the construction techniques to be applied for the various geological and groundwater conditions. The model(s) would:</p> <ul style="list-style-type: none"> • Identify sensitive receptors that may be impacted by ground movement • Inform monitoring of ground movement and ground water levels prior to construction to identify pre-existing movement • Inform tunnel design and the construction techniques to be applied for the various geological and groundwater conditions • Assess potential drawdown and identify trigger levels for implementing additional mitigation measures to minimise potential primary consolidation settlement <p>Assess potential ground movement from excavation and identify trigger levels for implementing additional mitigation measures to minimise potential ground movement.</p>	Movement of ground causes structural and safety damage to properties or critical infrastructure.	Line wide, however the investigation would focus on where the tunnel alignment is closer to the surface, or where there are critical assets that could be impacted (rail viaduct at Clayton, various sewer mains)	Medium priority

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	<p>As in the case of any large tunnelling project, the potential for ground movement exists where excavations are undertaken. Ground movements may occur above and adjacent to SRL Stage One works due to tunnelling, construction of station, portal and shaft excavations, and consolidation of compressible soils due to groundwater drawdown. Buildings, utilities, and civil infrastructure such as roads, rail lines, and bridges may be subjected to the effects of ground movements (settlement) caused by construction of the tunnels, stations, shafts, and portals and/or the associated drawdown effects.</p>	<p>Mitigation measures may be required to achieve acceptable outcomes. The type of mitigation measures that may be required for the SRL Stage One works are typical for other large tunnelling projects in Melbourne, and their effectiveness is well understood by regulators and stakeholders.</p>			
Groundwater	<p>Tunnel and station structures are proposed to be completely sealed, which would significantly limit the ability for groundwater to flow into the structures. As a result, it is unlikely that long term significant drawdown would be caused by the station and tunnel structures.</p> <p>There is potential for localised drawdown during the construction of the stations. However, this can be managed through conventional controls where there is the potential impact on PASS/R to avoid or minimise any potential for extensive or major effects. In addition, there is a risk of draw down associated with cross passage construction within sandy/highly permeable material.</p> <p>There is the potential of loss of stream baseflows at Burwood, however detailed modelling is yet to determine if stream baseflows are reliant upon groundwater. The depletion is likely to be localised in the immediate vicinity of the station box during construction, and loss of flow volume during this time is likely to only be a small component of the total flow in the catchment. In addition, due to the sealed nature of the final construction, any impact to stream baseflows would only be during construction.</p> <p>Regional groundwater levels would only be affected in the short-term during construction activities and would not have a long-term significant impact of beneficial uses of waterbodies as the permanent structures would be sealed.</p> <p>Contamination plumes have been identified near Cheltenham. Given the hydraulic characteristics of the groundwater systems at Cheltenham, mitigation measures (groundwater reinjection) would be incorporated into the construction methodology. There is the potential for contaminated water to be present near Burwood and the Southern Stabling Yard, which would require additional assessment to understand if the SRL Stage One works is likely to impact on these areas. The primary mitigation method to avoid disturbing contaminated groundwater plumes would be through groundwater re-injection during construction.</p> <p>Contaminated groundwater migration is not likely to be an issue during operational phase of the SRL Stage One works, as the permanent structures would be sealed.</p>	<p>The geological and groundwater model(s) prepared above would be used to develop an understanding of groundwater movement and quality. The models would be used to determine the characteristics of the groundwater systems and determine if there would be any significant changes as a result of the project. In addition, any mitigation measures would be tested on the developed groundwater models.</p> <p>Construction related groundwater impacts would likely be ameliorated through the introduction of a temporary recharge system at station constructions as required. Construction of cross passages could also impact on groundwater levels in permeable material. This would be mitigated by treating the cross passages prior to excavation, ensuring that there would be limited groundwater inflow.</p> <p>During the operational phase, potential impacts to ground water have been largely mitigated due to the design decision to construct sealed stations and tunnels.</p>	Impacts to groundwater resources during construction.	<p>Groundwater investigations would focus at station locations where groundwater inflow is likely to be higher during construction, within the Brighton group sediments at Cheltenham, Clayton and the portal structures at the Southern Stabling Yard.</p> <p>The construction and operation of the tunnels is unlikely to impact groundwater due to the use of TBM, and the sealed construction methods.</p>	Medium priority
Historical Heritage	<p>The SRL Stage One works are not expected to have potential extensive or major effects on cultural heritage places listed on the Victorian Heritage Register or the Archaeological Inventory under the Heritage Act 2017. There are a limited number of places on the Victorian Heritage Register (VHR) and Victoria Heritage Inventory (VHI) within areas potentially impacted by surface works. Only the Clayton</p>	<p>The <i>Heritage Act 2017</i> (Heritage Act) provides for the protection and conservation of places and objects of State level heritage significance. SRLA would ensure that any approvals under the Act are obtained.</p>	Not identified	Not expected	Low priority

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	<p>station area contains a VHR listing, (Clayton railway station building, VHR H1667). The current Clayton station has been extensively redeveloped by the recent Level Crossing Removal Project (LXRP) works. The heritage values of this place were impacted when the historical building was relocated and restored as part of the Clayton Road LXRP.</p> <p>There are a number of Heritage Overlays either directly intersecting the alignment or in close proximity. These are found at Clayton, Burwood and Box Hill.</p>				
Human health	<p>Potential impacts to human health include impacts during construction and operation from noise and vibration emissions, dust generated and emissions to air and potential health impacts to the local community from handling, transportation and treatment of contamination soil. Construction and operation of the SRL Stage One works would need to comply with relevant emissions criteria published by EPA Victoria and other regulators, as well as the duties in the <i>Environment Protection Act 2017</i>, to avoid or minimise risks to human health. Transparent engagement and dissemination of information to affected stakeholders would also help to manage impacts on community wellbeing.</p>	<p>The project will be assessed and mitigation measures prepared in accordance with relevant Victorian and National legislation and guidance including:</p> <ul style="list-style-type: none"> - <i>Public Health and Wellbeing Act 2008</i> - <i>Public Health and Wellbeing Regulation 2019</i> - <i>Environment Protection Act 1970 (EP Act)</i> - <i>Environment Protection Act 2017 (the 2017 Act)</i> - <i>enHealth Health Impact Assessment Guidelines (enHealth 2017)</i> <p>The assessment of human health requires input from several other impact assessments proposed to be completed as part of an EES. The outcomes of these investigations, and any mitigation measures required as result of those investigations is expected to minimise the impact to human health as a result of the SRL Stage One works..</p>	<p>Impacts of construction activities on human health</p>	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Cheltenham Station • Southern Stabling Yard • Clayton Station • Monash Station • Glen Waverley Station • Burwood Station • Box Hill Station. 	<p>Medium priority</p>
			<p>Impacts of operational activities on human health</p>		<p>Low priority</p>
Land (Contamination)	<p>Excavation of soils during construction would likely encounter contaminated soils and soil/rock with acid forming minerals. Inappropriate characterization, handling and disposal of contaminated and acid forming construction spoil has the potential to impact on human and environmental receptors.</p> <p>There are known and suspected sources of contamination along the the SRL Stage One works alignment that have been identified in the Existing Conditions assessment. Most of the alignment is not anticipated to be subject to elevated contaminant levels, although a number of known contamination issues have been identified at some specific locations, most notably Cheltenham and the Southern Stabling Yard. A comprehensive soil sampling program is being implemented, so that the extent of contaminated spoil can be understood, and appropriate management and disposal options identified. Results collected to date show that most of the spoil to be generated by the project is classified as Fill Material. Instances of contamination appear to be restricted to areas identified in the Existing Conditions Assessment as potentially containing contaminated material. It is noted that PFAS is being sampled extensively, and 98% of results thus far are either below the detection limits, or the current re-use criteria.</p> <p>Acid forming minerals may be present in the Quaternary alluvial soils, Brighton Group, Fyansford and Anderson Creek Formations. When disturbed during excavation, acid forming minerals may oxidise and produce acid runoff, which may result in impact to environmental receptors if not managed in accordance with environmental regulatory requirements.</p> <p>The sampling program is ongoing, with the interpretation of results being continually updated. Spoil handling during construction would be formalised within a Spoil Management Plan to be prepared during the</p>	<p>Mitigation measures would be determined in accordance with relevant standards, guidelines, statutory requirements and best practice including but not limited to:</p> <ul style="list-style-type: none"> • SEPP – Prevention and Management of Contaminated Land, 2002 • SEPP – Air Quality Management, 2001 (in respect of odour) • <i>Environment Protection (Industrial Waste Resource) Regulations 2009</i> • <i>Industrial Waste Management Policy (Waste Acid Sulphate Soils) 1999</i> • <i>National Environment Protection (Assessment of Site Contamination) Measures 2013.</i> 	<p>Impact on contaminated land during construction activities, including the generation and management of contaminated spoil</p>	<p>Sampling and analysis is being considered on a risk basis and where potential for contamination has been identified through site history investigations. Priority locations include:</p> <ul style="list-style-type: none"> • Southern Stabling Yard • Cheltenham Station <p>In addition, spoil management, including planning for reuse, has been identified as a priority to investigate.</p>	<p>Medium priority</p>

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	<p>delivery of the program, which would be consistent with an SRLA Spoil Management Strategy to be prepared, as is typical for delivery of major infrastructure projects.</p> <p>These risks are typical for large projects across Melbourne, and conventional management measures would be proposed to address these issues for the SRL Stage One works, and prevent extensive or major effects on, or associated with, contaminated land and potential or actual acid sulphate soils.</p>				
Land Use and Planning	<p>As described in Section 2.2, there is strong strategic planning and policy support for the project.</p> <p>The SRL Stage One works would likely require residential land acquisition at the majority of the station locations and at the Southern Stabling Yard. The majority of the SRL Stage One works will be constructed at depth and would not require acquisition of residential properties, limiting the impact to the proximity of station and other surface infrastructure. Although the impact on individual residences could be significant, the likely impact would not be considered significant on the wider community, provided SRLA complies with Victorian government guidelines and practices regarding the acquisition of land.</p> <p>In addition to the residential impact, the project would also result in direct or indirect displacement of non-residential land use activities, including open space, businesses and community facilities.</p> <p>There is the potential for severance of residential access to community resources such as open space and future open space identified in policy (such as the Southern Stabling Yard, which is part of the Chain of Parks in Kingston). Open space partially impacted by the SRL Stage One works include the Sir William Fry Reserve (Cheltenham), Gardiners Creek Reserve / Sinnott Street Reserve (Burwood), Remembrance Gardens (Clayton), Box Hill Gardens and activated community space beneath the rail viaduct at Clayton. The SRL Stage One works are unlikely to have any effect on facilities or open space currently utilised for organised recreational or sporting activities.</p> <p>The SRL Stage One works would have impacts on residential access to community facilities including places of worship at Clayton and Glen Waverley, RSL at Glen Waverley and childcare at Monash and Box Hill.</p>	<p>SRLA is committed to stakeholder consultation to reduce the effects of the SRL Stage One works as low as practicable.</p> <p>Although direct impact to residents and businesses is likely to be unavoidable, SRLA would manage impacts through design development and site selection. SRLA would meet the requirements of the <i>Land Acquisition and Compensation Act 1986</i>.</p> <p>It is worth noting that the impact assessment would also identify where the SRL Stage One works is providing improved access to community facilities, where previously public transport was not adequate.</p> <p>SRLA is developing an Urban Design Strategy which would promote the development of public open space in the local vicinity of the station.</p>	<p>Land use changes and displacement of residences and severance of residential access to community resources (including future identified open space at Southern Stabling Yard as part of the Chain of Parks concept).</p>	<p>Displacement of residences and severance of residential access to community resources would require further investigation at:</p> <ul style="list-style-type: none"> • Cheltenham Station • Southern Stabling Yard • Clayton Station • Glen Waverley • Burwood Station • Box Hill Station • Intervention shaft 	High priority
			Loss of public open spaces and recreational facilities	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Cheltenham Station – Sir William Fry Reserve • Burwood Station – Gardiners Creek Reserve, Burwood Skyline Drive-In Playground and Sinnott Street Reserve • Box Hill Station – Box Hill Gardens. • Future Public Open Space at Southern Stabling Yard (Chain of Parks project) 	High priority
Landscape and Visual	<p>There is the potential for amenity impacts on several residential areas in proximity to the Stage One works investigation area. Except for residential dwellings in proximity to the surface works associated with the Southern Stabling Yards, these impacts would be associated with the construction activities, and ongoing visual impacts related to the built form of two-to-three storey station buildings. It is anticipated that impacts could be prominent in locations where there are sensitive</p>	<p>SRLA is developing a Urban Design Strategy which would provide guidance on the urban design elements of the SRL Stage One works. The strategy would establish design principals to minimise the impact of the project on the local environment.</p> <p>The Urban Design Strategy would be developed in consultation with stakeholders and with community engagement in order to address local</p>	Landscape and visual impacts on amenity of residents.	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Cheltenham station • Southern Stabling Yard • Clayton station 	High priority

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	<p>residential or other interfaces to the SRL Stage One works, and where the existing built environment and landscape would be more sensitive to change. This includes the impacts of the new station buildings at Cheltenham (impacts on open space/parkland and residents to the west), Clayton (impacts on surrounding residents), Burwood (open space and residential interfaces) and Box Hill (impacts on surrounding residents).</p> <p>Residential properties located to the west of the Southern Stabling Yard could have on-going amenity impacts due to the operation of the stabling and maintenance facility. To ameliorate the potential impacts, the Southern Stabling Yard would be designed with low impact, directional lighting and acoustic treatments if required.</p> <p>The SRL Stage One works is not expected to have an extensive or major effect on landscape values of regional importance. There are no landscape values of regional importance recognised within a planning scheme overlay or within/adjoining land reserved under the <i>National Parks Act 1975</i>.</p> <p>A Significant Landscape Overlay (SLO) is in place to the east of the Burwood station area and to the north of Whitehorse Road within the Box Hill station area. This overlay protects the leafy garden and bushy character of Melbourne's eastern suburbs that can be viewed from many high points throughout Melbourne and is a significant component of the subregion. The treed character of areas such as Whitehorse provides an important 'green' link between Melbourne and the Yarra Valley. As such, the SRL Stage One works One would have limited impacts on the SLO within the Whitehorse council area.</p> <p>Further investigation is required to assess the effects on the amenity of residents in the station locations because of visual changes from the SRL Stage One works.</p>	<p>concerns and develop place specific requirements to meet local community expectations.</p>		<ul style="list-style-type: none"> Intervention and ventilation shaft Burwood station Box Hill station 	<p>Low priority</p>
Noise	<p>An assessment of airborne noise has been prepared that identifies noise sensitive land uses around the alignment, including residential, educational and health uses. The existing noise conditions have been determined to be typical of suburban Melbourne.</p> <p>The SRL Stage One works have the potential to generate construction noise due to the scale of the works required. Construction noise effects are most likely around the station sites, the Southern Stabling Yard and any other surface works. Works would be managed in accordance with relevant guidelines such as <i>Environment Protection Authority (EPA) Victoria Publication 1254 Noise Control Guidelines</i> (EPA Publication 1254) to reduce the construction noise effects on noise sensitive land uses. It is expected that conventional design, acoustic attenuation and construction management techniques can be applied to ensure noise emissions comply with regulatory requirements that apply to the SRL Stage One works.</p> <p>Operational noise would predominantly involve noise emissions from fixed infrastructure at the station sites, intervention and ventilation shaft and stabling yard. These noise emissions would be controlled to achieve compliance with <i>State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)</i> to maintain amenity outcomes in accordance with EPA requirements.</p> <p>As the railway lines would be predominantly in tunnels, airborne rail noise effects are not expected except for a short section of surface</p>	<p>Mitigation measures would be determined in accordance with relevant guidelines including:</p> <ul style="list-style-type: none"> <i>Environment Protection Authority (EPA) Victoria Publication 1254 Noise Control Guidelines (EPA Publication 1254)</i> <i>State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)</i> <i>Victorian Passenger Rail Infrastructure Noise Policy.</i> <p>During construction, works would be managed in accordance with relevant guidelines such as <i>Environment Protection Authority (EPA) Victoria Publication 1254 Noise Control Guidelines (EPA Publication 1254)</i> to reduce the construction noise effects on noise sensitive land uses.</p> <p>Operational noise would predominantly involve noise emissions from fixed infrastructure at the station sites, ventilation and intervention shaft and stabling yard. Noise emissions would be controlled to achieve compliance with <i>State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)</i> to maintain amenity outcomes in accordance with EPA requirements.</p> <p>During operation, where the railway lines would mostly be in tunnels, airborne rail noise effects are unlikely. Where required for any short sections of open railway line, rail noise emissions would be managed</p>	<p>Airborne and ground-borne Noise generated during construction impacting on sensitive receivers.</p> <p>Ground-borne noise during operation impacting on sensitive receivers</p> <p>Airborne noise generated during</p>	<p>All major infrastructure locations would likely require a lengthy period of construction. Those with residential interfaces would form a particular focus for the impact assessment.</p> <ul style="list-style-type: none"> Southern Stabling Yard Clayton Station Glen Waverley Station Burwood Station Box Hill Station. <p>Line wide</p> <p>Operational noise would be generated</p>	<p>High priority</p> <p>Low priority</p> <p>High priority</p>

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	<p>railway line at the Southern Stabling Yard. Rail noise emissions from SRL trains on this section of railway line would be assessed, managed and controlled in accordance with the Victorian Passenger Rail Infrastructure Noise Policy.</p> <p>There is the potential for ground-borne noise to impact on sensitive receivers, including residential properties, medical facilities and other noise sensitive activities (sound recording studios or theatres) during construction through construction activities at stations, and operation of TBMs. There is also the potential for ground-borne noise during operation as result of vibration caused by the operating trains.</p>	<p>and controlled in accordance with the Victorian Passenger Rail Infrastructure Noise Policy.</p> <p>Ground-borne noise, where assessed as having the potential to impact on sensitive receivers, would be mitigated through the use of different track forms. Depending on the sensitivities, more highly mitigated track forms could be used to limit the impact.</p>	<p>operation impacting on sensitive receivers</p>	<p>primarily from Station ventilation infrastructure and trains at surface at the Southern Stabling Yard. Stations with residential interfaces, would form a particular focus for the impact assessment.</p> <ul style="list-style-type: none"> • Southern Stabling Yard • Clayton Station • Glen Waverley Station • Burwood Station • Box Hill Station 	
<p>Social</p>	<p>The SRL Stage One works would likely result in the permanent acquisition of residences due to the construction of station boxes (Clayton, Burwood and Box Hill), Southern Stabling Yard and other infrastructure. There is also the potential for severance or loss of access for residents to existing open space at the Sir William Fry Reserve (Cheltenham), Gardiners Creek Reserve / Sinnott Street Reserve (Burwood), Remembrance Gardens (Clayton), Box Hill Gardens and activated community space beneath the rail viaduct at Clayton.</p> <p>The construction of the SRL Stage One works would have potential effects on social well-being due to the direct and indirect displacement of non-residential land activities. In addition to displacement, the project would also have potential effects on social well-being as a result of disruption associated with construction activities. These impacts would be experienced at a local level where surface level development is proposed (i.e. stations and stabling yard).</p> <p>When in operation, the SRL Stage One works would also have a positive impact on social well-being by improving access to jobs, health and education facilities that may not have been as easily accessible in the past. Finally, the project's construction would provide employment for a wide range of jobs.</p>	<p>SRLA is committed to stakeholder consultation to reduce the effects of the SRL Stage One works as low as practicable, but further investigation and consultation is required to determine the nature and extent of potential impacts on social wellbeing, and the most effective ways to reduces those impacts.</p> <p>In relation to displacement of residences, further investigation and consultation is required to determine the nature and extent of displacement. SRLA would comply with Victorian government guidelines and practices regarding the acquisition of land.</p>	<p>Displacement of residents due to acquisition of properties</p>	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Southern Stabling Yard • Clayton Station • Burwood Station • Box Hill Station • Intervention shaft 	<p>High priority</p>
			<p>Loss or reduced function of public open space, social infrastructure, recreational assets</p>	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Cheltenham Station – Sir William Fry Reserve • Burwood Station – Gardiners Creek Reserve • Box Hill Station – Box Hill Gardens. 	<p>High priority</p>
			<p>Displacement/reduced access to community facilities</p>	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> • Clayton Station • Monash Station • Glen Waverley Station • Box Hill Station 	<p>High priority</p>

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
Surface Water	<p>Water quality of the waterways potentially impacted by the SRL Stage One works are generally rated as 'Poor' or 'Very Poor' due to elevated levels of nutrients, metals and E. coli attributed to runoff from the urban catchment. Despite this poor water quality, the assessed waterways still provide social and environmental values that require protection.</p> <p>The key issues relating to water quality can broadly be summarised as increased pollutant loads and altered physicochemical condition due to surface water runoff (during construction and operations). These potential impacts are expected to be managed through conventional mitigation measures to minimise the impact to the receiving waterways.</p> <p>Potential effects on stream flows arise in the following contexts:</p> <ul style="list-style-type: none"> Any works located on the Gardiners Creek floodplain. The location of the proposed Burwood Station is adjacent to Gardiners Creek. The location of the Southern Stabling Yard, 500 m from the Clayton South Drain, could result in impacts to the overland flow paths associated with this drain. Works within the overland flow path associated with the Burton Avenue Drain which flows into the underground Clayton Drain. The location of the proposed Clayton Station, within the overland flow path associated with this drain, could result in a temporary interruption of overland flow paths. <p>The proposed Clayton station box is located within a Special Building Overlay associated with Melbourne Water's Burton Avenue Drain. The Burton Avenue Drain continues downstream where it connects into the Clayton Drain. The Southern Stabling Yard is located approximately 200 m to the north west of Clayton Drain.</p> <p>Clayton drain forms an upstream branch of the Mordialloc Settlement Drain that discharges to the Mordialloc Creek estuary. The northern section of the Edithvale wetland is within 1 km of the Mordialloc Creek Estuary, but a channel/drain is present between the wetland and the creek. There are flood flaps present on the drain to prevent backflows from the estuary to the wetlands, although backflows can occur if the flood flaps become jammed with rubbish (see Ecology Australia, 2016).</p> <p>As the direction of flow from the Edithvale wetlands is likely towards the Mordialloc Creek Estuary (rather than from the estuary), it is unlikely that water quality of the Edithvale wetlands would be impacted by the SRL Stage One works.</p> <p>Where standard mitigation measures are implemented it is not expected that the project would result in changes to water quality or flood levels that would lead to significant impact to the environment or human health.</p>	<p>Mitigation measures will be determined in accordance with relevant guidelines including:</p> <ul style="list-style-type: none"> SEPP (Waters) <i>Environmental Guidelines for Major Construction Sites (EPA Publication 480)</i>. <p>This would include:</p> <ul style="list-style-type: none"> Managing impacts during construction and operation to beneficial uses so far as reasonably practicable. This includes risks from dewatering, land disturbance, soil erosion, sediment resuspension, posing a barrier to fish movement, stormwater and storage and handling of chemicals and hazardous substances. Monitoring surface waters where construction activity adjoins or crosses surface waters to ensure beneficial uses are being protected will also be required. <p>The use of typical and conventional design and mitigation measures endorsed by Melbourne Water, and informed by modelling, would avoid the potential for extensive or major effects on beneficial uses of waterbodies</p> <p>Potential flooding issues will be managed through appropriate design of infrastructure and water treatments such as retention ponds and drainage infrastructure, informed by flood modelling to be endorsed by Melbourne Water. At Gardiners Creek, SRLA is exploring the option of creek naturalisation to ensure any impacts are mitigated, and to improve the social and environmental values of the Creek.</p> <p>Modelling would include consideration of climate change scenarios to ensure infrastructure and water treatments are climate resilient.</p> <p>Water Sensitive Urban Design (WSUD) would be developed to manage any potential surface water quality impacts associated with surface features during operation, specifically at the Southern Stabling Yard.</p>	<p>Impact on surface water quality which could impact the health of sensitive waterways.</p> <p>Impact on flood capacity and overland flow path</p>	<p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> Southern Stabling Yard Clayton Station Burwood Station <p>Priority locations for assessment include:</p> <ul style="list-style-type: none"> Southern Stabling Yard Clayton Station Burwood Station Box Hill 	<p>Medium priority</p> <p>Medium priority</p>

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
Traffic and transport	<p>The effects of construction vehicles on residential amenity is likely to vary along the SRL Stage One works alignment and work areas.</p> <p>The transport of spoil from the proposed TBM launch sites would result in truck movements during tunnelling operations, which would require further assessment of transport routes, timing, and potential improvements to the road network to reduce impacts to other road users.</p> <p>Residents adjacent to the Southern Stabling Yard are unlikely to be significantly affected by the construction of the SRL Stage One works as there is an existing environment of truck movement and access to Dingley Bypass for construction vehicles. Monash is within a primarily commercial and industrial setting, so a significant number of residents would be not be affected by construction traffic. At Burwood, truck movement is likely to be primarily via Burwood Hwy, in which case significant impacts of construction vehicles on residents in the vicinity of Burwood are unlikely, subject to standard assessment and mitigation.</p> <p>Each proposed station location is expected to be subject to surface transport network changes, although the extent of change, ability of the existing network to address additional traffic and additional activity likely is to be more pronounced at Clayton, Monash, Burwood and Box Hill Stations. At Southern Stabling Yard it is proposed to truncate Old Dandenong Road, with traffic using the adjacent Dingley Bypass.</p> <p>During construction, the impacts may relate to:</p> <ul style="list-style-type: none"> • Construction activities impeding traffic flow (including public transport) • Construction activities impeding active transport operations (e.g. due to closed footpaths/connections) • Trucks removing tunnel spoil increase congestion levels in key parts of the network <p>During operation, there may be legacy transport network outcomes such as enhancing active and public transport modes, which could also change road network connectivity or increase congestion (while impacts may be local only, the significance of those impacts would need to be investigated).</p>	<p>Construction impacts are considered to be local in nature and would be managed through the development of detailed Traffic Management Plans.</p> <p>The Traffic Impact Assessment would need to investigate the likely impacts of closing, temporarily or permanently, any local roads along the alignment. The assessment would need to determine if the closure would have a negative impact and consider if that impact is considered appropriate. Specific mitigation measures may need to be implemented if the impacts are considered significant.</p>	Disruptions to public transport services and local traffic (including motor vehicle, bicycle and pedestrian) during construction	Priority locations for assessment include: <ul style="list-style-type: none"> • Cheltenham Station • Clayton Station • Glen Waverley Station • Box Hill Station 	High priority
			Temporary or permanent changes to local road networks	Priority locations for assessment include: <ul style="list-style-type: none"> • Cheltenham Station • Southern Stabling Yard • Clayton Station • Glen Waverley Station • Box Hill Station 	High priority
Vibration	<p>The existing vibration environment in the majority of the proposed SRL Stage One alignment is expected to be typical of a quiet residential area with minimal sources of elevated vibration. Areas of slightly elevated Vibration conditions would be located near commercial centres, railway lines and major roads. For example, Clayton would be expected to have periods of elevated vibration conditions, with combination of commercial properties, the existing railway (although elevated) and Clayton Road with frequent heavy vehicle movements.</p> <p>Although the number of sensitive receivers would be considerably less than for other significant local projects (for example Melbourne Metro), there is the potential for vibration to impact on sensitive receivers and equipment at Monash University, CSIRO, the Australian Nuclear Science and Technology Organisation (ANSTO) Synchrotron, and Deakin University, as well as residential properties along the alignment.</p>	<p>Mitigation measures to be developed would be based off suitable criteria found globally, including:</p> <ul style="list-style-type: none"> • German Standard DIN 4150 – Part 3 – Structural Vibration in Buildings – Effects on Structures (2016). <p>Prepare and implement a Construction Noise and Vibration Management Plan (CNVMP) that has been informed by monitoring and modelling undertaken by a suitably qualified acoustic and vibration consultant prior to the construction works.</p> <p>Where necessary, SRLA would incorporate high vibration dampening track forms to ensure potential impacts are mitigated through design. The Vibration Impact Assessment would identify where high mitigation track forms would be required.</p>	Vibration caused by construction activities including piling, station excavation, and tunnel boring impacting sensitive receivers	Line wide	Medium priority
			Operational vibration caused by operating trains through the tunnel alignment	Line wide	Medium priority

RELEVANT ASSET	SUMMARY OF RELEVANT INFORMATION	LEGISLATIVE REQUIREMENTS AND MITIGATION OPTIONS	KEY ISSUE	KEY AREA FOR INVESTIGATION	PRIORITY FOR FURTHER INVESTIGATION
	<p>The potential vibration emissions during construction would be comparable to construction projects such as the Metro Tunnel Project, and works would be managed in accordance with relevant guidelines.</p> <p>All major surface infrastructure locations would likely require a lengthy period of construction. Those with residential interfaces, including Burwood, Box Hill and Clayton stations, would form the focus of further investigation.</p> <p>Groundborne noise and vibration during the construction and operation phases would also be a focus for further investigation.</p>				

5.1. Summary of further investigations

5.1.1. Low priority investigations

The preliminary evaluation indicates that several environmental assets described in Table 4 are not expected to require detailed further assessment because either the impacts are either sufficiently well understood, the element has not been identified within the investigation area or are not likely to be significantly impacted by the SRL Stage One works. The relevant assets that are considered as not requiring detailed investigations to inform an EES process are outlined in Table 4 .

Table 4 Low priority investigations

RELEVANT ASSET	RATIONALE
Aboriginal Cultural Heritage	Most of the alignment would be developed on areas of substantially urban development. Major surface works would typically be undertaken in areas of historically disturbed land, which would substantially limit the likelihood of impacting on Aboriginal cultural heritage elements. In addition, a mandatory Cultural Heritage Management Plan would be prepared for the project.
Ecology	As described in Section 3.1 and Table 3, SRL would be located in a predominantly urbanised environment with very limited ecological value. The SRL Stage One works are not expected to clear more than 10 ha of native vegetation, or impact on a significant portion of habitat for endangered or listed species. Considering the urban environment, and the relatively small surface impact, detailed surveys and ecological assessments are not considered a priority for an EES, if required.
Greenhouse Gas	Due to the nature of the activity, on-going greenhouse gasses directly attributed to the project would be relatively minor.
Historical Heritage	One Victorian Heritage Register site is in proximity to the SRL surface works at Clayton. As described in Section 3.1 and Table 3, the historic Clayton railway station building (Victorian Heritage Register Place H1667) was relocated and restored as part of the Clayton Road LXP. There are some Heritage Overlays either directly intersecting the alignment or in proximity. In particular these are found at Clayton, Burwood and Box Hill.

5.1.2. Medium and high priority investigations

The preliminary evaluation of existing conditions and initial assessment of potential mitigations provided in Table 3 has identified several environmental assets that require further investigation to more fully characterise the nature and significance of SRL Stage One 's effects on the environmental asset. The evaluation has identified key issues and areas associated with the relevant asset to guide further investigation.

Given the length of the SRL Stage One alignment and the nature of the proposed infrastructure elements, much of which would be established underground, many of the potential environmental effects have either limited, or localised, potential to be realised. As the potential effects relating to each environmental asset are not uniform across the entire project alignment, it would be appropriate to adopt a targeted approach to each investigation to focus on those areas of higher significance.

Table 5 below summarises the relevant assets requiring medium and high priority investigation detailed in Table 3. Generally, medium priority investigations are required where the potential impact is relatively well understood, and where standard mitigation measures are considered likely to manage potential environmental impact on the relevant asset. The further investigation would focus on quantifying the potential impacts and ensuring that the standard mitigation measures would satisfactorily mitigate the impact.

High priority investigations for relevant assets focus on where the potential for significant effects are not as well understood, or where standard mitigations are less likely to manage the adverse impacts on the relevant asset. The high priority investigations would require more detailed assessment, and significant consultation with community and stakeholder to ensure that the potential impacts are understood and mitigated as far as possible.

Both high priority and medium priority investigations and associated potential impacts on the relevant asset are typical for large infrastructure projects and are expected to be managed to an acceptable level through the development of mitigation measures and performance requirements.

Table 5 Medium and high priority investigations

MEDIUM PRIORITY RELEVANT ASSET	HIGH PRIORITY RELEVANT ASSET
Air Quality	Business and retail economics
Arboriculture	Land Use and Planning
Electro Magnetic Interference (EMI)	Landscape and Visual
Geology & Ground Movement	Noise
Groundwater	Social
Human health	Traffic and transport
Land (Contamination)	
Surface Water	
Vibration	

6. Community and Stakeholder Engagement

Effective consultation will be essential to successfully plan, design, construct and operate the SRL Stage One works. SRLA’s engagement approach is underpinned by key objectives and principles that guide the development of consultation for each project phase. SRLA has developed an overarching Communications and Engagement Framework based on best engagement practice and guided by Victorian legislation and policy.

Consultation with stakeholders and communities will be key to preparing assessments and ultimately guiding approvals for the SRL Stage One works. SRLA would prepare an EES Consultation Plan that will set out how we would engage with stakeholders and communities in preparing an EES

6.1. Objectives and Principles

A targeted, strategic approach would be applied to communications and stakeholder engagement throughout the planning and delivery of SRL. In line with this, SRLA’s overall engagement objectives are to:

- Inform and educate the community and stakeholders about the project scope, including the policy context, project objectives and project timelines
- Foster support and buy-in for SRL, informing the community and stakeholders about the SRL project objectives and community benefits
- Understand community and stakeholder interests, concerns and preferred outcomes for SRL
- Seek ongoing input and feedback from the community and stakeholders, including important information about technical, social and community aspirations to inform the planning, design and delivery of SRL
- Strengthen and nurture relationships between SRLA and stakeholders and the community
- Support planning approvals, scoping and development for the precincts and transport components of SRL.

SRLA recognises that project progress and decisions can be enhanced through informed dialogue with the community and stakeholders, including residents, businesses, government and other interested parties.

Communications and engagement would adhere to the principles as outlined in Table 6.

Table 6 Engagement principles

PRINCIPLE	DESCRIPTION
Transparent	The Stage One scope and decision-making process is clearly articulated to those potentially impacted by the project. Engagement is clear on the elements of the project that can be influenced by stakeholders and community and is explicit on which elements of the project are fixed and the reasons for this. Stakeholders and community understand how their feedback has been considered.
Inclusive	Effort is made to ensure that all stakeholder groups and the community are included in the project. This includes effort made to remove barriers to participation and provide reasonable time and resources to support meaningful participation.
Timely	Engage early and at all stages of the project, ensuring information is provided to the community and stakeholders as the project develops.
Meaningful	The scope and objectives of engagement are clearly articulated to stakeholders and community, including the engagement promise (level of contribution sought) and how their feedback will be used. Appropriate time and resources are provided to ensure stakeholder groups and the community can meaningfully participate.

6.2. Stakeholder Identification and Engagement

Stakeholder identification and analysis is a core part of developing an engagement approach. The term ‘stakeholder’ refers to any person, group or organisation with an interest in, or who is impacted by, a project.

It is important to note that stakeholders may change over time and different approaches may be required for effective engagement. Key stakeholder groups for SRL are shown in Table 7.

Table 7 Key stakeholder groups

GROUPS	ORGANISATIONS	
Decision makers	<ul style="list-style-type: none"> Federal Government 	<ul style="list-style-type: none"> State Government
Government partners	<ul style="list-style-type: none"> Department of Premier and Cabinet Department of Transport Department of Jobs, Precincts and Regions Department of Environment, Land, Water and Planning Department of Health and Human Services Heritage Victoria Aboriginal Victoria Rail Projects Victoria 	<ul style="list-style-type: none"> Infrastructure Victoria Victorian Planning Authority Development Victoria Environment Protection Authority Victoria VicTrack VicRoads Parks Victoria Melbourne Water
Local government	<ul style="list-style-type: none"> Local councils 	<ul style="list-style-type: none"> Municipal Association of Victoria
Commercial and development	<ul style="list-style-type: none"> Developers Commercial landowners 	<ul style="list-style-type: none"> Delivery industry
Advocacy groups	<ul style="list-style-type: none"> Industry and peak bodies 	<ul style="list-style-type: none"> Local and community interest groups
Institutions	<ul style="list-style-type: none"> Health Research 	<ul style="list-style-type: none"> Education
Technical stakeholders	<ul style="list-style-type: none"> Utilities 	<ul style="list-style-type: none"> Public transport franchisees
Directly impacted	<ul style="list-style-type: none"> Businesses 	<ul style="list-style-type: none"> Residents
Targeted communities	<ul style="list-style-type: none"> Culturally and linguistically diverse Indigenous stakeholders 	<ul style="list-style-type: none"> Commuters Innovators
Wider community	<ul style="list-style-type: none"> Precinct-based Media 	<ul style="list-style-type: none"> Whole of Victoria

6.3. Engagement to Date

This section provides a summary of engagement activities and findings for the period of May 2019 to September 2020. Community engagement during the early planning and development phase has focused on raising general awareness about SRL, explaining its benefits and understanding people's thoughts and what they would like to hear more about.

Engagement with relevant stakeholders and local government for SRL Stage One has included local government:

- Bayside City Council
- Kingston City Council
- Monash City Council
- Whitehorse City Council
- Monash University
- Deakin University.

Introductory briefings have also been provided to the following stakeholder groups other key institutions, peak body and advocacy groups.

Key channels by which information was provided and feedback was sought from community and stakeholders included:

- Community pop up information sessions
- Online and social media
- Online community 'Have your say' survey
- Social research
- Project videos and images
- Newsletters and e-news
- Engage Victoria online platform
- Project update letter to station precincts
- Phone and email enquiries
- Works notifications
- Stakeholder briefings and workshops
- Media announcements and briefings

In June 2020, SRLA launched the next phase of community engagement on the Engage Victoria online platform, which includes an interactive mapping tool and online survey.

This phase of engagement seeks to capture feedback from Suburban Rail Loop Stage One communities about their values and aspirations for their local neighbourhoods. This engagement remains open at the time of submitting this Project Outline.

Figure 3 provides a summary of SRLA's engagement reach from May 2019 to September 2020..

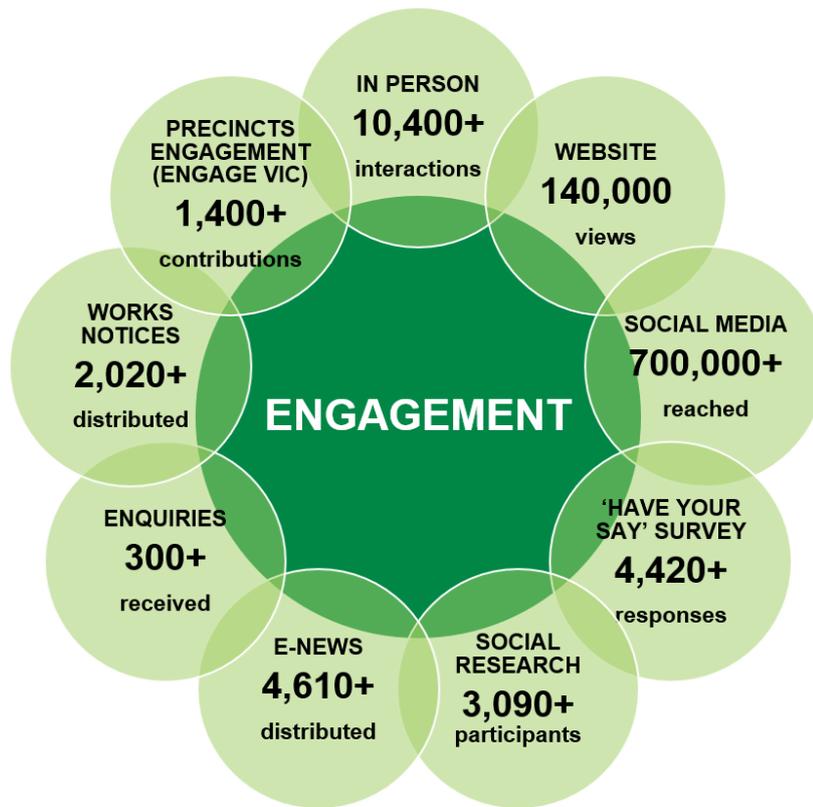


Figure 3 Summary of engagement reach

Feedback received from the community between May 2019 and September 2020 about early planning work for the project has been summarised below in Table 8.

Table 8 Community Feedback

THEME		FEEDBACK
	Route and station locations	<ul style="list-style-type: none"> • Questions about the project’s alignment and design, integration with existing structures and precincts, as well as station interchanges and potential upgrades to existing stations. • Questions about the number of new stations and concerns that some areas have been left out or overlooked (e.g. connection to Chadstone). • Requests for the community to have input on stations design and access points, as well as interest in opportunities for broader engagement in the project.
	Connections and access	<ul style="list-style-type: none"> • Feedback also emphasised the importance of providing better connections and more choice in transport options, especially for travel to hospitals, universities and Melbourne Airport. • Feedback highlighted the benefits of renewing areas along the corridor and improving access to jobs and services outside the CBD. • Questions about how the new line would integrate with the existing network including rolling stock and ticketing technology, and how new stations would connect with surface transport modes.

THEME	FEEDBACK
 <p>Environment impacts</p>	<ul style="list-style-type: none"> • Concerns about property and business acquisition and displacement. • Concerns about environmental impacts to local areas and assets, as well as noise, dust and vibration during construction. • Questions about how disruptions to the existing transport network, including train and bus services, would be managed while the project is being built. • Positive feedback for improved overall environmental outcomes by encouraging more sustainable transport and reducing emissions.

6.4. Future Engagement

Consultation and engagement with stakeholders and communities will be ongoing to support the planning and impact assessment process through to construction and operation of Stage One. Engagement activities will continue to be timed to coincide with the planning and delivery program and in line with feedback received.

7. Conclusion

This Project Outline describes the SRL Stage One works and presents a preliminary evaluation of their potential environmental effects.

The evaluation found that several effects are unlikely to be significant and limited additional studies would be required to assist with the EES process. However, the evaluation also found that for some effects detailed studies would be required to understand the impacts and potential mitigation strategies. These are:

- Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities.
- Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.

The evaluation shows that construction impacts are not Melbourne- or regional-wide but are typically localised at individual sites along the alignment. Many of these impacts can be managed using conventional mitigation responses appropriate to a project of this type and scale.

SRLA will continue its investigations to support a planning scheme amendment to authorise and regulate the construction and operation of the SRL Stage One works. Should the Minister for Planning require an EES for the SRL Stage One works, the evaluation in this Project Outline and subsequent work undertaken by SRLA could assist the preparation of Draft EES Scoping Requirements.