**Foreword**

First proposed in 2000, the Thornlie-Cockburn Link is Perth’s first east-west rail connection and will help link six important strategic centres – the CBD, Burswood Peninsula, Canning City Centre, Canning Vale Strategic Industrial Centre, Jandakot Aviation Hub and Cockburn Central Secondary Centre.

We need to support growing employment centres, and better connect and move people. We also need to help create new opportunities for integrated and liveable communities to meet our infill targets.

That is why we have established METRONET – a new approach which brings transport and land use planning together to work as a team as we design and deliver development intensifying rail infrastructure.

The Thornlie-Cockburn Link is a catalyst for redevelopment in Canning Vale with two new stations at Nicholson Road and Ranford Road and will serve the growing areas between the Armadale and Mandurah lines.

Not only will provide a high-level of service for passengers on day one of operations, it will also help to take pressure off existing stations like Thornlie, Cockburn Central and Murdoch.

This Project Definition Plan is an important step in defining the project scope, which will be delivered in the coming years, creating around 1,600 jobs as the railway is built.

Hon Rita Saffioti MLA
Minister for Transport; Planning and Lands
Project snapshot

14.5 km
passenger rail connecting Thornlie and Cockburn Central stations

11 km
relocation of freight rail lines

3 km
duplication of passenger rail between Beckenham and Thornlie stations

2,350 daily boardings (2031)
26-minute journey to Perth
1,000 parking bays
7 bus stands
10 u-rail and 2 bike shelters
Passenger toilets
Lifts and stairs
Universal access

Nicholson Road Station*

2
new stations
at Nicholson and Ranford roads

2,985 daily boardings (2031)
29-minute journey to Perth
400 parking bays
12 bus stands
10 u-rail and 2 bike shelters
Passenger toilets
Lifts and stairs
Universal access

Ranford Road Station*

New
Pedestrian crossing at Elliot and Cameron streets

Bridge duplication
Canning River Rail

Bridge modifications
Ranford Road and Karel Ave

Modifying Thornlie Station into a through station

Access to Stadium Station

Universal access

*Final details of station features are subject to a detailed design process and may change.
Executive Summary

The Strategic Need
Perth’s population is expected to grow from 2.02 million in 2017 to 3.5 million by 2050 (Perth and Peel @3.5 million).

The Thornlie-Cockburn Link project straddles the boundaries of the Central and South Metropolitan-Peel sub-regions of the greater metropolitan area. Planning frameworks for both sub-regions have now been finalised and seek to:
- achieve more consolidated urban form and development within the sub-regions;
- meet long-term housing requirements;
- strengthen key employment centres, including activity centres and industrial centres to meet the future needs of industry, commerce and the community; and
- provide transport linkages that connect people with key centres of activity and employment.

The South Metropolitan Peel sub-region covers an area of almost 5,000 square kilometres and comprises the cities of Armadale, Cockburn, Gosnells, Kwinana, Mandurah and Rockingham, as well as the shires of Murray, Serpentine-Jarrahdale and Waroona. The sub-region is expected to experience strong population growth from approximately 520,000 people today to over 1.2 million people by 2050. The forecast growth is influenced by, among other things, the provision of relatively affordable housing as well as employment and lifestyle opportunities.

The Project
The transport infrastructure investment includes:
- constructing a new 14.5 kilometre passenger railway from Thornlie to Cockburn Central stations;
- duplicating three kilometres of track between Beckenham and Thornlie stations;
- relocating 11 kilometres of freight lines;
- developing a new station at Nicholson Road complete with station infrastructure, including parking, bus interchanges, passenger amenities, cycling facilities and standard station systems to cater for around 2,350 daily boardings (2031) and offering an approximately 26 minute journey to Perth;
- developing a new station at Ranford Road complete with station infrastructure, including parking, bus interchanges, passenger amenities, cycling facilities and standard station systems to cater for around 1,985 daily boardings (2031) and offering an approximately 29 minute journey to Perth;
- modifying Thornlie Station into a ‘through’ station and building a new platform at Cockburn Central Station;
- duplicating the Canning River Rail Bridge and modifications to Ranford Road Bridge; and
- constructing a footbridge at Elliot Place to replace the pedestrian level crossing.

The new station precincts will be planned for longer term transit-oriented development, providing the catalyst for land use enhancement in adjacent areas to promote liveability, connectivity, increased housing diversity, improved community amenity and local employment opportunities.

The station and supporting facility designs, particularly at Nicholson Road, allows for future pedestrian connections and parking modifications to help integrate with the future land use.
Project Objectives

The Thornlie-Cockburn Link aims to:

- provide an improved transport alternative to private vehicle transport in the South Metropolitan Peel sub-region to increase connectivity of the network;
- address public transport service gaps that exist between the existing rail corridors in the South Metropolitan Peel sub-region; and
- alleviate current and future capacity pressures on the existing rail network and surrounding road network in the South Metropolitan Peel sub-region.

The Thornlie-Cockburn Link is the first initiative in the potential establishment of a longer term orbital rail service for Perth, which would help to improve connectivity to major centres of activity, employment and community services.

While in the short to medium term the station precincts will play an important role as transit hubs, the project will support longer term redevelopment in the area to more intensive employment and urban development around Canning Vale.

The METRONET Office has completed conceptual Thornlie-Cockburn Link Station Precinct planning as part of this PDP to ensure the placement and design of the new transport infrastructure maximises the surrounding area’s potential. These placement and design considerations include:

- locating new stations to provide the best available transport links, via Ranford and Nicholson roads, to the identified service gap areas south and south-east of the new line;
- providing at-grade and grade-separated crossings to connect the stations and wider precincts, allowing safe pedestrian and cycle movement. This is particularly important given the major movement network corridors around both station precincts have the potential to create significant barriers to non-car movement;
- locating bus transfer stations to have the least impact on pedestrian and cycle movement, and designing the bus transfer stations to complement future development; and
- enhancing public transport connectivity to adjoining employment areas in Canning Vale through a higher frequency bus service between the stations.

Delivery Strategies

Transport Infrastructure

The rail infrastructure outlined in this document will be delivered by the Public Transport Authority (PTA). The PTA conducted a detailed procurement option analysis, which recommends the following models to deliver the necessary work and best value for money:

- bundling the main project works for the Thornlie-Cockburn Link and Yanchep Rail Extension, into a single Competitive Alliance contract;
- using individual Design and Construct contracts to procure appropriate enabling and forward works on each site; and
- procuring professional services using standard PTA procurement processes with the option to include additional projects based on performance.

Station precincts

The METRONET Office will continue to work with state agencies, local governments and the private sector to develop planning frameworks around Ranford Road and Nicholson Road stations, which enable the precincts to transition to mixed-use centres over time.

The State Government will consider applying state planning schemes or mechanisms to station precincts to facilitate METRONET outcomes. This would be in the form of an improvement scheme administered by the Western Australian Planning Commission (WAPC) or a redevelopment scheme managed by the State’s land development agency (LandCorp/MRA).

Timing

Procurement for the Thornlie-Cockburn Link is expected to take up to 12 months, with construction beginning in 2019. During the procurement and detailed design stage, the contractor will be requested to optimise their construction methods and strive to achieve the Government’s target completion date in 2021.
1 METRONET Overview

METRONET is the Government’s vision to integrate transport and land use planning in Western Australia and provide a framework to support sustainable growth of greater metropolitan Perth over the next 50 to 100 years.

More than just a rail infrastructure program, METRONET planning goes beyond the station forecourts to shape and support development of communities within the surrounding walkable catchments.

The Thornlie-Cockburn Link (TCL) is one of a series of METRONET projects that will add significant capacity to Perth’s public transport network. Combined, METRONET Stage 1 is proposed to deliver approximately 72 kilometres of new passenger rail and up to 18 new stations, which represents the single largest investment in public transport in Perth’s history (Figure 1).

The following Stage One METRONET projects will create the opportunity to transform Perth through an expanded rail network that will see urban intensification in more than 5,000 hectares of land within METRONET station precincts, supporting delivery of the State’s metropolitan growth strategy Perth and Peel@3.5 million:

- Forrestfield-Airport Link;
- Yanchep Rail Extension;
- Thornlie-Cockburn Link;
- Morley-Ellenbrook Line;
- Byford Rail Extension;
- Karnup Station;
- Midland Station relocation and Bellevue extension;
- Level crossing removal on the Armadale and Midland lines;
- Automatic Train Control; and
- Railcar procurement.

The Forrestfield-Airport Link project is well into construction and on track for scheduled completion in 2020. The Yanchep Rail Extension and Thornlie-Cockburn Link projects are at PDP stage and the remaining projects are in concept development phase.

This PDP has been prepared by the METRONET Office to document the further evaluation and refinement of the preferred option and inform an investment decision.

Figure 1: Proposed METRONET projects
2 Project Overview

Connecting the Thornlie Line to the Mandurah Line at Cockburn Central station will see Perth’s first east-west passenger rail connection.

This important connection not only helps develop an efficient and sustainable metropolitan transport system, it will significantly influence the way people in Perth’s South Metropolitan-Peel Sub Region live and move around the city.

The project will address three problems impacting public transport in the South Metropolitan-Peel Sub Region:

- **PROBLEM 1**: Connectivity of the existing transport system is insufficient to cope with population growth and support employment nodes in the region.
- **PROBLEM 2**: The radial design of the current passenger rail network creates service gaps and reduces system resilience which limits passenger mobility in the region.
- **PROBLEM 3**: Economic and population growth pressures in the South Metropolitan-Peel Sub-region are leading to increased congestion and crowding across the transport system, adversely impacting the productivity of the system.

The Thornlie-Cockburn Link (Figure 2) starts at Beckenham Station with the duplication of three kilometres of passenger rail to Thornlie Station. From there, the line will continue along the southern half of the existing freight rail corridor, with 11 kilometres of freight track relocated to the northern half of the corridor. Stations at Nicholson Road and Ranford Road will cater for commuters living in the identified service gap areas, while strengthening rapid transport access to strategic metropolitan centres such as Cannington and Cockburn Central.

The 14.5-kilometre passenger line will then travel through the existing Glen Iris tunnel and continue to a new dock-style platform at Cockburn Central.

The project will support growth and accessibility across the southern suburbs by providing direct access to employment, education and recreation opportunities. It will also create new opportunities for integrated, liveable communities and improve access to employment in the areas surrounding the stations at Nicholson Road and Ranford Road.

2.1 Planning Context

Planning for the TCL is aligned with the following:

- **Central and South Metropolitan-Peel Sub-Regional Planning Frameworks (2018)** establish planning guidance for the TCL region to 2050. Both frameworks reinforce the importance of the TCL to the sustained growth of both the central and southern metropolitan areas.
- **The South Metropolitan Peel Sub-Regional Planning Framework**
  - identifies the TCL alignment as a ‘Stage 1 METRONET proposal’ with stations at Nicholson Road and Ranford Road;
  - identifies Jandakot Airport as a Specialised Centre supporting employment growth in the region; and
  - shows potential urban expansion and development at Huntingdale and Piara Waters, which will add further pressure on transport service gap areas.
- **The Central Sub-Regional Planning Framework:**
  - identifies South Street-Ranford Road as an urban corridor which could potentially support increased housing density and diversity of land uses;
  - identifies Murdoch as a major Specialised Activity Centre and employment centre for the southern corridor;
  - identifies the Strategic Metropolitan Centre at Cannington and the Secondary Activity Centre at Cockburn Central, which will benefit from enhanced access for regional employment and services through the TCL project.

2.2 Transport Context

The Thornlie-Cockburn Link was first proposed in the South West Metropolitan Railway Master Plan (April 2000). In July 2001, the then State Government announced a major change in the route to follow the alignment of the Kwinana Freeway. However, at this time a spur line from Beckenham Station to Thornlie was constructed and future-proofing included to eventually extend this spur line to connect to the Mandurah Line.

Figure 2: Recommended TCL alignment

**City Shaping Benefits**

- The Thornlie-Cockburn Link is the first initiative in the potential establishment of a longer term orbital rail service for Perth, which would help to improve connectivity to major centres of activity, employment and community services.
- Is a catalyst for redevelopment to more intensive employment and urban development around Cannington.
- Supports the development of Stage 2 of the Murdoch Health and Knowledge Precinct.

**City Serving Benefits**

- Reduces congestion and crowding on the existing transport network and the associated impacts this has on productivity.
- Increases the robustness of Perth’s movement network to help cope with expected population growth in Perth’s South-East.
- Creates the foundation for addressing service gaps through a potential longer term orbital rail link, which will build further system resilience and improve passenger mobility in the ‘middle ring’ suburbs.
- Frees capacity at Thornlie Station, which is currently one of the busiest stations on the Armadale Line, carrying 9.3% of all average weekday boardings.
2.3 The Project

2.3.1 Operations

On day one of services, the Thornlie-Cockburn Link is expected to have approximately 12,225 daily boardings growing to about 17,425 in 2031. To meet peak demand Armadale/Thornlie line services will operate at 12 trains per hour (TPH) - using four-car A Series trains; eight on the Armadale Line and four on the Thornlie Line when services commence. With the Government’s commitment to replace the A-Series with higher-capacity six-car railcars, the same operating patterns could be maintained until 2031 subject to other future investment, including platform lengthening.

Though Thornlie, Nicholson Road, Ranford Road and Cockburn Central stations will have six-car platforms, extending platforms at existing stations along the Armadale Line is outside this project scope, and not required to support initial demand on the Thornlie-Cockburn Link, similar to other works that may be necessary to meet longer term demand on this line.

New and amended bus services will support and complement the rail operations, with 12 new buses to be purchased outside of this project scope to cater for the expanded network. Some bus services will be redirected from Thornlie Station to the new Nicholson Road Station and a new route introduced linking Nicholson Road Station with Meddington Station. Given its location along an existing high-frequency bus corridor, all passing services will be diverted into Ranford Road Station, with a number of services extended to and some lower demand services truncated and terminated at the station.

In the medium-to-longer term, the stations will be a catalyst for change in their immediate vicinity, encouraging the transformation of underutilised urban and industrial land into new transit-oriented precincts.

2.3.2 Asset Investment

Key infrastructure components include:

- **Stations**
  - Nicholson Road – a new railway station and bus interchange with bus passenger transfer, drop-off area, walk on/cycle transfers, approximately 1,000 car parking bays and active mode facilities.
  - Ranford Road – a new railway station and bus interchange with bus passenger transfer, drop-off area, walk on/cycle transfers, approximately 400 parking bays and active mode facilities.
  - Thornlie Station – upgrade and modification of the existing station to allow it to function as a ‘through’ station to Cockburn Central.
  - Cockburn Central Station – extension of the existing island platform to service a third ‘dead end’ line to be added between the existing Mandurah Lines.

- **Railway Infrastructure** – relocating 11 kilometres of freight railway within the rail corridor, 14.5 kilometres of new dual-passenger rail track, plus a three kilometre duplication of the existing Thornlie Spur. The track structure and gauge will be consistent with the existing Thornlie and Mandurah lines.

- **Bridge crossings** – duplicating the Canning River Rail Bridge on the south-east side of the existing bridge, a footbridge to replace the existing pedestrian level crossing between Cameron Street and Elliot Place, modifying the southbound Ranford Road traffic bridge to accommodate the four-track arrangement for TCL, and an additional span for Karel Avenue Bridge to accommodate clearances for two extra passenger lines.

- **Maintenance and support facilities** – additional railcar maintenance and stabling facilities are not required. Additional buses can be stowed at the existing Canning Vale Depot.

- **Principal Shared Paths (PSP)** – new local connections into the existing PSP network to provide suitable access to the stations at Nicholson and Ranford roads.

2.3.3 Non-Asset Investment

Outside of this project scope is non-asset investment in travel demand management (TDM) initiatives, which are designed to optimise patronage of the new rail service and overcome barriers to uptake, such as the low cost of parking, low congestion levels and lower urban density in the TCL catchment area.

2.4 Land Use Integration

Following an integrated transport and land use planning (ITLUP) approach, the METRONET Office has undertaken a preliminary evaluation of all proposed station precincts to identify opportunities for integrated land use development. The evaluation included:

- baseline analysis of existing precinct character and latent development potential;
- identification of future precinct typologies and land use characteristics;
- assessment of market profile and demand for future land uses; and
- prioritisation of station precincts for planning/development intervention.

In the short term the Thornlie-Cockburn Link’s new station precincts at Nicholson Road and Ranford Road stations through the Canning Vale employment area.

Outside of this project scope is non-asset investment in travel demand management (TDM) initiatives, which are designed to optimise patronage of the new rail service and overcome barriers to uptake, such as the low cost of parking, low congestion levels and lower urban density in the TCL catchment area.
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station precinct analysis</td>
<td>A detailed analysis of each precinct using Western Australia's Integrated Land Information Database (ILID) and site verification identified latent land use potential that can be realised through transport infrastructure investment. This analysis will inform the integrated land use plans for each precinct.</td>
</tr>
</tbody>
</table>
| Precincts policy                | To facilitate the proper application of existing policy and address gaps to deliver optimal outcomes, the METRONET Office developed a policy framework to inform planning, design and assessment approaches to integrate transit within precincts. The policy operates on three levels:  
  • Station precinct typologies: a system-wide approach to identifying the long-term role, function and form of stations and precincts. The Station Precinct Typology Framework provides an overview of the expected long-term outcome for each station precinct, covering development intensity, optimal land use mix, urban design considerations, infrastructure investment and operational requirements.  
  • Precinct design: addresses the wider approach to integration of transit within new or existing centres, it details land use, built form, movement network and landscape considerations in advance of the Design WA Precinct Policy being finalised.  
  • Station design: addresses the design of the transit infrastructure and immediate environment within the wider precinct context. |
| Station precinct planning       | In collaboration with local governments, state government planning and land development agencies and private landowners, existing structure plans are being reviewed and new plans developed for METRONET precincts. These plans are being prepared to align with METRONET projects. |
| Economic and market assessment  | To best consider the scale of land development for METRONET projects, SGS Economics & Planning was commissioned to assess the greater Perth land development market to:  
  • model anticipated absorption rates across land use sectors;  
  • identify station precincts that should be targeted for early intervention;  
  • confirm which of the new precincts should be made ‘planning ready’ for market responsive development over time; and  
  • identify likely development staging timeframes. |
| Infrastructure coordination     | The METRONET Office will be working with the WAPC’s Infrastructure Coordinating Committee and the new Infrastructure WA to ensure cross-government coordination and the timely delivery of services to support the staged delivery of METRONET transport infrastructure and station precincts. The State Government’s netVIEW platform is being used to coordinate short, medium and long-term infrastructure requirements. |
| Planning and development certainty | Along with transport infrastructure investment, planning and development certainty is essential to stimulate investment in METRONET station precincts and clarify future land use expectations. To optimise the benefit and return from the METRONET investment in public transport infrastructure, the METRONET Taskforce has confirmed that State intervention may be required to achieve planning and development certainty. The State Government has two legislative models available depending on the level of intervention required:  
  • Redevelopment Areas and Schemes under the Metropolitan Redevelopment Authority Act 2011; and  
  • Improvement Plans and Schemes under the Planning and Development Act 2005.  
  The METRONET Office is reviewing each station precinct to recommend the preferred planning and development model. |
| Early activation                | To deliver early development activity, amenity around new stations and improve passenger comfort and experience, METRONET is developing strategies to provide a focus for local community development and potentially catalysing early private sector investment. The METRONET Office is working with landowners to determine the necessary infrastructure and development pre-conditions that will support the start of station operations. |
3 Strategic Justification

The Thornlie-Cockburn Link supports Western Australia on an economic, metropolitan and regional level, providing:

- **Public transport benefits**
  - Public transport travel time savings – from a reduction in the time spent on public transport journeys.
  - Increase in public transport fare revenue – from new public transport users.
  - Crowding – the project reduces crowding on bus services and on the northern section of the Mandurah Line.
  - Improved amenity – public transport users will make use of new train stations and travel on new railcars, which has an improved amenity over travelling on a bus service accessed via a road side bus stop.
  - Benefit of travel demand management – encouraging more people to use public transport over and above the level that would use the new stations.

- **Road user benefits**
  - Road user travel time savings – from a reduction in the amount of road travel due to the switch towards public transport travel.
  - Reduction in unperceived road vehicle operating costs – the reduction in car travel also has resource cost savings, some of which are unperceived.
  - Road crash cost savings – a reduction in the level of car travel, reduces road crashes.

- **Second round transport benefits** – Over the longer term, by 2031, the project is believed to result in population redistribution towards the new stations, as people choose to live in closer proximity to transport nodes that reduce their travel time. This adds to the public transport and road user benefits.

- **Wider economic benefits**
  - Agglomeration benefits – from productivity benefits of firms being closer to markets
  - Imperfect competition – productivity gains from greater competition, induced through improvement in accessibility.

3.1 Supporting Economic Growth

Perth is strategically located as a key international gateway between Australia, Asia and the Indian Ocean rim. Sharing the same time zone with major international cities including Shanghai, Singapore and Hong Kong provides Perth with a distinct advantage over Australia’s other capital cities, making it an attractive option for foreign investors. Perth contributed approximately $150 billion to the national economy in 2015/16, corresponding to an average GDP per capita of approximately $72,000, roughly four per cent above the Australian average. Between 1991 and 2016, Western Australia increased its Gross State Product, outperforming Australia as a whole in 20 out of these 26 years.

During the mining investment boom from 2002 to 2012, the economy grew significantly through investment activity flowing from outside the State and has seen a corresponding peak in population growth and demand for housing (Figure 4). At the same time there was significant investment in promoting the City’s profile for retaining a globally qualified workforce, highlighted by significant investment in the city centre.

The Thornlie-Cockburn Link core benefit cost ratio is 1.2, increasing to 1.7 including WEBs.

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**Figure 4: Perth’s Population and forecasted population, 1988-2026**

Pre Mining Investment Phase (1999-2001)
- CAGR: 1.5%

Mining Investment Phase (2005-2012)
- CAGR: 2.6%

Mining Production Phase (2013-2016)
- CAGR: 0.9%

Forecast (2017-2036)
- CAGR: 1.8%

Source: Historical data (1988-2016) Australian Bureau of Statistics (2017) Cat No 3218.0 – Regional Population Growth, Australia, 2016, accessed 1/12/2017; Forecasts*: Based on the assumption that Perth will reach 3.5 million people by 2050 as outlined in Perth and the University of Western Australia, November 2017

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METRONET AS A PROGRAM OF PROJECTS

When Perth reaches a population of 3.5 million people, it will continue to be an innovative 21st century city delivering distinctive Western Australian lifestyle choices and global opportunities.

A vibrant, connected and productive Perth will need a transport network to support connected communities and opportunities for business and jobs to grow.

Prosperous: A city that capitalises on technology and innovation to deliver a strong, competitive economy; efficient infrastructure; and an engaged community and will become a destination of choice for skilled migrants and business investment from around the globe.

Liveable: A city with an enviable quality of life characterised by a community which is diverse and inclusive; engaged and creative; safe and healthy.

Connected: A well-serviced, accessible and connected city with strong regional, national and international links. People will be able to move freely around the city via a choice of efficient transport modes.

Sustainable: Perth will responsibly manage its ecological footprint and live within its environmental constraints, while improving our connection with and enjoyment of the natural environment.

Collaborative: Government, business and the community will collaborate to progress the aims and objectives of the city as a whole.

METRONET, as a program of projects, will create the opportunity to transform Perth through an expanded urban rail network to support connected communities and opportunities for business and jobs to grow.

The METRONET program aligns with the strategic objectives of Perth and Peel @3.5 Million and its supporting transport strategy (Figure 5). Each METRONET project supports shaping of Perth into a more compact urban form, while serving the existing structure of the city in a more sustainable and responsible way.

3.3 Supporting Regional Growth

The Thornlie-Cockburn Link area includes a mix of established suburbs, such as Cannington Vale and Thornlie, and developing suburbs such as Southern River, Harrisdale and Piara Waters.

These areas are experiencing significant population growth due to the availability of urban zoned land and continuing demand for affordable land, particularly from young families.

Table 1: Projected population growth in the Thornlie-Cockburn Line area

<table>
<thead>
<tr>
<th>Description</th>
<th>2016 Population</th>
<th>2021 Population</th>
<th>2031 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranford Road and Nicholson</td>
<td>61,632</td>
<td>65,073</td>
<td>65,961</td>
</tr>
<tr>
<td>Road stations</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>core areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wider TCL catchment</td>
<td>139,703</td>
<td>180,011</td>
<td>219,885</td>
</tr>
<tr>
<td>Total</td>
<td>201,335</td>
<td>245,084</td>
<td>285,836</td>
</tr>
</tbody>
</table>

Source: PwC analysis. Department of Planning MUG’s output, April 2017.
3.4 Addressing Transport Service Gaps

In the South Metropolitan–Peel Sub-region, the passenger rail network has two separate lines linking the Perth CBD to Armadale in the south-east and Mandurah in the south-west. Rapid urban growth has resulted in new areas being developed that are physically separated from existing passenger rail corridors, creating public transport ‘service gap areas’ in the region.

These service gap areas cover approximately 81 square kilometres and contain a combined population of 72,730, based on 2016 figures. The population in these areas has grown by 30 per cent since 2011, accounting for around 15 per cent of the total growth of the wider sub-region in the past five years. These areas (Figure 6) include:

- Canning Vale – East;
- Canning Vale – West;
- Forrestdale-Harrisdale;
- Piara Waters; and
- Huntingdale-Southern River.

The Thornlie-Cockburn Link will provide a much need public transport service to these gap areas, improving access for local residents to jobs, services and amenity.

Figure 6: Location of the service gap areas

![Figure 6: Location of the service gap areas](image-url)
4 Route Corridor

The Thornlie-Cockburn Link will follow the existing Thornlie spur line, south of Beckenham through the existing Kenwick Tunnel under Albany Highway and across the Canning River to Thornlie Station. An additional three kilometres of track will be constructed to duplicate the line along the route. No modifications will be required to the Kenwick tunnel, however the Canning River rail bridge will be duplicated for the new passenger railway.

Thornlie Station was designed to accommodate the future Thornlie-Cockburn Link and will be converted into a through station. From here the route will continue in the roughly 30 to 40 metre wide rail corridor running south-west to a proposed station at Nicholson Road. Along this section, the pedestrian level crossing between Cameron Street and Elliot Place will be removed and replaced with a pedestrian footbridge.

From Nicholson Road Station, the track will continue under Ranford Road Bridge to the proposed Ranford Road Station. Finally, the route will continue under Karel Avenue through the Glen Iris Tunnel, which was constructed as part of upgrades to the Kwinana Freeway. The extension will come up between the Mandurah Road Station.

Every opportunity is made to avoid, minimise or rehabilitate as much as possible. Key environmental issues identified for the Thornlie-Cockburn Link include:

- clearing of conservation significant vegetation, including:
  - some areas of Banksia Woodlands of the Swan Coastal Plain;
  - vegetation within Bush Forever areas;
  - black cockatoo habitat;
  - wetlands of the Swan Coastal Plain;
  - disturbance of a contaminated site;
  - localised impacts to neighbouring residential areas from noise and vibration.

METRONET and the PTA will continue to work closely with the Environmental Protection Authority (EPA) and other State and Commonwealth environmental agencies to adequately identify and assess the environmental values of the area and further refine the project’s footprint.

4.2 Environmental Considerations

4.2.1 Regional Setting

The Thornlie-Cockburn Link is located on the Swan Coastal Plain, which is low-lying and mainly woodland with a complex series of seasonal wetlands. The average annual rainfall is in the order of 800mm per year, with most of the rainfall received during the winter months between June and August.

4.2.2 Environmental considerations

State Government takes its environmental obligations very seriously.

METRONET will play a key role in meeting Perth’s future growth by connecting people in a sustainable way by providing an environmentally friendly transport option.

Infrastructure projects require land to build them on, and while every effort is made to construct new transport facilities in established corridors, sometimes this is not practical.

Every opportunity is made to avoid, minimise or rehabilitate as much as possible.

4.2.3 Noise and Vibration

Without appropriate mitigations the Thornlie-Cockburn Link construction and operation is likely to increase noise and vibration impacts for surrounding residents, who already experience some impact from the existing freight railway. For major redevelopments within an existing rail corridor, State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning (2009) (SPP5.4) requires mitigation measures to be considered which take into account the:

- existing transport noise levels;
- likely change in noise emissions resulting from the proposal; and
- nature and scale of the works and the potential for noise amelioration.

An operational noise and vibration assessment was conducted in 2017, and recommended a combination of four-metre high noise walls and anti-vibration ballast matting under both the freight and passenger lines to reduce noise and vibration to the same or a lessor level than the existing situation.

Three community workshops with landowners sharing a boundary with the rail reserve were held in December 2017 to discuss the project’s early recommendations for noise and vibration mitigation, given the need to balance noise mitigation and local amenity impacts. Overall support was received for the recommended mitigation measures. Further consultation will be necessary during the design phase of the project to finalise the design and location of noise walls.

The operational noise and vibration assessment was referred to the OWER for technical review in early 2018. Feedback received was generally supportive of the assessment and its recommendations.

Construction noise and vibration will be required to comply with the Environmental Protection (Noise) Regulations 1997, in order to minimise impacts to the amenity of the community.

4.2.4 Light

Any light overspill which may impact on the surrounding properties due to the project will be assessed during the final detailed design stage to ensure compliance with AS/NZ 1158:2005 – Lighting for Roads and Public Spaces (including car parks) and AS 4282:1997 – Control of the Obtrusive Effects of Outdoor Lighting.

4.3 Heritage Considerations

4.3.1 Aboriginal Heritage

The Department of Aboriginal Affairs (DAA) heritage inquiry database identified one registered Aboriginal heritage site within the project area, located at the Canning River (Site number 3538).

An additional Aboriginal heritage survey identified a potential new heritage site, associated with a small wetland, at Nicholson Road Station. This potential site has been referred to the Department of Planning, Lands and Heritage (DPLH) for investigation.

Whadjuk representatives have given their conditional support for the project, on the grounds that disturbance to Aboriginal heritage sites will be minimal and that the proposed railway extension will have benefits for the general community. Their support is conditional on the following recommendations:

- the requirement to submit a Section 18 application for the Canning River Crossing and Nicholson Road Station (potential wetland site) (completed);
- the submission of a Heritage Information Submission Form to the DPLH in respect of the wetland area at Nicholson Road;
- in view of the possibility of encountering Aboriginal cultural material, Aboriginal monitors should be engaged to be on-site when initial ground disturbance associated with the project works is taking place.

4.3.2 European Heritage

The Heritage Council of Western Australia’s database did not identify any state heritage places located within the project area. The Register of National Estate is a list of heritage places that were protected under the EPBC Act. The register closed in 2007 and listed places are no longer protected under the Act. Three sites listed in this archival register were identified as being potentially impacted by the project footprint:

- Ken Hurst Park and Adjacent Areas (ID 100375);
- 1. Brixton Street and Associated Wetlands (ID 19538); and
- 2. Jandakot Airport Area (ID 18051).

Consideration should be given to reducing any impacts to these sites by the project.
5 Transport Operations and Infrastructure

5.1 Rail Operating Strategy

5.1.1 Day One Service Frequency
Upon opening, the recommended service patterns for the extended Thornlie Line are very similar to those currently operating, so integration of these services is not envisaged to cause timetabling issues.

Morning peak on day one of services will require 12 trains per hour (TPH) – eight on the Armadale Line and four on the TCL – to meet passenger demand. This is based on using existing four-car A-Series trains.

5.1.2 2031 Service Frequency
With retirement of the A-Series trains expected to begin around 2026, the three-car B-Series trains (currently used on the Mandurah and Joondalup lines) will be moved to the Thornlie-Cockburn Link.

The existing signalling capacity on the Thornlie and Armadale lines is approximately 15-16 TPH. Based on PTA’s longer term planning, three-car B-Series trains could meet demand in 2031 with the introduction of Automatic Train Control (ATC).

5.1.3 Rolling Stock Requirements
Three six-car trains are required to reallocate rolling stock within the existing railcar fleet to operate the extended Thornlie Line. These are being delivered under the METRONET Railcar Program.

5.1.4 Rolling Stock Maintenance and Stabling Facilities
It is not envisaged that additional rolling stock maintenance and stabling facilities will be required to support initial operations on the Thornlie-Cockburn Link.

5.2 Bus Operating Strategy

5.2.1 Current Bus Services
Transperth operates an extensive network of feeder bus services in the south-east suburbs with high-service frequencies on some alignments, such as Ranford Road to Murdoch Station and the Murdoch Activity Centre precinct, and direct links to the Cannington activity centre via Nicholson Road.

Bus services currently run between Murdoch Station and either Maddington, Thornlie or Cannington train stations, as well as from Bull Creek Station to Cannington Station.

5.2.1.1 Day One Service Frequency
A comprehensive feeder bus service is integral to the project’s success and new routes will be required to service the new rail stations and support regional travel patterns.

The success of the Joondalup and Mandurah lines demonstrates the effectiveness of the proposed model, with feeder bus routes operating between train stations. Each bus route ‘loops’ between two train stations and formalised bus-train connections are arranged at the train station closest to Perth, as this is the direction in which most passengers travel.

An indicative bus operating strategy has been developed to identify bus rolling stock and service kilometres needed for day one of operations and the ultimate network when development has progressed.

Final service details will be determined 12-18 months before operations begin following detailed planning and community consultation to ensure the bus network best aligns with local development and community needs.
5.3 Infrastructure Requirements

5.3.1 Civil works

Generally, the design has aimed to balance cut and fill quantities whilst maintaining existing freight vertical curves (which are more onerous than the PTA’s), providing for new maintenance access tracks and minimising impact to utility services. The current design only requires around 200m³ of imported fill, but further opportunities to balance cut and fill, and reduce the extent of retention needed should be examined through detailed design development.

Significant cut will be required:

• from the end of Thornlie Station to allow for the extension of the passenger tracks. This cut impacts on the existing Thornlie Station car park, which will require reconfiguration; and
• on the approach to Glen Iris Tunnel, a significant amount of cut will be required along the southern side of the corridor. This will also have an impact on the existing BP Oil and APA (Parmelia) Gas pipelines.

The earthworks design has been developed to stay within the rail corridor using 1:2 batters. Where this was not achievable, retaining walls or soil nailing treatment has been identified to avoid additional property impacts.

5.3.2 Track Alignment

All works to the passenger rail infrastructure will be in compliance with PTA’s Narrow Gauge Code of Practice. All works on Arc infrastructure will be in compliance with Arc’s Narrow Gauge and Standard Gauge Codes of Practice.

Arc Infrastructure’s twin track dual gauge lines, which forms part of the freight network between Forrestfield and Kwinana, is generally positioned centrally in the rail corridor. To accommodate the new twin track electrified PTA lines, Arc Infrastructures track will be relocated to the north side of the corridor with the new passenger services running parallel.

On completion, a boundary fence will separate the two systems (Figure 8 and Figure 9).

At the southern end, on the approach to the Glen Iris Tunnel, the freight lines will continue on their existing alignment beneath the Kwinana Freeway, through to the Cockburn Triangle and onwards to Kwinana/Fremantle.

The new passenger lines will veer south through the existing, but currently unused, Glen Iris Tunnel, and onto dedicated tracks within the Mandurah Line corridor to terminate at a new single track dock-style platform at Cockburn Central Station, constructed specifically for the termination of the Thornlie Line services.

Introducing the TCL also provides an alternative route to the south, which will be extremely beneficial for transporting patrons to and from events at Optus Stadium. The design therefore allows for alterations to the existing Perth Stadium Station to provide a rail connection to the southern suburbs, including platform modifications and supporting track and civil works.

These modifications include stowing five, six-car trains on the down loop, which will provide capacity to serve southbound passengers via the TCL and onto the Mandurah line after special events. The works include modifications to the existing platform and associated track and civil works.

5.3.2.1 Passenger Track

The passenger alignment has been designed for maximum 140km/hr track speeds from Thornlie Station to Glen Iris tunnel. The section from Beckenham to Thornlie Station will retain existing track speeds of 110km/hr with reduced speeds through the tunnel at Glen Iris. The majority of the passenger rail line will be at-grade, similar to the existing location of the freight rail line. The track and associated infrastructure design will be consistent with the existing passenger rail network.

All rail will be 50kg/m rail on concrete sleepers with 200mm of crushed stone ballast, consistent with the existing Mandurah Line Railway, and in line with the requirements of the PTA Codes of Practise.

Slab track used at Kenwick Tunnel, Canning River Bridge and Glen Iris Tunnel will use 60kg/m rail.

5.3.2.2 Crossovers

The design has 11 turnouts in total, with five crossovers and a turnout that allows the dual Thornlie tracks to converge into a single track on approach to the Cockburn Central Station dock-style platform. The five crossovers replace the operational functionality of the existing crossovers and enable trains to transfer between the Thornlie Line and Mandurah Line.

The design also has provision for a future central turn back facility immediately west of the Ranford Road Station platform for resilience.

5.3.2.3 Freight Track

The new alignment allows for 80km/hr track speed over the extent of works impacting the existing freight alignment, extending from west of Spencer Road to east of the Kwinana Freeway.

The alignment at Glen Iris has been designed to tie into the existing freight alignment before the Kwinana Freeway to ensure that it will not have any impact on the freeway bridge structure (Glen Iris Bridge).
5.3.3 Traction Power and Overhead Line Equipment
Western Power feasibility reports identified that there is sufficient capacity in the existing 132kV feeds to Beckenham substation to also feed the new 25MVA transformer. A Power Load Study should be undertaken at the commencement of the next stage of design to validate the High Voltage design.

The OLE equipment for the Armadale, Mandurah and Thornlie Spur Line is 25 kV 50 Hz AC systems and the catenary systems are auto-tensioned (sagged catenary). All of the existing lines adopt a booster transformer system.

New OLE infrastructure for the Thornlie-Cockburn Link will consist of 25 kV 50 Hz AC systems catenary systems in compliance with PTA standards and codes of practice.

5.3.4 Signals and Systems
The signalling system will include three-aspect colour light signals, supplemented with ASTS L1000 automatic train protection, in keeping with the PTA’s current standards and Codes of Practice.

PTA’s existing train control system will be modified to incorporate the extra signalling and systems. Capacity already exists at the PTA Train Control Centre to accommodate the extra control workload.

A digital radio system will support the PTA’s network-wide Radio System Replacement project and will interconnect all new communications, signals and control systems including:

- traction control;
- traction power supervisory control and data acquisition (SCADA);
- station SCADA;
- station services; and
- radio and signals control and indications sites.

Depending on the final project design, modifications may be needed to the existing fire monitoring system to add new sites for remote management.

Railway infrastructure, tunnel, station buildings and structures, systems and services, will be earthed and bonded in accordance with PTA standard to ensure safety and asset protection.

5.3.5 Bridges
There are a number of structure works required as part of the project:

- **Canning River Rail Bridge:** A duplicate bridge will be constructed on the south-east side of the existing bridge.
- **Cameron Street/Elliot Place Footbridge:** The pedestrian level crossing from Cameron Street to Elliot Place will be replaced with an overbridge that will act a shared pedestrian and cycle bridge.
- **Karel Avenue Bridge:** Currently a single span bridge crossing the railway, it forms part of the Karel Avenue duplication project.
- **Nicholson Road Bridge:** This bridge is adjacent to the proposed Nicholson Road station, and is being delivered by Main Roads WA as part of the Karel Avenue duplication project.
- **Ranford Road Bridge:** Ranford Road was widened approximately ten years ago, with the provision of a second two-lane bridge. The existing bridges cannot accommodate the two freight mains, the two passenger mains, future grade-separated pedestrian access to the station, and the station works including future turnback. Therefore both bridges require replacement.

5.3.6 Rail Corridor Access Points
Along the rail corridor, access points will be provided for personnel to:

- undertake regular maintenance activities within the rail corridor; and
- access (and egress) the area in the event of an emergency.

The points will be located no more than every 750 metres. They will either provide vehicle access or pedestrian access via a staircase, with the public able to use the staircases only in the event of an emergency.

A continuous safe walking route has been planned adjacent to the track to connect the staircases and vehicle ramps. A 3.5 metre wide access track for vehicles has also been accommodated at track level on the east side of the rail line for the majority of the line. A 1.5 metre wide walkway will be provided where there is insufficient space to provide a 3.5 metre wide vehicle access track.

5.3.7 Utility Interfaces
As the project is located within an established land corridor that has historically been used by third-party utility providers, the project interfaces with a high number of existing services and utilities.

Initial consultation with utility owners has assisted to assess the impact of the works on their assets, develop concept schemes for relocation or protection, and estimate costs, where applicable.

Protection or relocation of these utilities may be as forward/enabling works, to avoid any impact on the main construction program, as they may require long lead items.

Of the services impacted, the BP Kwinana white oil line and the APA Parmelia Gas Pipeline are the most critical.

Generally, the remainder of the affected services will be protected or relocated out of the railway corridor.

5.3.8 Fencing and Guard Rail/Road Vehicle Safety
Aside from where noise walls are identified, which will block access onto the corridor and act as boundary fencing for many of the affected residential properties, allowance has been made for 1.8 metre high, barbed-wire fencing along the rail alignment, to prevent unauthorised access to the railway infrastructure. Within the station vicinity, appropriate fencing of lower heights will be used.

Palisade fencing will be provided around high-security areas where required.

No fencing will be provided between the Glen Iris tunnel and Cockburn Central Station, where the new railway lines will be incorporated into the existing freeway median. Crash barriers/guard rails will be provided within this section to mitigate conflict between road and rail traffic.
The Thornlie-Cockburn Link includes two new stations, at Nicholson Road and Ranford Road, and modifications to two existing stations, at Thornlie and Cockburn.

The stations will be designed to:
• meet Rail Safety Management Standard AS 4292;
• minimise environmental impacts;
• optimise quality, value for money and benefit to the community;
• provide access, comfort and usability for the public and stakeholders;
• minimise maintenance and life cycle cost; and
• minimise capital costs and contractual risks.

The project provides medium to long-term redevelopment opportunities for both new and existing station precincts.

In the short term, Nicholson Road and Ranford Road station precincts will provide a new public transport interchange for passengers from service gap areas and give workers from the wider metropolitan area better access to the Canning Vale industrial area.

In the medium-to-long term, the stations will be a catalyst for change within the walkable catchment from the station, encouraging the transformation of underutilised urban and industrial land into new transit-oriented precincts featuring:
• a diversity of housing, including medium-to-high density around the stations;
• high-amenity public spaces leading into and around the stations;
• greater diversity of land use at key locations to provide increased amenity and local economic activity, including office, retail, cafes and entertainment;
• pathways and cycleways connecting the stations to surrounding residential and employment areas;
• the transformation of existing industrial areas close to the stations into contemporary, smart, high-amenity and intensive employment zones; and
• the opportunity for local, high-frequency public transport linking Nicholson Road and Ranford Road stations through the Canning Vale employment area to Murdoch Station.
6.1 Nicholson Road Station and Precinct

Nicholson Road Station is located in Canning Vale, presenting opportunities for medium term redevelopment into higher intensity residential and employment uses (10 years) with the surrounding residential neighbourhoods expected to progressively redevelop over the medium-to-long term (10-30 years).

6.1.1 Station Design

The early Nicholson Road Station design work determined the location, scale and general features of the future station. This work detailed how the station will serve passengers on day one of operations, but is future-proofed to accommodate the future growth.

The station will be ‘at-grade’ and integrated with a station entry building on the south of the rail line, with a pedestrian overpass to an island platform. The pedestrian overpass will be designed to enable a future linkage to the north.

The universally accessible station will have:

- **Passenger amenity:** public toilets, public services (such as vending machines), kiosk, passenger ticketing/information, staff amenities, station administration offices, storage/cleaning and operational facilities.
- **Pedestrian/cycle access:** well connected to a principal-shared path west of the station, with two secure bicycle parking shelters, bike u-rails and ability to add two additional secure bicycle parking shelters in the future.
- **Bus interchange:** seven-stands with weather protection, seating and information facilities. The interchange includes three layover bays.
- **Vehicle access:** dedicated passenger drop-off area and approximately 1,000 parking bays.

The station architecture and final design will be developed when a contractor is appointed.
6.1.2 Precinct Opportunities

The State Government has acquired approximately 5.7 hectares of undeveloped land on the north-western corner of Nicholson Road and Yale Road. Planning forecasts indicate demand is likely to grow for major urban development in the catchment area to the south of the Nicholson Road Station Precinct. The METRONET Office has identified medium to long term Nicholson Road Station Precinct development opportunities such as:

- longer term redevelopment of approximately 45 hectares around the Nicholson Road Station, comprising State Government-owned land, the new light industrial area to the immediate west and the Canning Vale Distribution Centre to the north;
- future multi-decked station parking to allow surplus government land to be rationalised and developed in the medium-to-long term;
- increasing density and infill of existing residential areas within one kilometre to the east and south of the station, capitalising on the station’s infrastructure including new pedestrian and cyclist paths; and
- a faster rate of infill development in established surrounding suburban areas, further stimulated by zoning changes under current consideration.

Figure 11: Development opportunities at proposed Nicholson Road Station and Precinct
6.2 Ranford Road Station

Ranford Road Station will serve the Canning Vale industrial area. It will be accessed from a precinct entry road, off the proposed new Jandakot Airport Eastern Link Road to the south-east of the station. Buses will access from the south-west, off Ranford Road, and from the station precinct entry road off the new Eastern Link Road. A signalised intersection at Ranford Road and the Eastern Link road will improve traffic flow around the precinct.

6.2.1 Station Design

The early station design work considered the location, scale and general features of the future station. This work detailed how the station will maximise its locations along on a high-frequency bus route.

Built in a cutting approximately 8.5 metres lower than Ranford Road, the station will include a station entry building and concourse connecting to the island platform.

The universally accessible station will have:

- **Passenger amenity:** public toilets, public services (such as vending machines), kiosk, passenger ticketing/information, staff amenities, station administration offices, storage/cleaning and operational facilities.
- **Pedestrian/cycle access:** well connected to a principal-shared path west of the station, with two secure bicycle parking shelters, bike u-rails and ability to add two additional secure bicycle parking shelters in the future.
- **Bus interchange:** 14-stands with weather protection, seating and information facilities. The interchange includes six layover bays.
- **Vehicle access:** dedicated passenger drop-off area and approximately 400 parking bays.

The station architecture and final design will be developed when a contractor is appointed.

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**Figure 12: Existing conditions at proposed Ranford Road Station and Precinct**
6.2.2 Precinct Opportunities

The station’s varying levels may enable longer-term development to ‘span over’ the rail reserve. However, other site factors, such as the underlying contaminated landfill site and an absence of short-term demand for urban rather than industrial land use, limit short to medium term TOD opportunities in this area.

Long term land development opportunities include:

- future ‘regeneration’ of the 51-hectare Market City site to increase employment intensity and introduce new land uses;
- de-constraining of the City of Canning’s land holdings around the Ranford Road Station site through zoning changes and site remediation to allow for increased land use intensity to the north and west of the station;
- long-term urbanisation of approximately 80 hectares of special rural land to the south-east of the station site which falls within a one kilometre walkable catchment zone; and
- a faster rate of infill development in established surrounding suburban areas.
6.3 Thornlie Station
Thornlie Station opened in 2005 and is currently a terminus station for the Thornlie Line, operated with a single passenger rail track.

The station is surrounded by predominately residential land use, which was developed for lower-density housing (R17.5/20) before the station opened. Since then there has been some increase in nearby zoning up to R60.

6.3.1 Station Design
Thornlie Station was designed and built for future extension allowing the south-west wall to be removed without significant interference to the station structure and operation.

Planned works at Thornlie Station include:

- separating the existing linked marginal platforms and extending their operational length from 100 metres to 150 metres to accommodate up to six-car sets and a ‘through’ rail arrangement;
- introducing a new concourse, vertical circulation infrastructure and associated roof cover between the platforms;
- modifying car parking to accommodate the platform expansion. This will result in about 450 parking bays, which sees 35 less bays. However, it is anticipated some passengers will use the new stations instead;
- removing the existing shared path and installing a new shared path at the northern edge of the modified western car park;
- relocating and replacing existing bicycle parking with a new design that meets PTA standards;
- installing and upgrading station infrastructure, systems, services and amenities to meet current PTA and legislative standards, including new electrical and communications rooms on platforms, public toilets and staff amenities and a new radio tower; and
- replacing the existing Western Power substation at the eastern end of the station to accommodate new station infrastructure and to address non-compliant earthing separation between the substation and Traction Power.

6.3.2 Precinct Opportunities
The City of Gosnells is preparing amendments to the Town Planning Scheme that identifies increased density of R80 to R100 around Thornlie Station.

6.4 Cockburn Central Station Modifications
Cockburn Central Station is an existing station on the Mandurah Line. The station is located within the Kwinana Freeway median, north of the Beeliar Drive intersection, and has pedestrian access to either side of the freeway.

The station caters for bus transfers, parking, drop-off and walk on/cycle passengers.

As part of the project, the existing island platform will be extended to provide an additional dock-style platform to the north of the existing central island platform.

The platform will be extended by 150 metres and will offer at least 50 per cent platform coverage with an on-platform building to house electrical equipment and staff facilities. Associated services will include security and passenger information systems.

6.5 Precinct Delivery Strategy
Transport projects can be planned and delivered in a relatively defined timeframe of approximately five years. However, the associated development and buildout of station precincts can take 30 to 40 years (or longer) to reach target densities. In addition, land uses are impacted by planning, investment and policy factors beyond the investment in transport infrastructure alone.

Wider precinct planning and delivery is outside of this project scope. However, within this context, the METRONET Office will continue to work with key stakeholders, including and local government, along with landowners, who will play a critical role in supporting land use intensification and ensuring the uplift potential of station precincts is realised.
7 Project Cost, Schedule and Delivery

7.1 Transport Infrastructure Cost Estimate
The State Budget allocated $536 million to deliver the Thornlie-Cockburn Link rail infrastructure. This cost estimate was based on the project schedule, developed through the METRONET Office with internal and external input from:

- PTA’s Major Projects Unit, which has expertise in delivering major rail infrastructure projects, and procurement options;
- environmental and legal representatives in ensuring realistic approval timescales are included in the proposed procurement; and
- external specialist consultants to provide constructability and staging recommendations.

The PTA will deliver the rail infrastructure.

7.2 Sources of Funds
State and Federal Governments have a shared interest in strategic infrastructure investment that enhances the productivity and liveability of Australian capital cities.

7.2.1 User Pays
Average annual revenue projections are typically approximately 30 per cent of total rail operating costs. User pays revenue sources are therefore insufficient to offset any capital costs and an operating subsidy will be required as per the existing PTA rail network. Advertising revenue is considered to be limited.

7.2.2 Value Capture
A modest contribution will be sought from landowners who benefit from this transport investment through associated residential and commercial development opportunities near new station precincts. Development contribution plans (DCPs) will be applied on a METRONET program wide basis, through updating of relevant local planning schemes. Alternative implementation pathways are currently being considered, through utilisation of existing planning legislation and powers.

7.2.3 Federal Funding
The Federal Government has allocated capital funding subject to a favourable assessment of the business case by Infrastructure Australia. The METRONET Office has been working collaboratively with the Australian Government’s Department of Infrastructure and Regional Development and Cities (DIRDC) and Infrastructure Australia since April 2017 and will submit final versions of the required documentation in due course.

7.2.4 State Funding
The State Government has allocated capital funding to fund the remaining costs through the normal state budget process. As land values rise around station precincts, State Government will benefit from increased transfer duty, land tax and Metropolitan Region Improvement Tax.

7.3 Procurement Strategy
A two stage procurement options analysis (POA) has identified the following transport infrastructure delivery strategy which provides the best value for money:

- bundling the main project works for the Yanchep Rail Extension with Thornlie-Cockburn Link, into a single Competitive Alliance contract;
- using individual Design and Construct contracts to procure forward works on each site; and
- procuring professional services using standard PTA contract processes with the option to include additional projects based on performance.
8 Implementation Frameworks

The Thornlie-Cockburn Link is a challenging, brownfields development and rigorous management systems are in place to ensure it is delivered efficiently, that risks are successfully managed, and the project’s substantial benefits are realised.

8.1 Project Governance Structure

As a METRONET project, the Thornlie-Cockburn Link planning and delivery will operate in accordance with the METRONET Governance Framework, which is endorsed by Cabinet. The fundamental principle underpinning the METRONET governance structure is decision-making at the appropriate management level.

Once Cabinet approves the project investment, responsibility for delivery of the project transfers to the PTA. The METRONET Office will continue to be responsible for monitoring the project and reporting performance to the METRONET Taskforce.

The State Government’s proposed joint land development agency (combining the MRA and LandCorp) and/or the Western Australian Planning Commission will be responsible for working in collaboration with local government, communities and stakeholders to establish detailed planning frameworks for each station precinct. The PTA will be responsible for constructing the project's transport infrastructure (and integrating it with the surrounding area).

The PTA will be responsible for constructing the project’s transport infrastructure (and integrating it with the land use planning outcomes), as well as project managing the overall project.

Detailed project reporting and issue resolution will be dealt with by the Project Control Group under delegated authority from the agency members. Issues beyond this delegation, or which involve unresolved and/or conflicting objectives, will be referred to the METRONET Taskforce via the SRO (and through the relevant steering committees) for its endorsement and/or recommendation to Government.

8.1.1 METRONET Taskforce

The METRONET Taskforce is responsible for overseeing the planning, design and delivery of the integrated METRONET program of works. As well as monitoring the planning and construction of transport infrastructure and transition to operations, the Taskforce’s role includes monitoring the preparation of precint plans and statutory planning frameworks to guide development around the stations, and the subsequent, progressive development by landowners, developers and nominated delivery agencies across government.

8.1.2 METRONET Project Control Group

The Project Control Group (PCG) provides overall leadership for the project and acts as a cross agency forum to discuss and resolve project issues that are unable to be resolved within the project delegations.

The PCG assesses delivery of the project against the approved cost, time, scope and quality parameters. The PCG also acts as a pathway for escalation, via the SRO, to the METRONET Taskforce (through relevant steering committees), for issues unable to be resolved at this level of governance.

8.1.3 Project Working Groups

A number of Project Working Groups (PWGs) may be established based on discipline or issue to communicate and resolve local issues and assist the project team in delivering the required project outputs. PWGs will be formed, as required, and act as a pathway for escalation to the PCG, via the Project Manager.

8.1.4 Project Assurance

To assure the State Government’s needs are appropriately managed and delivered, the project will be subject to independent review by the WA Department of Finance’s Gateway Review Team. As a minimum, the project will be required to undertake gateway reviews at the following stages:

- readiness for market (completed June 2018);
- tender decision;
- readiness for service; and
- benefits evaluation.

In addition, the METRONET Project Director may initiate independent assessments or ‘deep dives’ to examine project specific issues, as and when required.

8.2 Approvals

To gain the approvals necessary to enable the construction and operation of the Thornlie-Cockburn Link, State and Commonwealth regulatory processes will be followed.

Preliminary consultation has been undertaken with all of the approving agencies during early planning phase. Approval requirements will be reviewed on an ongoing basis, as the scope of the project is refined.

8.2.1 Rail Approvals – Rail Enabling Act

Under current State legislation, railways are required to be made under the authority of a special rail enabling act passed by the Parliament of Western Australia.

The Governor, by Order in Council, is also required to authorise the Public Transport Authority to undertake, construct, or provide railways as a public work, subject to the passage of a special rail enabling act authorising the construction of both the Thornlie-Cockburn Link and Yanchep Rail Extension railways.

Upon enactment and proclamation of the special Act, the PTA will be authorised to commence construction of the Thornlie-Cockburn Link railway.

In addition, the passage of the special rail enabling Act will authorise the PTA to compulsorily acquire and pay compensation for any land required for the Thornlie-Cockburn Link but not acquired by agreement prior to the passing of the special Act.

8.2.2 Environmental Approvals

The following environmental approvals are likely to be required for construction of the railway and railway stations:

- Commonwealth environmental approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
- State environmental approval under the Environmental Protection Act 1986 (EP Act);
- clearing permit may be required under the EP Act to allow clearing of native vegetation. The requirement for a clearing permit is dependent on the outcome of the State environmental approval process, and may apply to any additional laydown or stockpile areas required.
- A fauna relocation permit under the Wildlife Conservation Act 1950 to remove the protected fauna species from the project area;
- works approval and licence under the EP Act, to construct and operate concrete batching plants;
- works approval and licence under the EP Act may be required to store excavated material; and
The assessment process for these approvals is expected to take between six and 12 months and some will be the responsibility of the construction contractor. Consultation with the approving agencies is ongoing.

8.2.3 Planning Approvals – Station and Station Precincts

Construction of the station and supporting infrastructure and facilities will require development approval under the MRS by the WAPC.

Both station precincts require the following planning framework and approvals to enable development to proceed:

- planning scheme preparation and approval setting out planning outcomes, development control and development contribution arrangements;
- precinct plans to identify opportunities for increased densities which could be later mandated through a town planning scheme amendment;
- any required environmental approvals;
- subdivision approval; and
- development approval.

Overall the planning approvals timeframe is expected to take four years.

8.2.4 Section 18 requirements

Approval under the Aboriginal Heritage Act 1972 (AH Act) is required to provide consent to impact land containing registered Aboriginal heritage sites. A Section 18 referral was submitted to the DPLH for the Canning River (Site number 3536 and 3538) and the potential Aboriginal heritage site at Nicholson Road.

The wetland site at Nicholson Road was not considered by DPLH to be a registered site. Ministerial consent was granted to impact the Canning River heritage site subject to the following two conditions on 12 February 2018:

- PTA are to provide a report to the Registrar of Aboriginal Sites within 60 days of the completion of the Purpose, advising whether and to what extent the Purpose has impacted on all or any sites location on the land; and
- Invites in writing, two nominated members from the Whadjuk people native title claim group representatives consulted for ground disturbing works on the land where it intersects within the boundaries of Aboriginal sites ID 3536 (Swan River) and ID 3538 (Canning River).

8.3 Benefits Management

The project’s benefits realisation will be managed by the METRONET Office.

The benefits management process will ensure that outcomes from the project are defined, aligned to transport system objectives and managed through to their achievement or realisation. Benefits management will also provide lessons to ensure continuous improvement in transport system benefit management processes.

8.4 Risk Management

Risks will be managed in line with the METRONET Risk Management Framework, which is aligned with the International Standard ISO 31000 – Risk Management (Figure 16).

A comprehensive risk assessment process was undertaken for the project in accordance with the METRONET Risk Management Framework, PTA’s Risk Management Procedures, Department of Infrastructure and Regional Development (DIRD) and Infrastructure Australia (IA) guidelines.

The Australian Transport Assessment and Planning Guidelines (ATAP) defines benefits management (or realisation) as the process of properly identifying, defining, measuring, evaluating and reporting benefits to determine whether an initiative has achieved its intended outcomes and objectives once it is delivered.

Figure 16: AS/NZS ISO 31000 risk assessment framework
8.5 Issues Management

Issues will be managed in line with the METRONET Issue Management Guidelines.

The guidelines define risk as a past event or risk that has eventuated and impeded the progress of the project, and the project’s ability to deliver the project’s objectives. An issue can occur where a risk has been realised, or a concern arises that impedes the immediate progress of a project. If an existing risk is realised, it will be managed via the METRONET issue management process.

As part of the issues management process, issues have been rated and assigned to appropriate owners according to the discipline area. Issue owners will be responsible for identifying resolution strategies and tracking progress towards resolving the issue.

To ensure adequate oversight and visibility, issues will be escalated to the appropriate level of governance according to their rating.

8.6 Digital Engineering

Recognising the benefits of digital engineering for large-scale complex infrastructure projects, digital engineering will be applied to the project.

This will create models, data and documentation that will build over the life of a project to capture the knowledge related to the project over its lifetime – efficiently procure, operate and maximise the value of the rail asset.

8.7 Communications and Engagement

METRONET projects create benefits for the communities in which they are built, which is why key stakeholders are identified and engaged early in the planning phase to develop mutual understanding of the project objectives.

A Thornlie-Cockburn Link Communications and Stakeholder Engagement Plan has been developed to:

- build relationships with key stakeholders and foster support for the project by involving stakeholders, where possible, in developing the design and construction impacts;
- communicate the project vision and benefits to allow for a greater understanding of the alignment, station locations and why the line is being extended;
- identify stakeholder and community perceptions of potential risks/impacts/issues associated with the project and use this information to inform project planning;
- establish opportunities for two-way feedback during design and construction to maximise project outcomes by obtaining local knowledge and expertise; and
- provide regular information when and how stakeholders wish to receive it.

The successful implementation of this plan will involve:

- Working together – developing an internal communications plan to provide direction to the project team on branding, development and performance, internal communication, partner communication and industry communication.
- Working with the community – applying the guiding principles to work effectively with communities to minimise impacts, maximise project benefits and deliver value for money for Government and its customers.
- Working with the contractor – understanding roles and responsibilities and aligning the project’s community and stakeholder management implementation, at both the program and project levels, with the PTA’s key messages, branding and protocols.
- Managing risk – taking a risk-management approach to the development of tailored community engagement and communications plans for each project phase which addresses risks and opportunities and manages stakeholder priorities.
MORE INFORMATION

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